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Journal of Glenn T. Seaborg-Press Clippings

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Publication Date

1989-12-01

PUB-625
Appendix
December 1989

JOURNAL OF

GLENN T. SEABORG

Chairman, U.S. Atomic Energy Commission, 1961 - 1971

Press Clippings

Lawrence Berkeley Laboratory
University of California

Prepared for the U.S. Department of Energy under Contract DE-AC03-76SF00098

PUB-625

JOURNAL
OF
GLENN T. SEABORG

Chairman of the U.S. Atomic Energy Commission

1961 - 1971

PRESS CLIPPINGS

This work was supported by the U.S. Department of Energy
under Contract DE-AC03-76SF00098

This book contains a very limited sampling of press clippings from my tenure as Chairman of the Atomic Energy Commission (1961-1971). A more complete collection of these has been deposited with the Manuscript Division of the Library of Congress. This serves as an appendix to the *Journal of Glenn T. Seaborg, Chairman of the Atomic Energy Commission, 1961-1971,* which has been printed by the Lawrence Berkeley Laboratory in 25 volumes. Copies of this 25-volume daily journal have been deposited at the Lawrence Berkeley Laboratory, the Bancroft Library of the University of California at Berkeley, the University of California at Los Angeles Main Library, the University of California at Santa Barbara, the National Archives, the Library of Congress, and the presidential libraries of Kennedy, Johnson and Nixon.

Glenn T. Seaborg

Glenn T. Seaborg
December 1989
Berkeley, CA

BERKELEY GAZETTE, January 14, 1961

UC's Seaborg Held Top Choice for AEC Chairman

1-14-61
Berkeley Gazette

Scientist Declines Comment

Dr. Glenn T. Seaborg, chancellor of the University of University of California here and a Nobel Prize-winning chemist, refused any comment today over a report he's a leading contender for the post of chairman of the Atomic Energy Commission.

Reached at his Lafayette home early today, Dr. Seaborg, 49, refused to say whether the chairmanship offer had been made, if he'd accept it, or if he was planning a conference with UC President Clark Kerr.

"I'm sorry," he said, "but I cannot make any comment at this time."

FILES TO NYC

He flies to New York City tomorrow for a regular monthly meeting of the President's Scientific Advisory Committee.

Both the Washington Post and the New York Times reported that Dr. Seaborg was under serious consideration for chairman of the AEC.

The Times quoted congressional sources as saying Seaborg had been offered a position on the AEC by the incoming Democratic administration.

The chancellor was awarded the Nobel Prize in chemistry, with Dr. W. M. McMillan, in 1951, after an impressive list of discoveries of elements and isotopes in the nuclear energy field.

RESEARCH

Much of his research has been concentrated in nuclear chemistry, physics and artificial radioactivity.

He began his research in these fields in 1937 at the University here. Later he became a professor in the chemistry department, director of nuclear chemical research, associate director of the radiation laboratory and chancellor two years ago.

The AEC which he conceivably could head in the near future controls all U.S. atomic energy for the common good and national defense.

Kennedy Selects Seaborg to Be Chairman of AEC

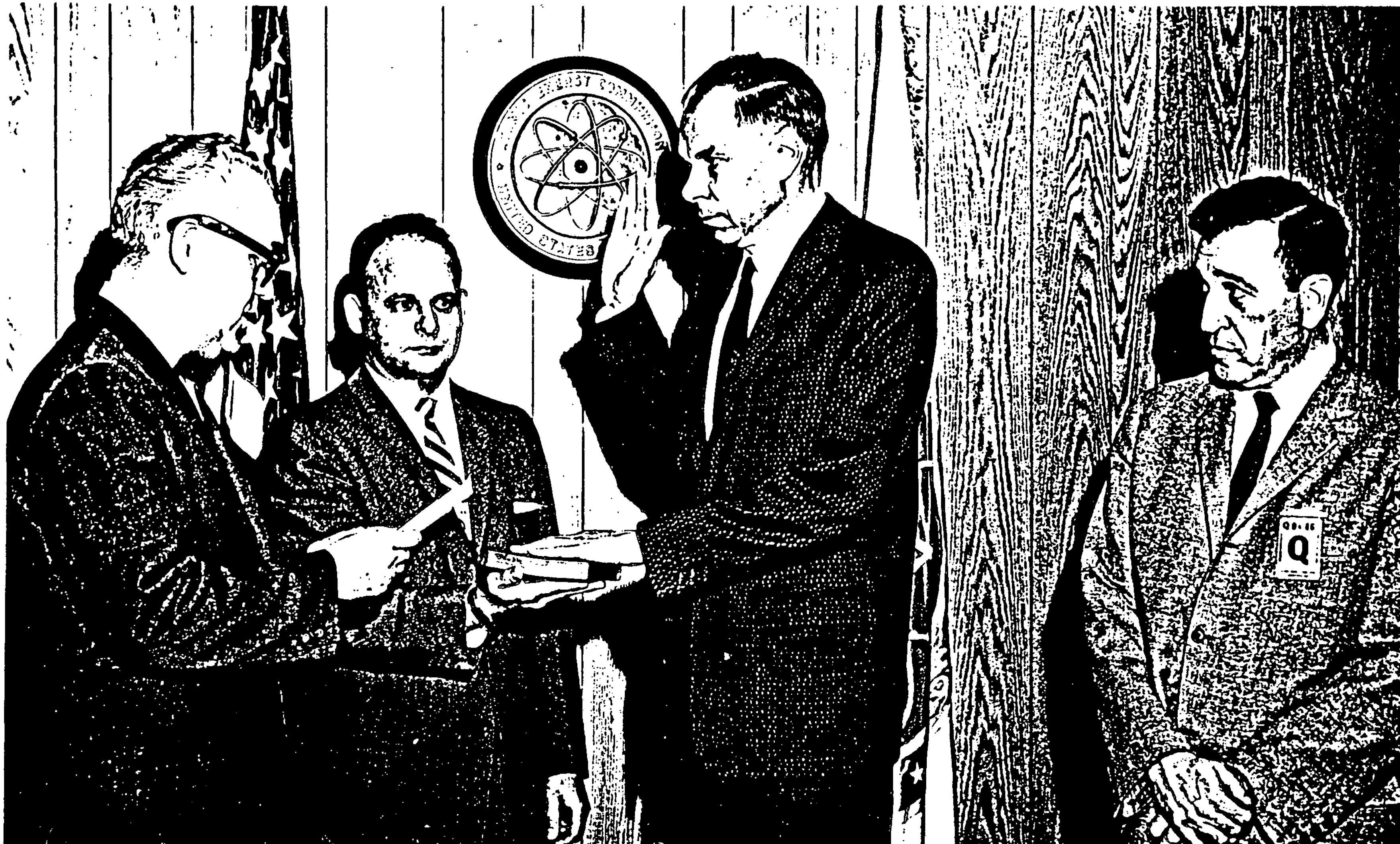
The Weather

Today—Some sunshine and warmer, high in the mid 40s. Tonight—Low about 30. Wednesday—Partly cloudy and milder, turning cold at night. Monday's temperatures: High, 36 at 5 p. m.; low, 33 at 9 a. m. Details, on B3.

The Washington Post FINAL

Times Herald

84th Year ···· No. 43 Phone RE. 7-1234 Copyright, 1961, The Washington Post Co. TUESDAY, JANUARY 17, 1961 WTOP Radio (1500), TV (Ch. 9) TEN CENTS



TUESDAY, JANUARY 17, 1961
NEW YORK TIMES INTERNATIONAL EDITION

Kennedy Names Seaborg As Chairman of A.E.C.

Nobel Laureate Heads Berkeley Campus of University of California—Trip to New York Set for President-elect

By W. H. LAWRENCE
Special to The New York Times

PALM BEACH, Fla., Jan. 16—Dr. Glenn T. Seaborg, Nobel prize-winning chemist, today was designated by President-elect John F. Kennedy to be chairman of the Atomic Energy Commission.

Dr. Seaborg, now Chancellor of the University of California at Berkeley, will succeed John A. McCone, a Los Angeles business man.

The Seaborg appointment, forecast in advance, was one of several made by Mr. Kennedy as he prepared to end his pre-inaugural Florida holiday tomorrow to fly back to Washington.

Dr. Seaborg, now 48, won the Nobel Prize in 1951 for the synthese of trans-uranium elements, and eight years later won the $50,000 Enrico Fermi award.

Has Special Peeve

BERKELEY, Calif., Jan. 16 (AP)—Dr. Seaborg has a particular peeve increasingly shared by many top men in science.

"The popular notion that scientists are a strange, impractical breed couldn't be more wrong," he says.

"What we have to do is improve our educational system to the point where people place more value on scientists," he says. "Instead of being denounced as eggheads, scientists should be looked up to for their intellectual achievements. One of the major faults in our society today is that we tend to equate money with merit."

Dr. Seaborg is not the layman's idea of an ivory tower scientist. He is gregarious, lanky, even rugged. He has mastered golf and half a dozen other sports as much as he has the art of getting along with people.

At 39, Dr. Seaborg had already won the Nobel Prize in chemistry. He and Dr. Edwin M. McMillan were recognized jointly in 1951 for giving the world the important fissionable isotopes of uranium 233 and plutonium 239

DR. GLENN T. SEABORG
Choice for AEC Chairman

Seaborg Named AEC Chief

Appointment of University of California Chancellor Glenn T. Seaborg as chairman of the Atomic Energy Commission today filled out one of the last top-level positions in the administration of President-elect John F. Kennedy.

Seaborg, the 48-year-old Nobel Prize winner in chemistry, was

More About Seaborg, Page 6

named by the President-elect to succeed John A. McCone, a Republican businessman, as chief of the nation's civilian and military atomic energy efforts.

"I feel it is a great honor to be asked by Mr. Kennedy to serve my government and country in this very important position," Dr. Seaborg said today in New York. "My only hope is that I can be successful in meeting my great responsibility."

The AEC chairman will direct the United States atomic program and will work toward international control of nuclear weapons.

Dr. Seaborg's appointment will restore a scientist to the commission, under a tradition adopted several years ago. No scientist has served on the five-man commission since the resignation of John H. Williams last May.

Dr. Seaborg, a registered Democrat, was believed to have had the strong support of Representative Chet Holifield, California Democrat, chairman of the Senate-House Atomic Energy Committee. The commission will be comprised of two members of each major party with one vacancy remaining to be filled.

McCone, the retiring AEC chairman, will become a director of the First-America Corp. on Jan. 31.

As director of the $2.7 billion program of atomic research and development, Seaborg will receive $22,500 a year.

CONFAB WITH JFK

Seaborg is expected to confer with the President-elect on nominations for the vacant fifth post of the AEC. Kennedy has given no indication when he will fill the position.

Colleagues report that Seaborg is convinced of the need for pushing serious negotiations with the Soviet Union to reach agreement on atomic test controls.

Seaborg has been reported as undecided whether he will submit his resignation to UC President Clark Kerr or request a leave of absence from the University.

The new AEC chairman worked his way through UCLA, receiving a Phi Beta Kappa key in his junior year, and was awarded his Ph.D. from the Berkeley campus in 1937.

In 1940, Dr. Seaborg discovered plutonium, the first in a series of transuranium discoveries that led to his winning the Nobel Prize in 1951 for work in the nuclear field.

Seaborg became UC chancellor in 1958. He lives with his wife and six children in Lafayette.

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SAN FRANCISCO SUNDAY CHRONICLE, Jan. 22, 1961

Be ore the Wh rlwind

— By Ken McLaughlin

GLENN SEABORG AND DAUGHTER DIANNE
Six children, two turtles are Washington bound

(Continued)
San Francisco Chronicle, 1/22/62

AEC Challenge Ahead

Seaborg at Home— Atoms and Skates

By David Perlman, Chronicle Science Writer

Glenn T. Seaborg returned to California from Washington yesterday—his mind and his briefcase burdened by problems at two extremes of a spectrum.

There were the problems posed by his new appointment as Chairman of the Atomic Energy Commission; the profound questions of nuclear weapons testing, atomic power, and management of one of the world's largest scientific establishments.

There were also the intimate problems of home: moving a family with six children, two turtles, a hamster, a dog, and a gopher snake all to Washington.

In the midst of all this Glenn Theodore Seaborg, aged 48, managed even to relax.

He flew home by jet at noon. An hour later he was fixing a busted roller skate for his son Eric, 6, with the wry comment that "these things always wait for dad to put together." A few minutes later. Even-Flo bottle in hand, he was soothing daughter Dianne, aged 14 months, to sleep on his lap.

And a moment later he was speaking to his wife, Helen—already with a touch of homesickness—about his enforced plan to spend a lonely winter in a Washington apartment until the family can join him when school lets out next June.

The rest of the family—self-possessed Peter, 14; attractive Lynne, 13; and the roistering middle boys, David, 11, and Stephen, 9—compressed time confusingly yesterday. Alive with plans for the week end at one instant, at another they were sobered by the thought of abandoning their comfortable Lafayette home, their friends and their neighbors.

DECISION

The homecoming ended a hectic week for Seaborg, the Nobel Laureate, nuclear chemist and Chancellor of the University of California at Berkeley.

He had been in the East, aware he was under consideration for the top post in the powerful AEC. He had not even met John F. Kennedy when he was called upon to decide. He said "yes," and plunged into work. He had already wound up meetings of the National Science Foundation's governing board, and of President Eisenhower's Science Advisory Committee.

There followed a meeting with the new President, a meeting with the President's staff, and a long, arduous session with John A. McCone, the Republican businessman whom Seaborg succeeds as AEC chairman. There was the Inauguration, with Seaborg now a top-ranking participant; and the Inaugural Ball, in a crush of 10,000 at the Washington Armory until 3 a. m.

SCHOOL AFFAIRS

This week end is the last respite of family and peace that Seaborg will have for some time. From now on it's a week or two to clean up the affairs of a university Chancellor, then back to Washington alone for the big problems.

Those problems will be met by a big man—physically and intellectually. Six feet three, Seaborg has been working hard since he was a kid delivering papers and picking apricots. His physical energy is matched only by the energy of his mind, which has always quested for knowledge on the frontiers of science, and which has been increasingly concerned these recent years with the immensely difficult task of educating a democratic citizenry to live in the age of the atom.

"Now I'm facing a really big challenge," Seaborg said yesterday with the typical smile that creases his dark, jut-browed face so frequently.

"The Chairman of the Atomic Energy Commission"—and Seaborg uses the full title as if it were a symbol of high responsibility that takes getting used to—"will have to offer really sound advice to the President on really important questions.

"The question of nuclear disarmament and weapons testing negotiations: these are so complex, so much more complex than most people realize.

"The question of public and private nuclear power development—here's another complex area. The cost of atomic power is coming down; it's a matter of engineering games and tricks now to make the peaceful atom competitive with other sources of electricity. What role should the Government play? And private industry?"

Seaborg offers no answers publicly—not yet. They will come perhaps when the Senate questions him prior to his confirmation.

SPREAD

But it is known that Seaborg, like Mr. Kennedy, is concerned about "the steady spread of the deadly atom" and the "uncertain balance of terror," as the new President phrased the problem in his inaugural address. To Seaborg the speech was magnificent.

Seaborg, it is certain, can be counted on to work in harmony with men like John McCloy, the President's new disarmament specialist, in seeking an intensive new approach to atomic negotiations with the Soviets. It is certain he will try to resolve constructively the complex questions of atomic test detection and weapons control.

His management of the AEC, with its $8 billion in plant and equipment, its 105,000 workers, and its $3 billion budget, will tax his abilities as an administrator.

His advice to the President, on the atom in war and peace, will measure his statesmanship.

S.F. Examiner—Sec. I 3
Sunday, Jan. 22, 1961 ★ CCCC★

DR. GLENN T. SEABORG HOME WITH FAMILY FOR SHORT VISIT BEFORE ASSUMING AEC CHAIRMANSHIP
. . . l. to r., Stephen, 9; Lynne, 13; Eric, 6; Dr. Seaborg holding Dianne, 1; Mrs. Seaborg, Peter, 14, and David, 11

The San Francisco Examiner, January 22, 1961

The Seaborg Clan---Off to D.C.

By JUNE MULLER

Like many another husband and father, Dr. Glenn T. Seaborg finds his family unenthusiastic about moving to a new job in a new town.

Seaborg leaves for Washington within two weeks to become chairman of the Atomic Energy Commission.

But his family doesn't want to go.

His wife, Helen, 43, and some of his six children made that plain yesterday.

BACK AGAIN

Seaborg returned to his Lafayette home after a week in New York and Washington that saw him appointed to the high position and twirling at the Inaugural Ball — three times around the floor with somebody's daughter.

You would think he had come home after eight hours at the office—the University of California, where he was chancellor.

He was greeted with reserved delight, but not effusiveness. Even his son, Peter, 14, dragged himself out of bed, where he was recovering from a cold.

Mrs. Seaborg and the children, Peter, Lynne, 13; David, 11; Stephen, 9; Eric, 6, and Dianne, 1, find it difficult to pull up the roots they put down when they built their modern redwood home in Lafayette.

FOR 10 YEARS

"We've been here 10 years," Mrs. Seaborg said. "We have kind of deep roots. We haven't had time to make plans but I will stay here with the children until school is out. Then we will rent our home."

She didn't look happy about it.

"The only thing mother could say when she heard the news," said daughter Lynne, "was 'all that packing and moving.' I have mixed feelings about it. I don't like the weather in Washington. And I'll have to give up all my friends."

Rangy Peter had the same opinion.

NICE PLACE

"Washington," he said, "is a nice place to move to if you have to move any place, but I don't like to leave here. It's a lot better that we don't have to move in the middle of the school year."

Even David is reluctant to go.

"I'd like to take a vacation in Washington," he said, "but I wouldn't like to live there permanently."

Mrs. Seaborg had difficulty describing her feelings when she learned that her Nobel Prize winning husband had been appointed to such a position of trust.

"I was very excited," she said thoughtfully. "But, like the children, I enjoy it here and the thought of leaving . . ."

One of the main concerns of the children is what will happen to their pets—only two of which are named—Cricket the dog, Squeeky the hamster, the gopher snake and the two tortoises.

"I don't know what father says, but I know what the kids say," Mrs. Seaborg remarked with a gentle smile.

"Take 'em," Stephen piped up.

The beetle-browed Seaborg showed his first sign of animation.

"We'll take them," he said. "They'll probably have one in each pocket. And David will probably ask some lady to hold his snake for him."

Seaborg, who received the AEC's $50,000 Enrico Fermi award for his work in nuclear chemistry in 1959, had only a brief comment on his new job, to which he was appointed by President Kennedy.

"It is a great challenge," he said. "Certainly the problems include the development of economic nuclear power and overseeing all of the wide range of research projects the commission carries on.

"First I must get familiar with the job. Any plans will have to wait until I become acquainted with the present status of all the manifold affairs the AEC is engaged in.

"But the hardest part will be leaving my family, living alone for awhile."

He gave his family a tender smile.

They smiled back.

Newsweek

THE MAGAZINE OF NEWS SIGNIFICANCE

January 30, 1961

SPACE AND THE ATOM

ADMINISTRATION:

Boss of the Atom

To command one of the most crucial outposts on the New Frontier, President Kennedy last week called upon Glenn T. Seaborg, 48, to head the Atomic Energy Commission, a vast enterprise that spends $2.6 billion a year and numbers 122,000 government and contractor employes on its payrolls. On the face of it, it would be hard to find a man better trained for the job. As a scientist* and chancellor of the influential University of California at Berkeley since 1958, Seaborg has been dealing with tiny atoms and big organizations most of his adult life.

The tall, gregarious physicist, who was educated at UCLA, has already had one taste of Washington politics. Between 1946 and 1950, he served as a member of the AEC. When his term was over, Seaborg returned to the Berkeley campus and his lab, working primarily on the development of artificial elements until the school made him chancellor.

A confirmed sports lover, Seaborg builds up as much enthusiasm on the golf course as in his lab. This passion has made him the hero of the neighborhood kids in his home town of Lafayette. He has converted the big lot alongside his house into a playground, laying out a baseball diamond and tennis and basketball courts for the benefit of all comers, often joining in the games himself.

Typically, he was voicing worries over his own children last week, in between conferences. "I'm here for a series of meetings," he said, "then I'll dash home for a couple of weeks, pack up a few things, then return. I've got six children, five in school, and you can't move them just like that. It's a real problem in logistics."

In his new post, Seaborg will be faced with many delicate and difficult questions.

▶**Test Suspension:** For the moment, the U.S. is continuing its moratorium on nuclear blasts, despite failure to reach a test-ban agreement with Russia. Should the U.S. suspend testing indefinitely, risking the possibility of Soviet advances in surreptitious underground tests? Or should the country resume its own weapons tests and diminish the possible chances of a U.S.-Soviet arms-control agreement?

▶**Power:** The dreams for competitive nuclear power, so bright a decade ago, have failed to materialize. The outgoing Administration earmarked $250 million for development of civilian power reactors in its last budget, but there's increasing sentiment for a new approach, trying out new types of smaller, less costly reactors which industry could expand into big plants later on.

▶**Nuclear Safety:** The commission has come under fire for setting safety rules for its own projects. These deal with handling civilian power reactors, "hot" isotopes, and radioactive wastes. Seaborg will have to walk a narrow line to satisfy safety demands and still leave AEC with enough room to conduct its work.

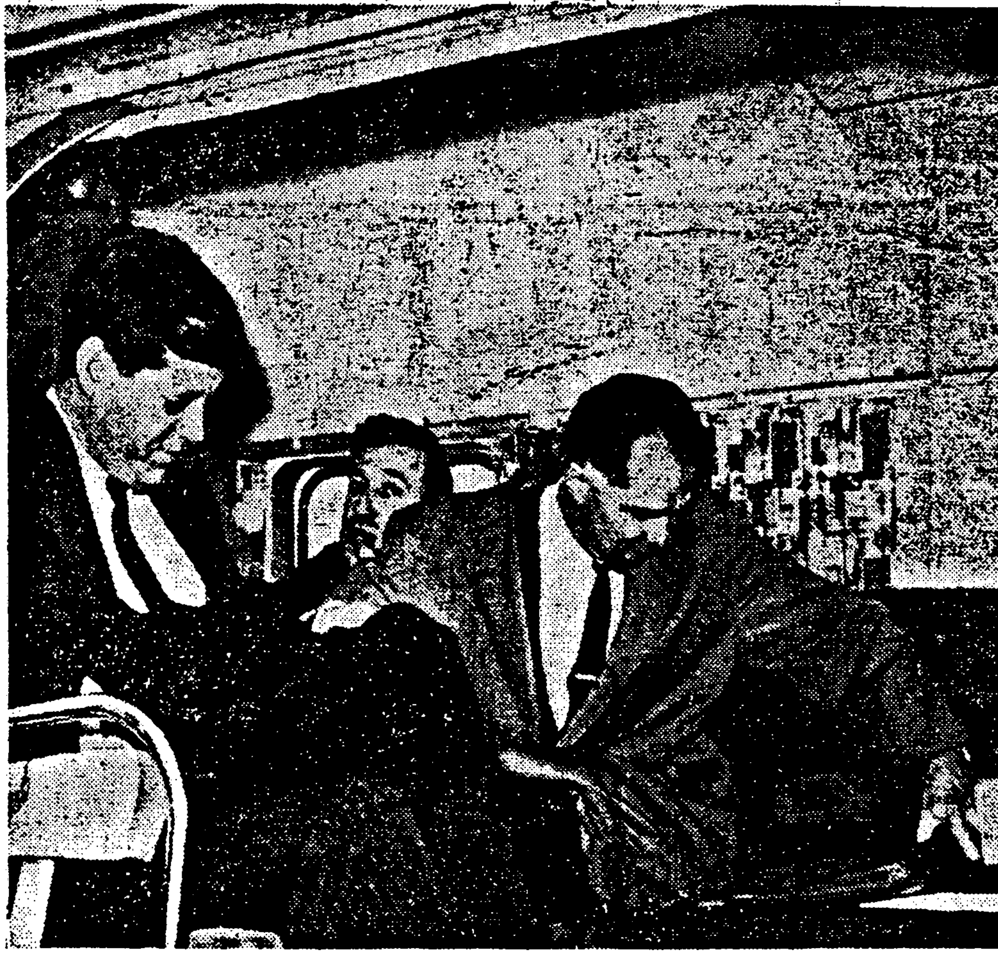
▶**Propulsion:** The costly push to provide atomic power for planes and ships hasn't paid off, despite the resounding success with submarines. Seaborg will have to revamp these programs, perhaps diverting more funds to the Rover nuclear space rocket.

▶**Atoms for Peace:** Ike's program to promote international interest in the nonmilitary aspects of nuclear energy has bogged down. What's more, news that Israel is building a reactor of its own to make weapons-grade plutonium has soured a number of congressmen on the whole idea of helping other nations develop their own nuclear technology.

Despite the program's lackluster history, however, Seaborg still has hopes for it: "I believe that in time—not right away—the peaceful uses of atomic energy will mean a great deal to the average person. Many of the benefits of the atom probably have not even been thought of yet."

THE NEW YORK TIMES, FRIDAY, FEBRUARY 17, 1961

Kennedy Pays a Visit to A. E. C. Headquarters



Associated Press Wirephoto

President Kennedy in helicopter yesterday as it prepared to take off on flight from Germantown, Md., to White House. With him are Dr. Glenn T. Seaborg, right, his nominee as chairman of Atomic Energy Commission, and Dr. Jerome B. Wiesner, science adviser

WASHINGTON, Feb. 16 (AP) — President Kennedy spent three hours today inspecting headquarters of the Atomic Energy Commission at near-by Germantown, Md. Top agency officials briefed him on commission activities.

Mr. Kennedy made the trip both ways by helicopter. He took off and landed from the south lawn of the White House, leaving at 9:14 A. M. and returning at 12:46 P. M.

There was no public announcement of his plans. He was accompanied by Dr. Glenn T. Seaborg, chairman-designate of the agency; Dr. Jerome B. Wiesner, his special assistant for scientific matters; McGeorge Bundy, special assistant for international security affairs, and Brig. Gen. Chester V. Clifton, his military aide.

The tour was Mr. Kennedy's second to major Government installations in the area. He had made a similar visit to headquarters of the Central Intelligence Agency at Langley, Va.

Just before leaving the White House, Mr. Kennedy received Jacques Piccard, explorer of the ocean depths, who called to present a copy of his book "Seven Miles Down."

Meanwhile, the President offered his residence in Georgetown for sale again. The three-story red brick home was put on the market soon after his election, then withdrawn. Mr. Kennedy is negotiating again to sell it.

ST. LOUIS POST DISPATCH, December 21, 1961

Nominee Testifying

St. Louis Post-Dispatch 12-21-61

—UPI Telephoto

GLENN T. SEABORG testifying yesterday before Joint Congressional Committee on Atomic Energy whose Senate members approved unanimously his nomination to be chairman of the Atomic Energy Commission. In background is SENATOR THOMAS H. KUCHEL of California.

COMMITTEE OK'S SEABORG ON AEC, NEW FIGHT BREWS

Democrats Say Budget for Construction of Atomic Power Plants Is Too Low.

© New York Times News Service

WASHINGTON, Feb. 24.—Dr. Glenn T. Seaborg won congressional committee approval yesterday as chairman of the Atomic Energy Commission and found himself involved, even before taking office, in a new congressional controversy over the atomic power program.

The Senate members of the Joint Congressional Committee on Atomic Energy gave their unanimous approval to President Kennedy's nomination of Seaborg, former chancellor of the University of California at Berkeley and a Nobel prize winning chemist. Behind the scenes, however, the new Democratic leadership of the committee was beginning to disagree with Seaborg and the Administration—over an extended program for development of atomic power plants.

Representative Chet Holifield of California, the new chairman, has told Seaborg and President Kennedy that the planned budget for construction of atomic plants is too low.

Favors Partnership.

The key issue is whether private industry or the Government should bear the primary responsibility for developing and building atomic power plants.

Seaborg appeared yesterday to have indorsed the Eisenhower Administration policy by saying he favors a partnership approach between industry and government. He said, however, that he would not object to the Government building plants if industry was unwilling to undertake a project, another policy of the Eisenhower Administration.

In his natural resources message to Congress yesterday, Mr. Kennedy said an effort to develop "economically competitive nuclear power" will be encouraged through research, development, and construction "by the Atomic Energy Commission in co-operation with industry."

Senior democrats on the co[illegible]mittee were understood to ha[illegible] been distressed to learn recent[illegible] that the administration appare[illegible]ly will recommend, and perhap[illegible] [illegible]n cut, the budget drafted in [illegible] final days of the Eisenhower [illegible]ministration for the so-called power demonstration program, under which the commission assists utilities to build atomic reactors. The budget provided only $15,000,000 of Government assistance. Further, the budget provided for no new starts on atomic projects.

In a private meeting with Seaborg last week, Holifield is said to have termed the administration's atomic power budget completely inadequate and declined to introduce the necessary authorization bill. Holifield furthe[illegible] expressed his displeasure direc[illegible]ly to the President at a Whit[illegible] House meeting Wednesday.

NEW YORK TIMES, February 24, 1961

ATOM POWER FIGHT SHAPING UP AGAIN

Kennedy Budget for Plants Irks Holifield—Seaborg Nomination Advances

By JOHN W. FINNEY

Special to The New York Times.

WASHINGTON, Feb. 23—Dr. Glenn T. Seaborg won committee approval today as chairman of the Atomic Energy Commission.

The Senate members of the Joint Congressional Committee on Atomic Energy gave their unanimous approval to President Kennedy's nomination of Dr. Seaborg, former Chancellor of the University of California at Berkeley and a Nobel Prize chemist.

Behind the scenes, however, Democratic leaders of the Congressional committee were beginning to joust with Dr. Seaborg and the Kennedy Administration.

Representative Chet Holifield of California, chairman of the committee, has expressed displeasure to Dr. Seaborg and President Kennedy over the planned budget for construction of atomic power plants.

Old Issue Re-emerges

Once again the key issue that is emerging is whether private industry or the Government should bear primary responsibility for developing and building such plants. The Eisenhower Administration supported a cooperative program, with the Government furnishing research and development assistance to utilities.

Dr. Seaborg appeared today to have endorsed the Eisenhower policy. He said that he favored a "partnership" approach between industry and Government. He said, however, that he would not object to the Government's building large developmental plants if industry was unwilling to undertake a project. This was also the policy of the Eisenhower Administration. Dr. Seaborg also suggested that "some kind of a new approach might be required.

The Kennedy Administration seems to be adopting an atomic power policy differing little from the Eisenhower Administration's. In his natural resources message to Congress today, Mr. Kennedy presented the following policy for development of atomic power:

"Our efforts to achieve economically competitive nuclear power before the end of this decade in areas where fossil fuel costs are high will be encouraged through basic research, engineering development and construction of various prototypes and full scale reactors by the Atomic Energy Commission in cooperation with industry."

Some Democrats Upset

Senior Democrats on the Congressional committee were understood to have been distressed when they discovered recently that the Kennedy Administration was apparently intent on recommending, and perhaps even cutting, the budget drafted during the final days of the Eisenhower Administration for the industry-Government power demonstration program. This budget provided $15,000,000 of Government assistance—in contrast to $178,400,000 five years ago—and there were indications that the commission was considering cutting this amount in half. Furthermore, the budget provided for no new starts on atomic projects.

In a private meeting with Dr. Seaborg last week, Representative Holifield is said to have termed the Administration's atomic power budget completely inadequate and declined to introduce the necessary authorization bill. Mr. Holifield further expressed his displeasure over the Administration program directly to President Kennedy Wednesday.

WASHINGTON POST, February 24, 1961

Senate Unit Approves Seaborg for AEC Post

Associated Press

Senate members of the Joint Atomic Energy Committee yesterday approved President Kennedy's nomination of Glenn T. Seaborg as a member of the Atomic Energy Commission.

Seaborg, a Nobel-Prize winner and chancellor of the University of California at Berkeley since 1958, was praised highly by all of the Committee members present.

Kennedy has announced that Seaborg will be named AEC Chairman as soon as he is confirmed by the Senate. He will succeed John A. McCone who resigned as of Jan. 20.

Seaborg has been on duty at the AEC for three weeks in an informal capacity.

Seaborg pledged to keep the Joint Committee fully informed on all atom energy developments. This is required in the 1954 Atomic Energy Law but Committee members sometimes have complained that the AEC has not done it, particulary when Lewis L. Strauss was chairman.

Seaborg also said that when the Committee and Congress voted funds for a project, he would feel bound to carry it out unless some new important facts dictated otherwise. He said that, if opposed to the project, he would speak out when the Committee first considered it.

Committee members sometimes have complained that the Eisenhower Administration dragged its feet on projects congress felt were important

Seaborg said in answer to other questions that he would like to see the nuclear electric power industry "grow and prosper" but that he was not sure how this best could be accomplished.

He said he would have no objection to Government construction of plants if private industry were unable to proceed with a promising experimental type.

[Also in response to questions, Seaborg said he has an "open mind" on continuing the unilateral U. S. atomic test ban in effect for more than two years. American-Soviet talks on a permanent test ban agreement will resume March 21 in Geneva.]

Members said a statement of financial holdings filed with the committee by Seaborg revealed no conflict of interest.

Seaborg testified that he had resigned as a consultant to the U. S. Rubber Co. and to Bell Telephone Laboratories and as a member of the Board of Nuclear Science and Engineering Corp., Pittsburgh, and had sold his stock in the latter.

LOS ANGELES TIMES MARCH 12, 1961

U.S. to Push for Russian A-Test Pact

Kennedy Seeking Suspension Plan, Dr. Seaborg Says

BY DON SHANNON
Times Washington Bureau

WASHINGTON—Dr. Glenn Seaborg, in his first interview since he was sworn in March 1 as chairman of the Atomic Energy Commission, said Saturday that the Kennedy administration will make an "earnest and serious" attempt to negotiate a nuclear test suspension agreement with the Soviet Union.

Seaborg spoke as Arthur Dean, chief U. S. negotiator at the Geneva talks resuming March 21, paid a farewell call on President Kennedy at the White House.

The new AEC chairman said the President and Secretary of State Rusk have agreed that the United States will set no deadline for the resumption of testing "since that might not be consistent with their expressed intent" to reach an understanding with the Soviet Union.

Changed Position

Seaborg's immediate predecessors — John A. McCone of Los Angeles, who was a visitor at AEC headquarters Saturday morning, and Adm. Lewis L. Strauss — consistently opposed the voluntary U.S. moratorium on weapons testing which began in October, 1958. They warned that while the United States was unable to make advances which require testing, the Soviet Union could make progress through undetectable testing.

(As a candidate, President Kennedy himself at first favored laying down an ultimatum to the Russians to negotiate a treaty or face resumption of testing by the United States. He later changed his position to call for "one more try" at agreement and added that even if U.S. tests should start again they might be limited to underground and outer space shots to avoid polluting the atmosphere.)

Seaborg said he does not expect to join Dean and other U.S. negotiators at the three-power talks, which broke off last Dec. 5 over the issue of inspection.

Peaceful Uses Blocked

One thing an agreement will have to cover, the chairman pointed out, is nuclear explosions to permit the perfection of detection devices. Although much of the difficulty in writing a treaty has come from the fact that detection methods are inadequate, he said, the moratorium which has prevented U.S. weapons development has equally handicapped the improvement of detection experiments.

Another area which a treaty must cover, he added, is peaceful uses of nuclear energy. The United States has voluntarily ceased explosions for peaceful purposes along with weapons testing.

The Nobel prize-winning chemist, and until recently chancellor of the University of California at Berkeley, talked freely about his role as the boss of U.S. nuclear power development.

"We need incentives to encourage private investment in nuclear power plants," he said. "The government will have to take the lead in expensive research, but I want to see as much partnership with industry as possible."

Although the AEC has paid research and development costs and supplied low cost fuel for privately owned reactors, Seaborg feels that additional incentives must be provided—possibly in tax concessions—if nuclear power is to become a practical energy source by 1968. The commission in 1958 set a 10-year goal for such development.

Safeguards Boost Cost

Seaborg said the location of plants at considerable distances from cities and the heavy protection which has been built into them to meet AEC safety requirements has increased the cost to private power companies.

"One of our troubles has been that the cost of producing power from conventional fuels has been going down because of increasingly efficient generating methods," he explained. "If the cost of generating hadn't gone down, we would have competive nuclear power now."

The chairman said he feels that the direct production of electrical energy from the atom is a long way off, since even the most advanced experiments still require the use of heat, but he did not rule out a breakthrough.

Seaborg will insist on the maintenance of the highest safety standards in the peaceful uses of nuclear power.

"I want to stay on the conservative side," he emphasized.

OAKLAND TRIBUNE - March 21, 1961

Seaborg Reports on A-Energy in Peace

By David Perlman
Science Correspondent

The atom in space and the atom underground are spurring two of America's most successful nuclear programs, Dr. Glenn Seaborg reported here yesterday.

For the competitive, who like to Beat The Russians, America's progress in both fields is both impressive and dominant, Seaborg said.

And for those whose standards of achievement are more basic, the progress promises immense returns both in scientific knowledge and practical benefits.

SPEECH

Dr. Seaborg, chairman of the Atomic Energy Commission and Nobel laureate in chemistry, came to San ancisco yesterday to speak before the newly formed Chemical Industry Council of Northern California.

At a press conference before his luncheon speech at the Mark Hopkins Hotel ,Dr. Seaborg reviewed some recent atomic successes i noptimistic terms.

Yesterday morning, he said, he visited the Air Force Satellite Control Center at Sunnyvale and watched pro-

GLENN SEABORG
Progress on two fronts

duly while engineers tracked the new satellite that carries SNAP 10-A, the world's first orbiting nuclear reactor.

OPERATION

The reactor is operating prefectly, Dr. Seaborg said; it is developing its full design power o f500 watts, and its command system from the ground is flawless.

"It's definitely a major first for America," Seaborg said.

Dr. Seaborg reported that America's development of nuclear-powered rockets for propulsion to the planets is also moving forward swiftly, toward a manned interplanetary mission aboard a nuclear space ship by the late 1980s.

RUSSIA

As for Soviet progress in nuclear propulsion and in nuclear electric power for use aboard spacecraft, Dr. Seaborg said:

"I'm quite sure the Soviets are mounting a huge effort in both these areas, but we are obviously far ahead of them, both in ground tests and in space prototypes .The Soviet Union has no reactors in orbit."

Dr. Seaborg said the Russians are also lagging behind America in developing nuclear explosives for such America in developing nuclear explosives for such peacetime applications as mining and excavating.

Within four to five years, Dr. Seaborg said ,the United ates will have developed an advanced nuclear technology effective enough to blast a full-scale canal across the Isthmus of Panama at afraction o fthe cost of conventional explosives ,and with minimal radioactive fallout.

TREATY

The Russians have now become intensely interested in

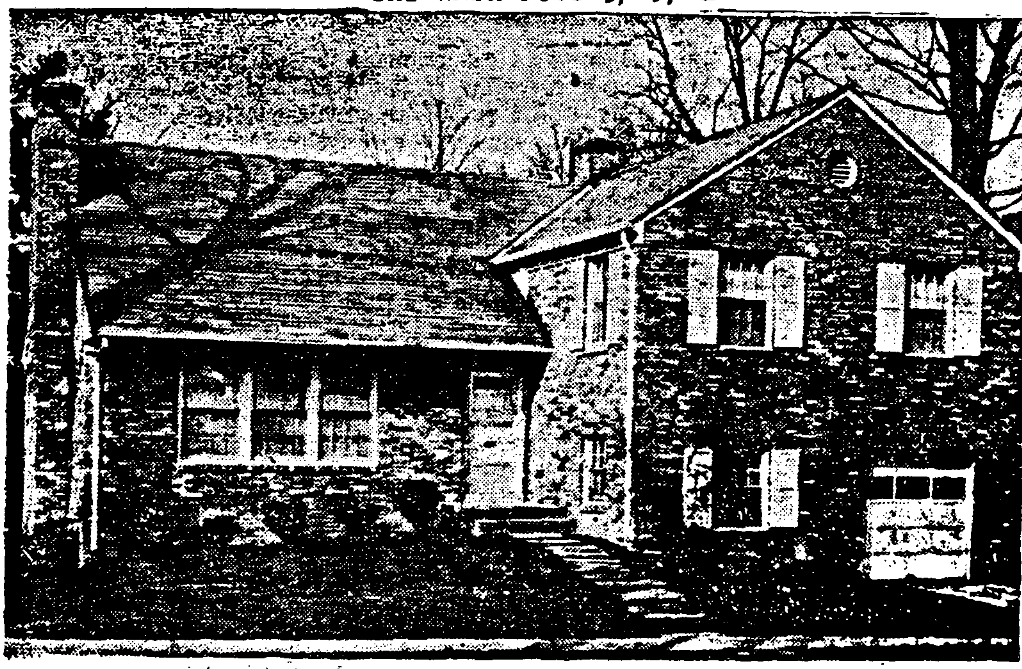
d he is optimistic that their interest will prod them to agree on the amendments thatwould be neededin the rrent nuclear test ban treaty in order to build a canal using nuclear blasting.

Dr. Seaborg commented briefly yesterday on a report by Governor Brown that the California power reactor planned as part of the State's water program is running into technical snags.

Design studies have shown that the proposed reactor's fuel elements would not last for the full nine years that would be required to assure economical operation, Dr. Seaborgexplained.

"But I don't regard this as a surprising problem,' 'he said. "The reactor is technilly sound, and the difficulty can be overcome. It's the kind of problem we in the AEC are encountering and overcoming all the time."

SAT WASH POST 3/25/61



A Man in the News Buys a House . . .

Glenn T. Seaborg, new chairman of the Atomic Energy Commission, has purchased this 6-bedroom, 3-bath split-level home at 3825 Harrison st. nw. for his family which will move here from California in July. Seaborg, former chancellor of the University of California, made arrangements to purchase the home from Mr. and Mrs. Edgar R. Baturian. John Harrison, of Shannon and Luchs, was the agent. This 2½-year-old all-brick home, located in Old Chevy Chase, was built by Case Construction. The home is located among established residences.

Oakland Tribune, Friday, April 28, 1961

AP Wirephoto

AWARDS FOR SCIENTISTS — Dr. Leo Brewer (left) of the Lawrence Radiation Laboratory at Berkeley was one of three scientists to receive the Ernest Orlando Lawrence award, which includes a grant of $5,000. With him (from left) are Chairman Glenn Seaborg of the Atomic Energy Commission and winners Dr. Wolfgang Panofsky of the High Energy Physics Laboratory at Stanford University and Dr. Conrad Longmire of the Los Alamos, N.M., Scientific Laboratory. They also got medals.

U.S. Atom Rocket 'Up In 4 Years'

By JOHN F. ALLEN
Examiner Science Editor

Chances are good that the U. S. will flight test the world's first nuclear-powered rocket within four years.

It is feasible right now to fling into earth orbit a satellite containing a nuclear generator to provide an almost endless source of power for instrumentation and radio transmission.

Head of AEC

These estimates were provided here yesterday by one who ought to know: Dr. Glenn T. Seaborg, the new Nobel Prize-winning chairman of the Atomic Energy Commission, and former chancellor of the Berkeley campus of the University of California.

Speaking before an American Ordnance Association luncheon, Doctor Seaborg said he is convinced America is well out in front of Russia in the development of nuclear power—"the most feasible and practical approach to long-range manned space missions."

Speaking of the ROVER program, which calls for substituting nuclear power for chemical fuels to provide rocket thrust, Doctor Seaborg said:

"Our best technical judgment is that it is reasonable to expect that flight-testing can begin in the 1966-67 period. It might be possible to start flight-testing in 1965."

Already ground-testing of a nuclear power plant for rockets has proved the feasibility of the method, he added.

The main advantage of nuclear power over chemical combustion for rockets is the great gain in specific impluse —a term that signifies the number of pounds of thrust produced by each pound of fuel in every second.

Thus, the specific impulse for kerosene and liquid oxygen in general use today is 300 pounds per pound of fuel per second.

REDSTONE HIGHER

The most advanced chemical rockets—such as the Redstone that launched Cmdr. Alan B. Shepard Jr. into space—use a fuel of hydrogen and liquid oxygen, which has a specific impulse of 450 pounds, and the maximum possible with chemical fuels is probably 475.

The ROVER nuclear system, however, have a specific impulse of 800 or more.

The contemplated rockets will contain compact nuclear reactors where fission will be used to heat and pressurize hydrogen, with hydrogen serving as the driving force.

In his speech, Doctor Seaborg said

"I do not have any information concerning USSR developments in nuclear rocket propulsion, but I'm convinced that our own program shows real progress."

Even farther advanced, Doctor Seaborg said, is the SNAP (Systems for Nuclear Auxiliary Power) program, which contemplates the use of nuclear energy aboard satellites and space ships to operate data-gathering and transmitting instruments.

SAFETY CHECKS

Some SNAP devices are now so well developed, he said, that they could be put aloft in an orbiting satellite at any time; only final safety checks are holding up the program.

Such sources of power—much better and longer-lived than chemical or solar batteries—would permit world-wide television, telephone and radio communication.

Tallahassee Democrat

Tallahassee, Florida, Sunday Morning, June 4, 1961

972 Finish At FSU

AEC Chairman And Novelist Given Degrees

Chairman Glenn T. Seaborg of the Atomic Energy Commission and novelist Vinnie Williams of Georgia, an alumna, were awarded honorary degrees in commencement ceremonies at Florida State University last night for a graduating class of 972.

Dr. Seaborg, the commencement speaker, was chancellor of the University of California at Berkeley until his appointment to the AEC in January. The 49-year-old Nobel laureate is equally well known as a research chemist and an "elder statesman" of science.

The citation which was read as FSU President Gordon W. Blackwell conferred on him the Doctor of Science degree praised him for his "unique role in the discovery of nine transuranium elements, transforming the science of the elements and in a profound way altering the course of world history."

Glenn T. Seaborg

ABLE, COURAGEOUS

After serving, said the citation, as an able and courageous university administrator Seaborg recently was selected "for national responsibility in the relationship of science to national affairs, and in the control and development of nuclear energy for the protection of the free world and the benefit of mankind everywhere."

Mrs. Williams, who received her bachelor's degree from Florida State College for Women as Vivian Ahlsweh, has won acclaim with two novels, and particularly **Walk Egypt**, a story of the North Georgia mountains. The novel, published by Viking in 1960, was the Book of the Month selection in August of that year.

Her first novel, **Fruit Tramp**, published by Harper in 1957, was about migrant workers in the vegetable fields around Lake Okeechobee. A citation read as the Thomson, Ga., novelist was awarded a Doctor of Literature degree said she already had become distinguished for her literary achievements and had the promise of more recognition to come.

'INCREASING POWER'

Her writings, said the citation, showed her "a portrayer of the lives of simple people with truth and dignity; recorder of deep, fundamental human problems with rare insight and increasing power."

The honorary degrees were the 17th and 18th conferred here in the 49 years FSU and FSCW have been awarding honoraries.

Dr. Seaborg told a class of 826 candidates for bachelor's degrees, 122 candidates for a master's degree and 24 candidates for a doctorate, there is a need for more "scientific literacy."

"The lack of scientific literacy can have particular application to the problems of the peoples of more primitive, or at least non-technical, cultures who are trying to fashion viable sovereign states," he said. "The West can be instrumental in influencing the kind of societies they will build but will be handicapped by a lack of ability to make use of scientific knowledge and methods.

EVEN INTELLIGENCE

"How widespread, for example, is the appreciation of the fact that intelligence among races is fairly evenly distributed? The fact that a man lives in a hut in the jungle is not a measure of his potential intelligence. Persons acquainted with elementary scientific principles know this.

"A better understanding, then, of the capabilities of the undeveloped peoples, an understanding which derives from scientific principles that are not difficult to comprehend, might do much to inspire the Western culture to give more intelligent guidance in the peaceful development of national governments in the new countries."

'AN UNHAPPY HARVEST'

There already has been "an unhappy harvest from our lack of sufficient knowledge about science," said the speaker. There is a need for an appreciation by the layman of the need for basic research, he said, and "perhaps more importantly, as a citizen, yau have an active role to play in the solution of the scientific and technical problems of our age. This is true whether you become an artist, an industrialist, an administrator or a housewife and mother."

Problems awaiting solution "will tax the resources of the most creative talent of the scientist and the engineer and, at the same time, require political action in which you, as a citizen, should participate." Among these are the decisions made necessary by space exploration.

"As citizens in this new space age, your country will need your intelligent participation in the making of these political decisions. It is for this reason that we must move swifUy to erase scientific illiteracy."

'WAITED TOO LONG'

Seaborg said it is important that a liberally educated person "be as well acquainted with science—its method and spirit, its cultural and aesthetic aspect—as he should be with the great classics." He expressed the fear "we have waited too long in this exciting age of science to increase the quality and scope of science teaching in liberal arts education."

The commencement speaker predicted "the fast tempo of change" would affect graduates whether they remained for further university work or left to pursue their careers. "It will affect the future of your Alma Mater," he said, and he added:

"I want at this point to pay tribute to the type of educational institution represented by this university. As some of you know, I was chancellor of a state-supported school—the University of California at Berkeley—prior to coming to Washington early this year to serve as Chairman of the Atomic Energy Commission. I think your President, Dr. Gordon Blackwell, very well expressed the mission of such institutions when he said recently:

" 'State-supported higher education bears witness to our belief that education, even to the most advanced levels, must be available to match the capabilities of all young men and women without regard to the position or power of their family.'

"I congratulate the faculty, the administration, and the state legislature on the forward-looking plans that have made for the development of Florida State University. In the fulfillment of these plans lies the opportunity to make this institution one of the great centers of research and learning in the Southeast.

"In this connection, a special panel of the President's Science Advisory Committee last year produced a report titled 'Scientific Progress, the Universities, and the Federal Government.' I had the privilege of heading this Panel.

"One of the most important Panel recommendations advocated increased support for rising centers of science. It was urged that over the next 15 years, the United States should seek to double the number of universities doing excellent work in basic research and graduate education.

'SMALL BEGINNINGS'

"I think this recommendation has particular application to Florida State University. From very small beginnings some 15 years ago, the number of men and women engaged in graduate work at this University has shown an amazing increase. In more recent years, there has been a significant growth in the development of resources for basic research.

"The Marine Laboratory on the Gulf of Mexico is being developed. Your Board of Control has approved the construction in the near future of laboratories for graduate work in physics and chemistry. Another project, of great interest to the Atomic Energy Commission, is the new Institute of Molecular Biophysics.

"The Atomic Energy Commission is anxious to stimulate fundamental research in the effects of ionizing radiation on biological systems. Therefore, when your University developed plans for an expanded biophysics research program to be carried out by my friend and fellow chemist, Dr. Michael Kasha and his staff, we were much impressed. The result is that the Commission is participating in the support of your new Institute over the next several years. We consider it a sound investment.

IMPROVING RESOURCES

"The panel report to the President that I cited earlier was concerned primarily with improving the resources for scientific research in our country. I think, however, that the spirit of this Report suggests a much broader application. There is an urgent need for research in all fields of learning—in the social sciences, in the humanities—and particularly in the areas of study that will improve our educational system."

A native of Michigan, Seaborg grew up in California, became interested in science in high school, and received his bachelor's degree from University of California at Los Angeles in 1934. After getting a doctorate from University of California at Berkeley in 1937 he remained on the faculty there and most of his research and teaching were done at that institution.

He was co-discoverer in 1940 of element 94, plutonium, and this revolutionary discovery was followed by several others of the trans-uranium elements during the years ahead. During World War II, on leave from the university, he directed the plutonium work of the Manhattan Project.

THE NOBEL PRIZE

His work in the trans-uranium elements won Seaborg and a colleague the Nobel Prize in chemistry in 1951 and in 1959 he was awarded the AEC Enrico Fermi Award. He became chancellor of the Berkeley institution in 1958 but three years later was called to Washington by President Kennedy to head the AEC.

Mrs. Williams, according to her teacher at FSU, Earl L. Vance, was identified while a student at FSU with a group of "intellectually alert, enthusiastic and liberal" journalism students and was herself the editor of the literary magazine, **The Distaff** and was a member of the staff of **The Flambeau**, student newspaper.

Her first novel was dedicated to Vance. Of her most recent, **Walk Egypt**, and its principal character, Toy Crawford, the **Saturday Review** said: "Not merely a 'character' limited to the Georgia ridges, she resists easy pigeonholing, and takes on during the course of the story a fine aura of universal meaning."

Presently, said Vance, she is working on two other novels. A native of South Carolina, she has lived for several years at Thompson, Ga. She is married to M/Sgt. Roy R. Williams and they are the parents of a daughter, Merldee.

U. S. Takes 2 Big Steps In Atom Use

Orbits Power Unit, Uses Isotope for Weather Station

By Howard Simons
Staff Reporter

The Atomic Energy Commission yesterday announced two giant steps forward in the peaceful use of the atom — one in outer space and the other on the ground.

They were:

1. The first atomic power device to be used in space was successfully orbited attached to a Transit navigation satellite yesterday morning. It is now at work generating almost three watts of electricity, powering two of the satellite's four transmitters. The tiny, plutonium-238 fueled generator is the forerunner of more and bigger devices to power the Nation's space efforts, including future transmitters aboard communications satellites and others to be set up on the moon.

2. The world's first isotope-powered automatic weather station is now at work at the Martin Company in Baltimore. The experimental station has been sending weather data for a month to the AEC headquarters building in downtown Washington. The station derives its power from a strontium-90 compound marking the first major use of a waste fission product for a safe and beneficial purpose.

In both projects, AEC Chairman Glen T. Seaborg emphasized at a press briefing yesterday, safety considerations have been paramount. Because of these considerations the flight of the atom-powered generator was held up for almost a year until all government departments were satisfied. Seaborg said the plutonium device was so safe he was willing to sit on a similar nuclear power generator "for the duration of the press conference."

The first atom-powered satellite was put into orbit in a spectacular three-in-one shot from Cape Canaveral shortly after midnight yesterday. At 12:23 a. m., a 50-ton, 2-stage Thor-Able-Star rocket sent three satellites successfully into orbit. This was the first known multiple satellite launching with one rocket.

The most important of these is the Transit IV-A, the first of four operational prototypes for the Navy's satellite navigation system. Signals beamed to earth from these satellites will permit airplanes, ships and submarines to know where they are at all times and in all weather. The 175-pound, drum-shaped satellite was developed by the Applied Physics Laboratory of the Johns Hopkins University.

Transit's equatorial orbit takes the satellite as high as 629 miles and as low as 550. It whirls once about the earth every 104 minutes. During this passage properly equipped ships, planes and submarines can take a fix on their longitude and latitude from the information being relayed to earth from the satellite.

Transit's memory system is fed orbital data from the ground and "broadcasts" this information continuously until new data is sent to it. In addition to its nuclear-powered generator, the 16-sided satellite has solar cells and two nickel-cadmium batteries.

To Stay Up 50 Years

Present indications are that Transit IV-A should remain in orbit for 50 years, though it is not expected to transmit data for this entire period.

The two smaller satellites piggy backed with Transit are designed to provide information that will be of value to science generally and to the

The cutaway drawing of the first atomic-powered weather station shows how it will soon be installed in a remote Arctic area. The atomic generator at the bottom of the cylinder, deriving power from pellets of strontium-90 via a thermoelectric conversion system, will operate the electric instrumentation.

Navy's Transit program in particular.

The heaviest of these, Greb III, is a 20-inch sphere weighing 55 pounds. Developed by the Naval Research Laboratory here, Greb III continues experiments begun a year ago with the Navy's first piggy-back launching of Greb I which is still in orbit.

Essentially, Greb III will measure X-ray radiation from the sun, radiation that plays havoc with radio reception on earth during periods of solar storms. The aluminum shell, patched with solar cells, is expected to collect data that will shed light on the relationships between sunspot activities, solar X-ray emission and radiowave propagation on earth.

Injun, the third satellite, is a 40-pound drum developed by James Van Allen of the State University of Iowa for the Office of Naval Research here. Its primary task is to learn more about the Van Allen radiation belts—zones of intense radiation girdling the earth, discovered by Van Allen. These belts, extending out beyond 50,000 miles from the earth's surface, could constitute a serious hazard to manned space travel.

As spectacular as the triple satellite play was, however, the day's plaudits clearly went to the tiny nuclear power generator aboard Transit IV-A.

Obviously pleased and excited, Seaborg — flanked by three other atomic energy commissioners — described the event as a "happy occasion" culminating a long program to use the atom for peaceful purposes.

The transit generator contains a tiny amount of radioactive material, in this case plutonium-238. As the radioisotope spontaneously decays it emits heat. This heat is converted directly into electrical energy through the use of thermocouples, employing a principle discovered almost 150 years ago by the German scientist Seebeck.

No Moving Parts

Plutonium 238 was picked for the job because it is the only available radioisotope that emits alpha particles with a half-life suitable for the 5-year design of Transit. Plutonium-238's half-life is 90 years, which means that at the end of this time its heat-generating ability is diminished by half.

The generator, which contains no moving parts, is approximately five inches in diameter and stands about 5½ inches. It was developed and built for the AEC by the Martin Company of Baltimore. Its cost, exclusive of fuel, is $4800.

Seaborg was so elated about the space-borne nuclear device that he disclosed for the first time information about a similar device being used to transmit weather data between Baltimore and Washington.

The experimental, unmanned weather station operates on the same heat-to-electrical-energy-conversion principal as the Transit generator with the major exception that it employs a strontium-90 compound. It produces 5 watts of electrical energy.

To dispel any fears about strontium-90, AEC officials emphasized that the strontium-90 has been made into a compound called strontium titanate. This compound remains stable even beyond its melting point of 3700 degrees Fahrenheit and is insoluble in most anything. It can survive in sea water without emitting radioactivity, for example, for at least 1000 years.

Paul Abersold, director of AEC's Office of Isotopes Development, said the strontium-90 has "been locked up and can never get out." "I have been dreaming of the day when a use could be found for a waste fission product for 15 years, and now that day is here," he said in an interview.

Safety has been a key concern in the development of nuclear power generators, such as those described yesterday. Particular concern about such devices being orbited over inhabitated lands has been voiced by the State Department.

AEC officials yesterday described the safety tests for the Transit device. These included the package's abilities to withstand fire, explosion, impact and burnup in the atmosphere.

Both devices described yesterday are experimental members of a program called SNAP (Systems for Nuclear Auxiliary Power). Separate SNAP devices of varying power are being developed for different space and ground requirements. Some are to be non-fissionable radioisotope types, and others are small fissionable nuclear reactors. They will develop from 5 to 30 watts.

Part of the elation expressed by officials yesterday stems from the fact that the Russians are known to lag a few years behind the U. S. in the development of SNAP devices. It is also known that Soviet planers are concerned about this lag.

New York Herald Tribune Friday, August 18, 1961

Kennedy Confers With Top Aids

New Look at A-Tests and Arms

By David Wise

WASHINGTON, Aug. 17.—President Kennedy called his disarmament and nuclear testing advisers to the White House today for a top-level review of United States policy on the eve of new talks with the Soviet Union in both fields.

The Chief Executive is sending Arthur H. Dean back to Geneva next Thursday for what he has termed a "decisive" attempt to reach an agreement with Moscow for an inspected ban on testing of nuclear weapons. The United States has warned that it may have to resume testing if a satisfactory pact cannot be achieved.

Mr. Dean attended today's White House session, as did John J. McCloy, President Kennedy's disarmament adviser who has been trying in bi-lateral talks with the Soviet Union to reach agreement on resuming multination disarmament talks. Mr. Dean will meet again with Valerian A. Zorin, Soviet representative to the United Nations, on Sept. 5 in New York.

Administration officials said today's meeting was a general review of the United States position in both areas in advance of the upcoming talks.

As the President met with his advisers, pressure was mounting on the Administration to resume nuclear testing. Paraphrasing a Kennedy campaign slogan, Sen. Wallace F. Bennett, R., Utah, called on the President today to "get America moving again in the field of atomic testing." Yesterday, Rep. Charles A. Haleck, R., Ind., House Republican leader, said there is "enough information to indicate" that Russia has been testing nuclear devices while negotiating at Geneva.

Meantime, Mr. McCloy said today in a radio interview that Communist China should be included in any disarmament agreement. "No thought of general disarmament can be effective in my judgment without Red China being brought in it at some point."

He added he did not see "much hope" of a test ban agreement because "the Russians do not seem to be anxious to have a nuclear test ban." Mr. McCloy commented one day after Mr. Dean had said that Communist China soon will have nuclear bombs, if not within the year "certainly in the near future."

Also present at today's White House meeting were Secretary of State Dean Rusk, Secretary of Defense Robert S. McNamara, Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission; McGeorge Bundy, special assistant to the President and Donald M. Wilson, deputy director of the United States Information Agency.

The Soviet Union put forward a new disarmament proposal when Mr. McCloy was in Moscow last month and this is now under study by officials of the Disarmament Administration who are drafting a reply. The reply is expected to be ready when Mr. McCloy meets with Mr. Zorin next month.

Meantime, Administration officials were becoming increasingly concerned about the fate of President Kennedy's proposed bill to transform the informal Disarmament Administration into a full-fledged "United States Disarmament Agency for World Peace and Security," a semi-autonomous agency that would report to the Secretary of State and the President.

There were indications that President Kennedy would personally push for the measure, once action is completed by Congress on his foreign aid bill.

Fears Secret Tests

On the nuclear test talks, President Kennedy said last week that a report he received from an eleven-man panel of scientists made him feel "more urgently than ever that without an inspection system . . . no country in the world can ever be sure that a nation with a closed society is not conducting secret tests."

But he said that the experts indicated they "could not make a precise determination whether testing was going on" in Russia today. The dilemma faced by the President is that the United States might be condemned by world opinion if it resume atomic testing, but if it does not, the Soviet Union, by stalling the test-ban talks, can "cheat" while the United States continues to refrain from testing in hopes of reaching an agreement.

Mr. McCloy said Sunday that the United States was preparing a dramatic new disarmament plan. This aroused speculation that Mr. Kennedy might personally unveil it in a speech to the U. N. However, White House press secretary Pierre Salinger said he knew of "no plan" for such a speech. Later in the day the State Department said that while such a speech is "always a possibility" there was no present plan for the President to go to the U. N.

U. S. WILL RESUME NUCLEAR TESTING

'NO OTHER CHOICE'

Blasts to Begin This Month—Offer of Ban Still Open

By TOM WICKER

Special to The New York Times.

WASHINGTON, Sept. 5—President Kennedy ordered today the resumption of nuclear weapons tests by the United States. He specified that the tests should take place "in the laboratory and underground, with no fallout."

The decision was taken soon after the Atomic Energy Commission announced that the Soviet Union had exploded a third nuclear device in five days.

The President said in a statement that the United States had "no other choice."

The statement was issued by Pierre Salinger, White House press secretary. He said that laboratory and underground tests would take place this month at unspecified locations.

President's Statement

The text of the statement follows:

"In view of the continued testing by the Soviet Government, I have today ordered the resumption of nuclear tests in the laboratory and underground with no fallout.

"In our efforts to achieve an end to nuclear testing, we have taken every step that reasonable men could justify.

"In view of the acts of the Soviet Government, we must now take those steps which prudent men find essential. We have no other choice in fulfillment of the responsibilities of the United States Government to its own citizens and to the security of other free nations.

"Our offer to make an agreement to end all fallout tests remains open until Sept. 9."

The President's statement signaled the end of a voluntary undertaking by the United States not to test nuclear weapons. It was announced on Aug. 22, 1958 and went into effect Nov. 1, 1958.

U. S. Detected Blasts

The Soviet Union announced last Wednesday that it was ending its own voluntary moratorium on testing. Soviet tests were detected and announced by the United States on Friday, yesterday and today.

President Kennedy's statement left open the offer he and Prime Minister Macmillan of Britain made to the Soviet Union Sunday. It was a proposal that the three powers agree to conduct no atmospheric tests that produce radioactive fall-out.

The statement said this offer remained open until Saturday as originally proposed. Mr. Salinger would not whether that meant the United States would consider itself free to conduct atmosphere tests after Saturday.

From congressional sources, it was learned that President Kennedy had hoped originally to be able to delay a resumption of the United States' tests until after the United Nations General Assembly meeting open Sept. 19.

The President's decision to resume testing was a result of the third Soviet explosion, Mr. Salinger said.

He added that it was the accumulation of three Soviet tests, despite the United States and Britain's offer, rather than any special fact about the third test, that influenced the President. All the Soviet explosions took place in the atmosphere.

Defense Termed Adequate

"It became apparent with the third test that the Soviet Government was not interested in protecting mankind from fallout," Mr. Salinger said.

He repeated the assurance that Mr. Kennedy gave in a statement last Thursday that the United States nuclear arsenal and means of delivery were "wholly adequate" to defend the free nations.

Nevertheless, Mr. Salinger said, in explaining the decision to resume certain kinds of tests, "it is also true that important advances can be made by further scientific development."

He said there would be no "crash program" of nuclear tests. He added that he did not know if it would be possible to conduct a test or tests before the Saturday deadline given to the Soviet Union on a voluntary ban.

U. S. Said to Be Ready

It was understood, however, that Congressional leaders were told last week that the United States could conduct certain tests in a day or two, if it became necessary.

It was learned from another source that some of the tests would be a part of Project Vela, which is designed to help the United States learn to detect underground nuclear explosions registering less than 4.75 on the seismographic scale.

The Soviet Union was invited to join the United States and Britain in Project Vela but declined. The Kennedy Administration further invited the Soviet Union, subject to Congressional approval, to observe Project Vela tests.

Both the White House and officials of the Atomic Energy Commission declined, on security grounds, to amplify the reference "nuclear tests in the laboratory." But one commission spokesman, professing "surprise" at the public reference to such experiments, suggested on the basis of data already on the public record at Congressional hearings—and elsewhere, that the statement might mean a new program to test missile propulsion systems involving "controlled explosion" of nuclear material.

The Congressional leaders of both parties were understood to have been consulted again today, before Mr. Kennedy's statement.

The President was said to have learned of the third Soviet test shortly after a morning conference with Glenn T. Seaborg, the chairman of the Atomic Energy Commission, and Roswell Gilpatric, Deputy Secretary of Defense.

His decision to resume testing apparently was taken shortly after he was informed of the new Soviet explosion. It was understood that he and members of his staff consulted extensively with other officials before making a public announcement.

Allies Informed

The Governments of Britain, France and West Germany also were notified, Mr. Salinger said.

The Atomic Energy Commission announced the Soviet blast early this afternoon in two terse sentences:

"The A. E. C. announced today that the Soviet Union detonated a third nuclear device early today. The yield of this latest detonation was in the low to intermediate range."

A spokesman later added that the explosion took place in the Semipalatinsk area of Central Asia, where the Friday and Monday tests were conducted. He said it was an atmospheric test, like the others.

The description of its yield as having been in "the low to intermediate range" meant that the device exploded had been somewhere near the same siz as the first two.

All in Kiloton Range

All three were apparently in the kiloton rather than the megaton range. That is, they had the explosive force of thousands, rather than millions, of tons of TNT.

Many here regarded the third test, and the President's response to it, as having all but scuttled the possibility of any agreement with the Soviet Union on nuclear testing in the near future.

After the second Soviet test, Administration officials let it be known that they did not believe enough time had elapsed for the explosion to be regarded as a negative response to the offer extended Sunday to refrain from atmospheric testing.

After the third shot, however, there was little expectation here that the Soviet Union would enter such an agreement until it suited their purposes to do so.

There was equally little belief that they conference on a nuclear test ban treaty, still nominally under way in Geneva, could have a fruitful result.

THE NEW YORK TIMES, SATURDAY, SEPTEMBER 16, 1961

U. S. RESUMES ATOM TESTS WITH UNDERGROUND BLAST THAT CAUSES NO FALL-OUT

EXPLOSION SMALL

Device Touched Off in Nevada Tunnel Has Military Link

By JOHN W. FINNEY
Special to The New York Times.

WASHINGTON, Sept. 15 — The United States resumed atomic testing today by setting off a small underground explosion in Nevada.

It was the first atomic weapons development test by the United States since Oct. 30, 1958, when testing was voluntarily suspended in a futile attempt to reach a test-ban agreement with the Soviet Union.

In announcing the explosion, President Kennedy said the United States had been "forced reluctantly" to renew testing because "the Soviet Union without warning but after a great deal of preparation resumed testing in the atmosphere."

The President also said that "the United States once again affirms its readiness to negotiate a controlled test-ban agreement of the widest possible scope."

Test Conducted in Tunnel

The underground explosion took place at 1 P. M. Eastern daylight time deep in a tunnel dug into a mesa in the Nevada desert sixty-five miles northwest of Las Vegas. It was described in the White House announcement as being "a nuclear weapons development test of low yield."

No further elaboration was given on the exact purpose or power of the explosion. From the announcement and because of the limitations of the underground chamber, however, it seemed likely the explosive yield was well below twenty kilotons. This is the equivalent of 20,000 tons of TNT and it was the power of the Hiroshima bomb.

The announcement emphasized that the detonation had "produced no fall-out." It said that "this is in marked contrast to Soviet nuclear tests in the atmosphere."

All the Soviet explosions since it resumed testing Sept. 1 have been in the atmosphere and thus have spread radioactive debris that returns to the earth as fall-out. Thus far, ten Soviet explosions have been announced by the United States, three of them in the megaton (millions of tons of TNT) range of hydrogen bombs.

In ordering a resumption of tests on Sept. 5—the date of the third Soviet explosion — the President specified that they should be conducted underground so there would be no fall out. One reason for this policy is to place the psychological burden on the Soviet Union for adding to the radioactive contamination of the world.

As United States and Soviet testing proceeds, however, the Administration will be under increasing pressure to conduct some tests in the atmosphere. One such test already being urged by the Strategic Air Command is to fire an Atlas intercontinental missile with a live atomic warhead from Vandenberg Air Force Base, Calif., to Eniwetok Atoll in the Pacific to test the warhead.

The White House said today's test was the first in a series designed "to strengthen the defense of the free world." Emphasizing the military objective of the tests, the announcement said:

"The resumption of extensive Soviet testing has made this action necessary to fulfill the responsibilities of the United States Government to its own citizens and to the security of other free nations."

Objectives Outlined

According to informed sources, the new test series will have these immediate objectives:

¶Proof-testing of recently developed tactical or battlefield warheads, such as for the Army's Davy Crockett bazooka, and development of still lighter tactical weapons with yields as low as 100 tons of TNT.

¶Development of lighter, higher yield warheads for such long-range missiles as the Polaris and Minuteman. Because of the limitations on the size of an underground explosion, these strategic warheads will have to be developed by projecting the information gained from smaller devices.

Beyond these objectives, the test series will be pointed at eventual development of such weapons as a warhead for an anti-missile missile and a neutron bomb that would kill personnel by radiation but cause relatively little property damage.

And as in the past test series, there will be a number of experiments aimed not at any particular weapon but at weapons design.

Peaceful Aims, Too

The White House said that as the weapons program progresses the tests will be used for the indirect purposes of studying ways of improving the detection of underground explosions and the use of nuclear explosives for peaceful purposes.

Thus, the seismic shock waves produced by the weapons explosions will be studied to find some more certain method for detecting and identifying underground explosions.

One reason the United States was able to resume underground tests so quickly was that the tunnels had already been dug for nonmilitary explosions in Project Vela, the Government program on improved seismic detection methods. The weapons shots, officials said, can now serve as a substitute for the long-planned but never authorized Vela shots.

The weapons explosions can also contribute to the study of the peaceful use of atomic explosives—an Atomic Energy Commission program known as Project Sherwood—by providing information on the break-up of rock, or underground storage of heat.

With today's test, the United States has announced 154 atomic explosions since it began testing in 1945. The Atomic Energy Commission has announced sixty-five explosions by the Soviet Union. Each side, however, is known to have conducted several tests that have never been announced. There have been twenty-one announced. There have been twenty-one annonced explosions by Britain and four by France.

The last United States test was a twenty kiloton underground explosion in Nevada Oct. 30, 1958. The Soviet Union continued testing until Nov. 3 and then joined the voluntary moratorium that ended Sept. 1.

The explosion was announced by the White House within minutes after it had taken place. An open telephone line has maintained between the Nevada test site and the Washington office of Dr. Glenn L. Seaborg, chairman of the Atomic Energy Commission. Dr. Seaborg, in turn, relayed word of the explosion to the President at the White House, where he was lunching with the Western Foreign Ministers.

Pierre Salinger, White House press secretary, had announced earlier that the United States tests would be conducted in complete secrecy, with no advance announcement or press coverage. He also said that all the tests might not be announced by the White House.

This represented somewhat of a departure from past policy on press coverage. Ever since 1952, the press has been permitted to observe at least one shot in tests at Nevada and in 1958 all the tests were open to the press. The press has also been permitted over the years to view a few of the shots in the Pacific.

Asked to explain the shift in policy, Mr. Salinger said "It just has been determined it would not be in the national interest to announce in advance or to announce all of them."

THE NEW YORK TIMES SEPTEMBER 30, 1961

ATOM EXCHANGES PRESSED IN TALKS

Seaborg and Yemelyanov in Private Vienna Sessions

By M. S. HANDLER

Special to The New York Times.

VIENNA, Sept. 29—Dr. Glenn T. Seaborg, chairman of the United States Atomic Energy Commission, and Prof. Vasily S. Yemelyanov, head of the Soviet Atomic Energy Authority, have had a number of private meetings in Vienna to discuss the continuation and possible expansion of United States-Soviet collaboration in the peaceful uses of atomic energy.

These meetings, which included a luncheon yesterday, have taken place on the margin of fifth conference of the International Atomic Energy Agency, which is now going on.

The "cold war" note injected into the conference proceedings yesterday by Professor Yemelyanov, when he accused the United States of misusing the international agency for its own political and military aims, does not seem to have extinguished Moscow's interest in maintaining scientific exchanges with the United States.

These contacts were inaugurated two years ago when John A. McCone, new director of the Central Intelligence Agency, was Chairman of the Atomic Energy Commission. He exchanged memoranda with Professor Yemelyanov to arrange visits of scientific personnel and the exchange of information published in the field of nuclear research.

Wide Range of Topics

In Dr. Seaborg's meetings with Professor Yemelyanov, the new Chairman of the Atomic Energy Commission, gained the impression that his Soviet counterpart was interested in continuing this program. The conversations covered a wide range of subjects, including possible United States-Soviet corporation in constructing the world's biggest high speed particle accelerator.

The project, which was first broached during Mr. McCone's term of office, concerns an atomic smasher, 300,000,000,000 electron volts or greater, possibly up to 500,000,000,000 electron volts. An electron volt is the amount of energy gained by an electron in passing from a point of low potential to a point one volt higher in potential.

Dr. Seaborg today that such an accelerator, bigger than the atom smasher put into operation recently at Brookhaven National Laboratory at Upton, L. I., would probably cost about $500,000,000 and that it would therefore be desirable to obtain international financing.

Reports Exchanged

As an additional indication of the Soviet Union's interest in collaborating with the United States, Dr. Seaborg said that last March 5, five days after taking office, he had written to professor Yemelyanov expressing the hope that the cooperation outlined in the exchange of letters with Mr. McCone would be continued.

Professor Yemelyanov replied sometime later that Dr. Seaborg could expect hundreds of Soviet scientific reports. These reports, many of them in full, arrived in due time. They were not on classified material but were of value. The United States in turn sent many unclassified research reports to the Soviet Union.

Dr. Seaborg said he did not intend to make a statement to the Vienna conference in reply to Professor Yemelyanov's charges against the United States. He indicated that he thought such a reply would serve no useful purpose and "would only contribute to tension."

Dr. Seaborg said he considered Professor Yemelyanov's attacks on the United States less sharp than those in the past and that, on the whole, the Soviet official's speech had been more moderate than some in preceding years.

Sir Roger Makins, head of the British Atomic Energy Authority, replied today to some of Professor Yemelyanov's charges and criticized Soviet methods for nuclear testing. Sir Roger said the disposal of low yield radioactive waste in rivers and seas was not harmful under proper controls.

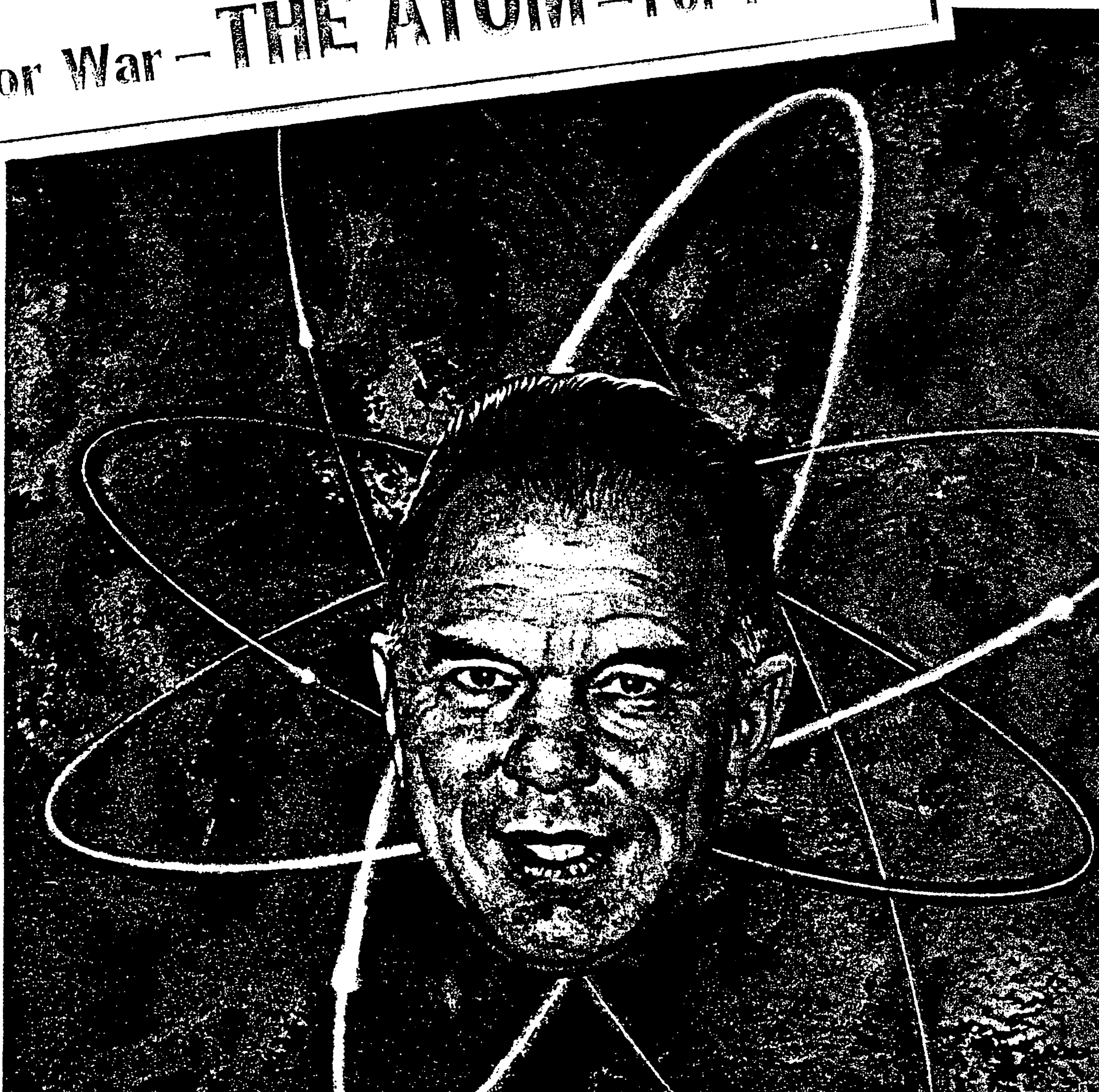
He declared:

It is the pollution of the atmosphere through nuclear bomb test explosions which has serious effects for the people of the world, and for this the Soviet Union has assumed a heavy responsibility."

OCTOBER 16, 1961 25c

Newsweek®

For War — THE ATOM — For Peace



Seaborg of the AEC: A Scientist in Command

Seaborg's AEC: Atoms for War or Peace

Atomic energy has two faces: One is the face of death, the dead end of history; the other is the face of life, the benign servant that can lighten man's work, lengthen his life span, and give him the final mastery over nature. Last week the duality of the atom was dramatically symbolized on both sides of the world.

On one side, above the Arctic Circle at Novaya Zemlya, Soviet scientists detonated two huge nuclear bombs with yields in the megaton range, the seventeenth and eighteenth tests in a secret series aimed at developing better missile warheads. On the other side of the world, deep beneath a dun-colored mesa in Nevada, scientists of the U.S. Atomic Energy Commission also worked in secret, preparing to set off a small kiloton-size device as part of its underground series testing battlefield bombs.

At the same time in Vienna—in the middle of this divided world—Dr. Glenn T. Seaborg, the chairman of the U.S. AEC, and Vasily S. Emelyanov, the chief of the Soviet's Central Board on the Use of Atomic Energy, had a friendly lunch of caviar, Hungarian fogosh and chicken, and drank a toast in Crimean wine to international cooperation and the peaceful atom. Half a dozen times throughout the week at the fifth general conference of the International Atomic Energy Agency, the tall, gangling Seaborg and the stocky, gray-haired Emelyanov met privately. They discussed projects to build jointly a $500 million particle accelerator for probing the final secrets of matter, to exchange nuclear physicists and scientific reports, and to study radioactive waste disposal means.

Inextricably, by the laws of physics, the events in Novaya Zemlya, Nevada, and Vienna are bound up with one another. A nuclear reactor of a certain design, run on one time cycle, produces weapons-grade plutonium, the stuff of bomb tests; the same reactor, operated on a longer cycle, yields a form of plutonium to produce electricity for lighting.

THE ATOMIC YEARS

The nuclear scientist, because his knowledge and ingenuity are equally applicable to the military and civilian atom, shares some of the duality of his creation. And among this small band of scientists, none has been so intimately involved with the atom over so many years as Glenn Theodore Seaborg. In 1940, as a 28-year-old chemistry instructor at the University of California, he helped preside over the birth of the atomic age.

During the feverish days of the Manhattan Project, his contributions hastened the development of the plutonium bomb which ended the war against Japan. Throughout the post-war years, his laboratory at Berkeley completely dominated the field of heavy-element chemistry and won for him the Nobel Prize in 1951. Last January, when President Kennedy nominated him as chairman of the Atomic Energy Commission, he picked the one man preeminently familiar with both the good and the bad in the atom.

Erich Hartmann-Magnum

Seaborg: A time to test and a time to talk

The Atomic Energy Commission which Seaborg heads is a vast industrial and engineering complex with installations or contractors in every state of the union. Headquarters is an architecturally uninspired, red-brick building put up four years ago on rolling Maryland farmland twenty miles north of Washington. The location, part of a federal dispersion plan to blunt the consequences of an atomic attack, has succeeded in easing the parking problems of the 2,100 employes at headquarters. At 5 p.m. the parking lots quickly empty, while inside the "wastebasket details" wheel the "classified" trash to incinerators.

Across the country, the AEC employs some 6,900 scientists, technicians, administrators, and secretaries. But, like the visible part of the iceberg, this figure fails to reflect the full magnitude of the AEC's activities. Most of the atomic energy technology is done by the AEC contractors—corporations, universities, hospitals, and other research institutions—which employ some 115,000 professional and blue-collar workers. According to A.R. Luedecke, the AEC general manager, two-thirds of all major U.S. companies hold AEC contracts, many of them administered by secret divisions with tight security regulations. AEC establishments throughout the U.S. consume seven per cent of the nation's total annual electric power output. Its physical plants represent an $8 billion investment; the AEC budget is $2.7 billion a year, the fifth largest in the Federal government.

OFF LIMITS

One and the same reason dictates both the AEC's size and secrecy: Its overriding function is the production of nuclear fuels and the fabrication of weapons. To carry out this function, the AEC in effect has made certain areas of the U.S. as inaccessible to unauthorized visitors as the moon. The Savannah River Plant, for example, where five reactors produce triple-weight hydrogen, or tritium, sprawls over 315 square miles in three South Carolina counties. The process requires billions of gallons of water from the nearby Savannah River.

At Hanford, Wash., eight huge graphite reactors produce the plutonium fuel for tactical A-bombs and for H-bomb triggers. In the fall of 1942, Seaborg's team, working at the University of Chicago Metallurgical Laboratory, the bland code name for the plutonium project, had produced a microscopic speck of plutonium, weighing one thirty-millionth of an ounce. In 1945, Hanford reactors were turning out pounds of the metal.

Because of security, any account of this weapons-producing aspect of the AEC's operations is necessarily out of focus, but enough has been published

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to put together a roughly accurate picture of the production cycle. To keep the picture simple, uranium bomb fuel, rather than tritium or plutonium, is discussed here.

The cycle starts in the ground with the mining of high-grade uranium pitchblende. Mills turn this ore into a heavy, yellow, paste-like concentrate known as uranium oxide. In 1960, the AEC received 33,500 tons of uranium ore, more than half of which came from private domestic producers. The great uranium rush of the early 1950s in Colorado and the Far West had paid off. The U.S. has comfortable supplies; "stretch-outs" of deliveries are now necessary.

The raw materials go next to feed materials plants at Fernald, Ohio, and Weldon Spring, Mo. The next step involves the critical, and expensive, technique of separating enriched uranium from ordinary uranium at the gaseous diffusion plants in Oak Ridge, Tenn., Paducah, Ky., and Portsmouth, Ohio.

Interior bomb designs, including the relationships between the nuclear fuel, the detonators, and the other auxiliary apparatus, are worked out at the two weapons laboratories in Livermore, Calif., and Los Alamos, N.M., both operated by the University of California. The final mechanical work, exterior assembly, and "mating" of the warhead to the delivery package (the casing, the shell, or the nose cone) are done at the Sandia Base, operated by the Western Electric Co.'s Sandia Corp. in Albuquerque, N.M.

THE SECRET SHARERS

Finally, the finished product is turned over to the Defense Department, which, in turn, doles out the weapons around the world to SAC bases, the fleet air arm, fighter fields, and rocket and missile sites and special depots near tank and artillery units. Those warheads not assigned specifically to field units are buried—in an unarmed or inert state—deep beneath the ground at secret sites throughout the U.S. Thus the uranium cycle, much like the gold buried at Fort Knox, is essentially one that moves from earth to earth.

How much has been produced? The rate of production, together with the methods by which bombs are designed to achieve the maximum explosive effects, are the AEC's most secret secrets. The official attitude was best summed up by former AEC chairman Lewis Strauss. "To the public," he said, "[the nuclear stockpile] could scarcely be anything but a number ... but the number would be significant, fatally significant ... to the planning staff of a potential enemy." Some rough rules of thumb, however, show that the figure could be well up in the tens of thousands. Some 1,300 pounds of uranium oxide, for example, yields the 10 pounds of fissionable uranium needed for a Hiroshima-size bomb. What the enemy planning staff doesn't know, of course, is how the various fuels are apportioned among the various possible packages.

A small percentage of fission fuel, probably between 5 and 10 per cent, is channeled into such non-military purposes as research reactors, propulsion units, and A-electric power plants. Some of this fuel has been earmarked for foreign reactor programs provided there are adequate safeguards to insure that they are for research. Last week, President Kennedy offered to raise the U.S. contribution from 220,000 pounds of uranium 235 to 363,000 pounds.

This predominance of the military atom causes some AEC men a certain amount of anguish. "The AEC," one official says, "is a big, free department store for weapons. The military shops for what it wants and charges its purchases to our budget." But Commissioner Robert E. Wilson counters: "In the present sorry state of the world, I am not a particle ashamed of our division of effort between peaceful uses and the development of weapons."

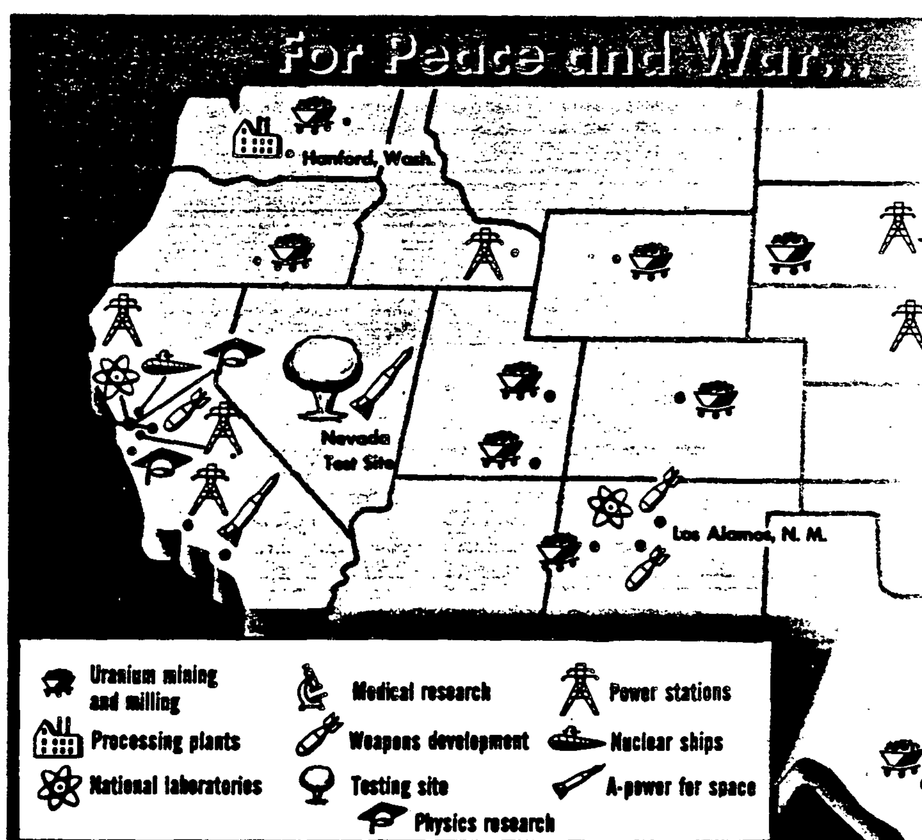
Fifteen years ago, however, amid all the talk of the bright promise of atomic energy, there were many who expected that the present division of effort would be exactly the reverse. When the war ended, Seaborg and many of the nuclear scientists, like millions of draftees, joined the rush home. The period from 1945 to 1948 in the United States, Prof. Emile Benoit has noted, marked the "largest unilateral disarmament in history."

DREAM AND REALITY

Everywhere there was talk of peaceful uses. Atomic power, it was freely predicted, would close the coal mines and shut down roadside gasoline stations in a few years. In 1946, the Congress voted to take atomic energy away from the Army and place it in the hands of five civilian commissioners. The goal would be "improving the public welfare, increasing the standard of living, strengthening competition in private enterprise, and promoting world peace." A phrase added that this would always be subject "to the paramount objective of assuring the common defense and security."

On this high note of expectation, and with its parenthetical reminder of reality, the first commission set up shop Jan. 1, 1947. Lawyer David Lilienthal was chairman and commission meetings were informal shirtsleeve affairs. Staff members sometimes complained about the "creeps"—the security guards—and occasionally forgot to lock their files.

The hopes were shortlived. In 1948, the Russians rejected the U.S. plan for international control of atomic energy.



Foreign Minister Vyacheslav Molotov, now Russian ambassador to the international agency, rejected the plan as an "infringement of Soviet sovereignty." In 1949, Joe I, the first Soviet A-bomb test, shattered the U.S. nuclear monopoly. Meanwhile, simple economics made atomic energy less and less attractive as a source of electric power. Instead of the predicted imminent shortage of conventional fuel sources, new petroleum reserves were discovered. Nuclear technology proved trickier than the first glowing reports had led anyone to believe; there were "hot" waste disposal problems.


IAEA

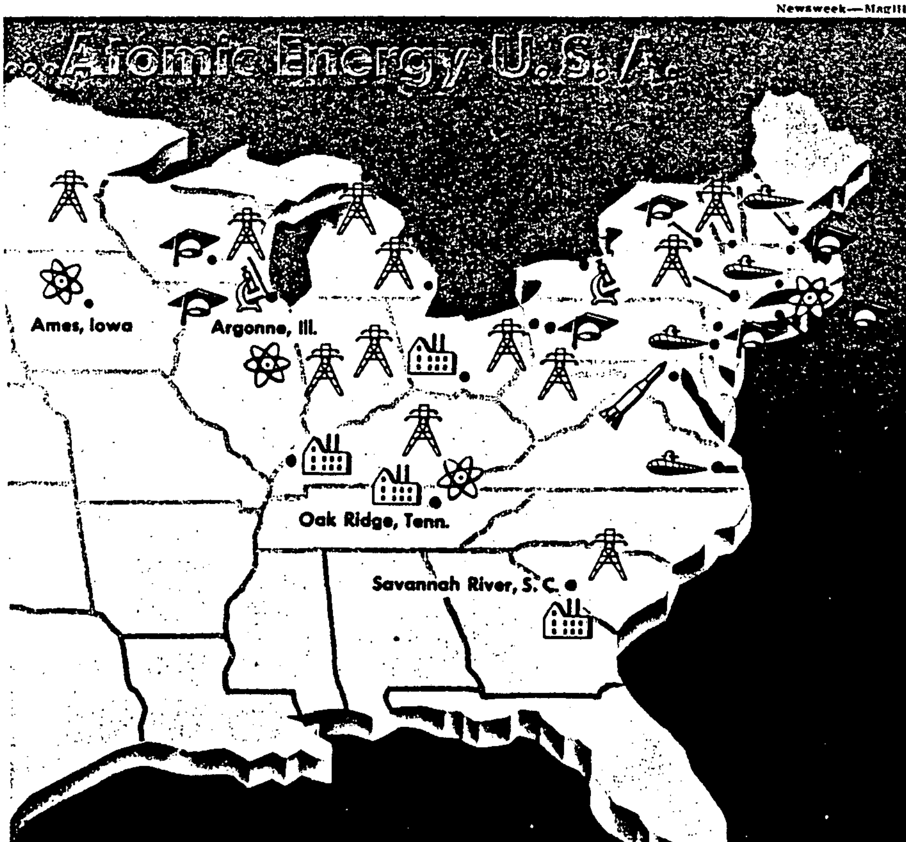
Familiar face at Vienna: 'Old Bolshevik' Molotov (left), Emelyanov (right)

The big power-reactor program, which had captured public imagination with the millennial vision of smokeless, all-electric cities, suffered most from rising costs and the technical drag-outs. The Dresden, Ill., Nuclear Power Station, 50 miles from Chicago, and the Yankee Atomic Electric Plant, at Rowe, Mass., are both generating electricity, the former enough to serve a city of 200,000 persons. But the Enrico Fermi plant at Monroe, Mich., has been delayed several times.

Of all the plans for A-powered locomotives, A-powered airplanes, and A-powered autos, only Admiral Hyman Rickover's nuclear ship reactors ever left the drawing board. Ironically enough, these propulsion plants have demonstrated their enormous value aboard the U.S. Navy's fleet of Polaris-carrying subs. The sole civilian nuclear ship to be built, the N.S. Savannah, has suffered a series of delays, the most recent when a reactor control-rod mechanism broke down. The Savannah is not expected to go to sea for her trials until next year.

On the positive side, the great national laboratories have made unexpected contributions. Argonne, in Lemont, Ill., operated by the University of Chicago, is the direct descendant of the Metallurgical Laboratory, yet it does no bomb work at all now—an irony of another sort. Instead, Argonne has developed several reactor concepts, including a breeder reactor designed to produce both power and more fuel. This is analogous to a soft drink machine that supplies a drink and gives your nickel back. At Oak Ridge, Dr. Alvin Weinberg is working on a reactor that is fueled with thorium, a new source of nuclear power. The major assignment at Los Alamos is still weapons but the laboratory is also running the highly successful Rover nuclear rocket program, which could send an instrument package into space by 1964. Livermore, the other weapons laboratory, has taken a leading role in the efforts to get usable electric power from the H-bomb fusion reaction. Brookhaven National Laboratory on New York's Long Island, which was established in 1946 by a group of Eastern universities, has a medical reactor that possesses special access ports which permit the treatment of certain brain tumors.

Newsweek—Magill



Seaborg says that he was never overly optimistic in the early atomic days about the prospects of competitive nuclear power. "The time schedule I estimated," he recalls, "has turned out to be just about what we've found." Still, he expects that by 1968, in high cost areas such as the San Francisco Bay region, a utility company will be able to build a nuclear power plant which could be competitive with a conventionally fueled plant. He is less sanguine about the fusion power effort; "to show you how good our estimates are," he says, "we said five years ago that it was 20 years away—and we're still saying it's 20 years away today."

RIGHT IS NOT ENOUGH

The two areas of civilian activity sure to get higher priority under Seaborg are AEC educational and basic research programs. In the television Westerns, he sometimes tells friends, the "good guys" always win out over the "bad guys." Right is might, he agrees. But he also wonders if in the real world of Vostoks and advancing technologies, it might be possible that "intelligence and determination will tip the scales in favor of the better prepared rather than the morally right." He wants to make sure the nation's gifted youngsters are not deprived of the opportunity of advanced training, that the best possible teachers be recruited in the secondary schools, and that the AEC stimulate, with grants, university support of basic research. "Intellectual curiosity," he says, "is one of the highest qualities of mankind."

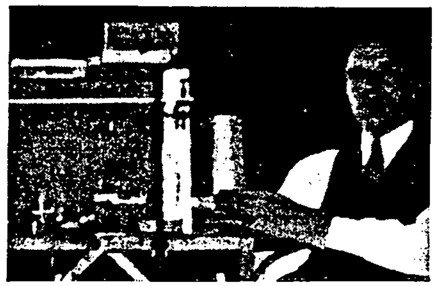
Seaborg speaks on these matters from personal experience. His career reflects the best in the American tradition of the self-made man. Born in Ishpeming, Mich., of a Swedish immigrant family, he mowed lawns and delivered papers for spending money, was inspired to study chemistry by Logan Reid, an enthusiastic high school teacher, and earned his way through UCLA by working as a stevedore, an apricot picker, and an apprentice linotype machinist. As a graduate student and instructor at Berkeley, he had the opportunity to work with the brilliant group gathered around Professors E.O. Lawrence and G.N. Lewis. When he was named chancellor of the Berkeley campus in 1958, he took over what is quite possibly the best faculty in the U.S. Berkeley is sometimes called the "Harvard of the West," but Berkeleyites like to think of Harvard as the "Berkeley of the East."

THE UNCOMMITTED

Seaborg's prestige as a scientist—the first to head the AEC, and a Nobelist at that—places him in a unique position to accomplish his programs. In the past, the AEC chairmanship has always been a hot seat. Between 1953 and 1958, during the regime of Adm. Lewis Strauss, commissioners refused to speak to one another for months at a time. The Democrats of the Joint Congressional Atomic Energy Committee, Strauss complained, treated him like "a valet" and "a schoolboy." Even under the steadying hand of Strauss' successor, John McCone, there were problems. During the time of the nuclear test moratorium, the AEC's advice was considered overly prejudiced in favor of resuming testing.

Seaborg remained on good terms with all factions and, the record shows, uncommitted on the great issues of fallout and nuclear testing. "I haven't obtained enough information to find my position," Seaborg might say characteristically. Because he has stayed out of so many disputes, he has been criticized by some of his peers as a "hollow man." "He never sticks out his neck too far," one acquaintance says somewhat invidiously. What is frequently overlooked, however, is that Seaborg was one of the seven signers of the so-called Franck Report. This report, named for its senior author, Nobel Prize winner James Franck, was sent in June, 1945, to the Secretary of War, Henry L. Stimson. In it was an amazingly accurate forecast of the post-war race for nuclear weapons. But the Franck Report's main purpose was to urge that the U.S., instead of dropping the first

Student: Seaborg received his Ph.D. in 1937. Just a year later, Hahn and Strassmann in Germany reported splitting the atom.



Researcher: "Fate," Seaborg recalls, "cast us in the role of the discoverers of plutonium." The experiments began in 1940.

Teacher: After the secret, feverish war years in Chicago, Seaborg returned to teaching and peaceful probing of the heavy elements.

UPI

Nobelist: The date was 1951; Seaborg was awarded the Nobel Prize and the U.S. and Russia were building the hydrogen bomb.

Chairman: The new boss of the AEC still finds time for his six children. Summer 1961 in Washington, D.C.

bomb on a Japanese target, hold a demonstration bombing on a desert or barren island. Seaborg stands by his signature and the report today.

Seaborg's first test as chairman came last February when he appeared before the Joint Committee for confirmation. In the past the committee has tended not only to dominate the AEC chairman (*vide* Strauss) but the AEC technical program as well. Only last week, a study sponsored by the national law center of George Washington University concluded that that committee was "probably the most powerful congressional committee in the history of the nation." Its demonstrated ability to overthrow executive authority, the study pointed out, is based on the undeniable fact that veteran committee members often have more technical knowledge of the atom than AEC commissioners, who might be serving for relatively short times. When Seaborg testified, however, it was the gentlest of sessions.

Another test of Seaborg's effectiveness came shortly thereafter, when President Kennedy visited the Maryland headquarters of the AEC. He was supposed to stay one hour; instead he stayed over two hours. He and Seaborg sat side by side at a table, coffee cups and pad and pencil between them, while Seaborg gave the President a short but intensive course in the physics of nuclear reactions. Seaborg found Mr. Kennedy "a good student." By the same token the President apparently has found Seaborg a good instructor. In the past few weeks, with both the U.S. and the Soviet Union testing bombs once again, Seaborg has been a frequent caller at the White House. "Seaborg doesn't say much," one official claims, "but when he has something to say, the President listens."

THE ACADEMIC TOUCH

Inside the commission, staff members now feel "one of their own" is in charge. Seaborg has a phenomenal number of friends; Dr. Spofford English, the AEC assistant general manager for research and development, for example, was a student of his at Berkeley. The five-man commission acts as a group again, even though the scientists (Seaborg, Wilson, and Leland Haworth) outnumber the lawyers (Loren Olsen and John S. Graham). The majority will probably agree on a boost in research funds that will take the AEC budget over $3 billion. Meetings are relaxed. Seaborg, usually standing in front of two newly installed green blackboards, conducts meetings with a professorial air. Occasionally, he will refer to notes scribbled on the handful of 3-by-5 cards he always carries in his left coat pocket.

Seaborg's biggest test, of course, turns on the events in Novaya Zemlya, Nevada, and Vienna. His chairmanship represents a fresh start. He has not been identified with either the "bombardiers" who think only of more weapons or the "dreamers" who think only of a unilateral moratorium. Seaborg does not believe the U.S. lost any appreciable ground vis à vis the Soviets during the three year test ban. On the other hand, he knew that "once the Russians started, we stood to lose if we didn't start . . ."

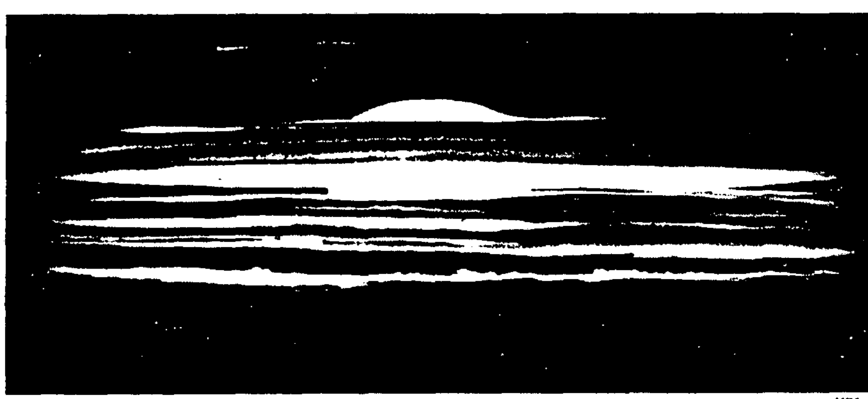
The pattern of testing by the Soviets makes fairly clear what they are trying to accomplish. Four of the 18 Russian detonations so far have been in the one-megaton range, five in the one-to-five-megaton range, and the rest in the kiloton range, about what would be expected in a series aimed at developing a warhead to be carried in a submarine-launched rocket of the Polaris type. It is now also clear that the U.S. wants to develop anti-missile missile warheads for area defense of big cities.

As new offensive weapons are tested, there will be a need to test better and better defensive weapons. As defensive weapons improve, there will be an urgent need for still more sophisticated offensive weapons. When will one side feel it has tested enough? Where will the leap frog game end? What happens when any number can play? In the next year or so, Red China is expected to enter the Nuclear Club. Within five years, such countries as East and West Germany, Japan, India, Israel, Sweden, Italy, and Czechoslovakia could have nuclear bombs.

ARMS AND MEN

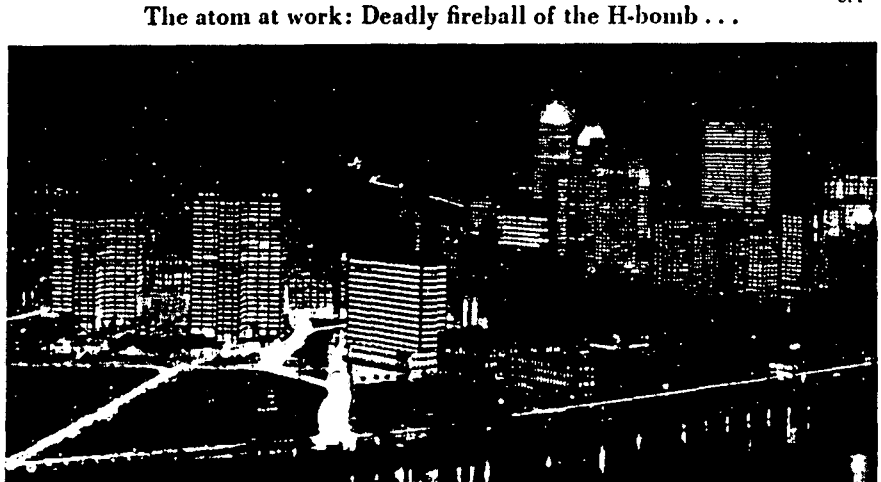
With each passing day the kind of nuclear inspection and arms control program envisaged by Mr. Kennedy in his United Nations speech becomes progressively harder to implement. In a recent unpublished study by Sir John Cockcroft and Sir William Penney, the distinguished British scientists, it was estimated that even with the best system of inspection an estimated 20 per cent of a nation's nuclear stockpile could be concealed. Each year, of course, the relative size of this 20 per cent increases.

Faced with these onerous questions, Seaborg sums up his formula for the future this way: "During the present crisis we are going to ride two horses. We are going to have to continue our negotiations with the Russians in such forums as represented by the IAEA in Vienna, and we must at the same time keep our defenses strong. This could, indeed, be the pattern of our international conduct for the next decade."



UPI

The atom at work: Deadly fireball of the H-bomb . . .



. . . Or peaceful power for light and heat?

LOS ANGELES TIMES OCTOBER 25, 1961.

Dr. Glenn T. Seaborg
UPI Telephoto

U.S. Planning No Massive Nuclear Tests

Los Ang. Times 10/25

BY MARVIN MILES
Space-Aviation Editor

LAS VEGAS—The United States can resume nuclear tests in the atmosphere within a few weeks if such a decision is made, but the government does not plan any such massive explosions as that detonated Monday by the Soviet Union.

Lower Yields Adequate

"The tests needed for such weapons development could be adequately carried out with yields such as the Russians have already tested (before the Monday blast)," he declared.

Asked if he felt that the giant Soviet explosion was detonated more for propaganda purposes, he answered:

"It certainly would have to be for reasons other than technical work."

Here to address an International Symposium on Aero-Space Nuclear Propulsion at the Riviera Hotel, Dr. Seaborg was asked how far ahead of the United States he felt Russia might be as a result of the Soviet atmospheric tests.

"I don't think they are ahead," he replied.

Could Fall Behind

Then, in response to another question, he agreed that this nation could well fall behind if the USSR continues to test indefinitely in the atmosphere while America explodes her bombs underground.

He declined to estimate how soon this might occur, however. The scientist was asked if he feels there is any chance of reaching a test ban treaty with Russia.

"I don't know how much room there is for optimism," he replied somewhat grimly, "but I feel we should keep trying."

Dr. Seaborg declined politely to say whether the United States has exploded more than the three announced underground shots at the test site near this Nevada gambling capital.

Nor would he indicate the total of Russan tests known to the United States although the President has said there have been more in the recent series than this country has announced.

In response to a question, the AEC chairman re-emphasized the fact that the United States can build huge thermonuclear bombs if they should be found desirable.

"I am almost tempted to say 'rather easily' if I could use such a term in such a terrible deal," he commented.

In saying—and repeating—that this country contemplates no such development, Dr. Seaborg felt impelled to add:

"As a scientist I cannot say that at no time in the future we might not develop such a bomb. Who knows?"

Asked if the resumption of atmospheric tests would mean shots both in Nevada and in the Pacific, the AEC chairman said no program has been decided upon and added that the location would depend on the projects involved and how to make the quickest progress with the least hazard "to people."

NOVEMBER 9, 1961
CHICAGO DAILY TRIBUNE

Why U.S. Dropped A-Plane is Revealed

The decision to scuttle America's nuclear powered airplane program was taken because of technical rather than burocratic problems, Dr. Glenn T. Seaborg, chairman of the Atomic Energy commission, said in Chicago last night.

Dr. Seaborg made the statement in a press conference in the Conrad Hilton hotel in response to charges made here Monday by Rep. Melvin Price [D., Ill.] that the program was "committeed to death."

970 Millions Spent

According to Price, the aircraft nuclear propulsion program [ANP] was abandoned last March after the United States had sunk approximately 970 million dollars into the project since 1947.

"The facts are," Seaborg said, "that we simply ran into a lot of really hard technical problems."

He said, however, that development of nuclear rocket engines for deep space probes is continuing.

"Nothing must be allowed to slow this program," he said. "We must go on full speed ahead in spite of renewed activity in nuclear weapons testing."

Much Atomic Material

Seaborg said the United States has plenty of atomic materials for both propulsion and bomb purposes.

"The United States will have a working nuclear rocket engine by 1967 or even by 1965, if we get the breaks," Seaborg said.

The first engine, called the Rover, is designed to carry the upper stage of a conventional rocket deep into space. Seaborg said the early models won't have much power and won't need much.

Scientists compute that a Model T atomic rocket developing only one pound of thrust 100 miles from earth could put a 10,000 pound vehicle in the neighborhood of Mars in nine months.

Looks to Ion Engine

Seaborg said the ion engine will be the engine of the future. The ion engine instead of heating hydrogen or some other agent as is done by Rover, will get its power by spewing streams of subatomic particles.

Among other topics touched on by Seaborg was fallout.

"I can't discuss its possible effects on my grandchildren because I don't have any," he quipped. "I do have six children, tho."

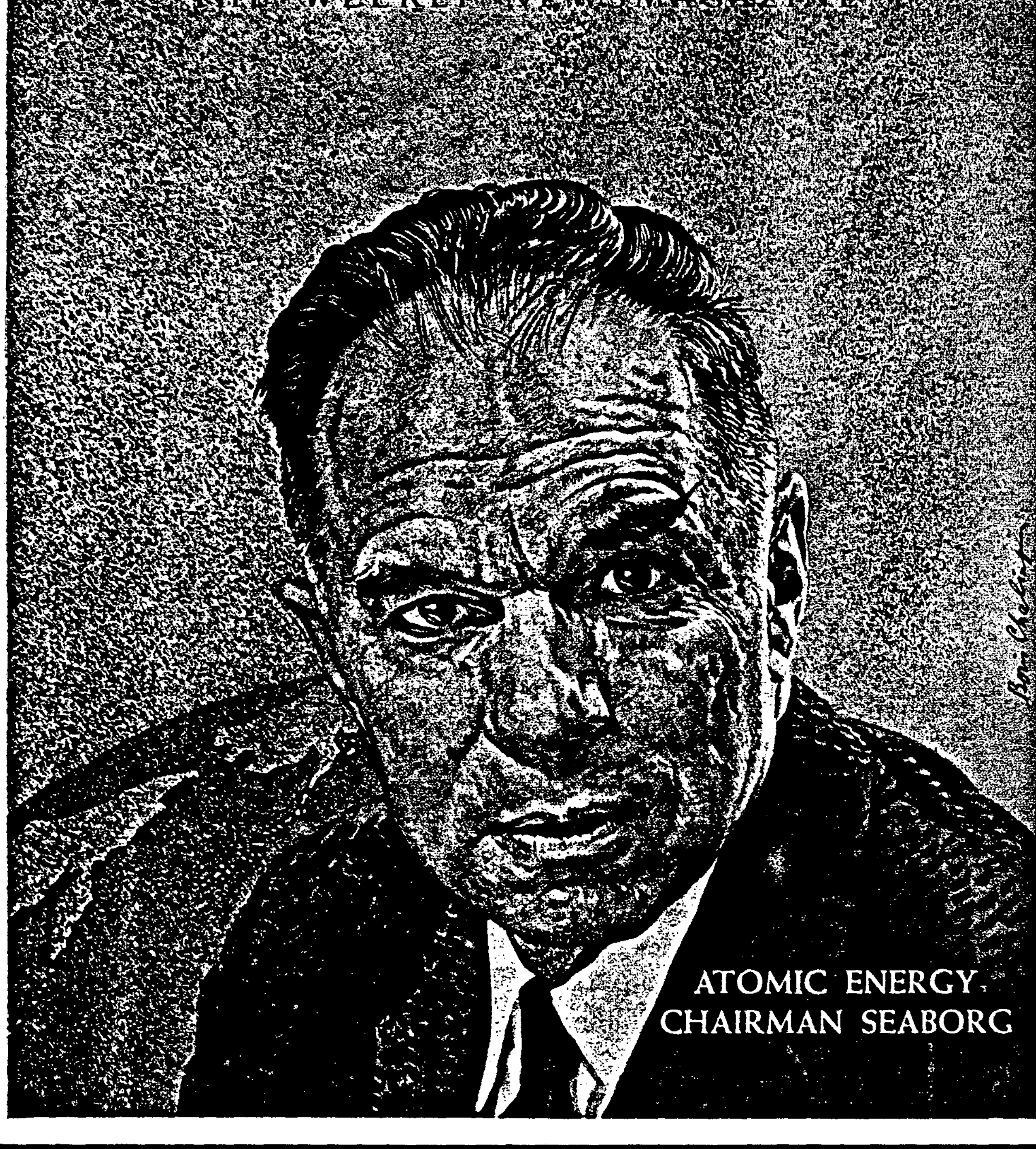
Seaborg is one of a dozen or so of the nation's top scientists who are in Chicago to attend the third national youth conference on the atom, which starts today in the Palmer House.

TWENTY-FIVE CENTS NOVEMBER 10, 1961

FALLOUT FROM RUSSIA
The Argument Over Testing

TIME

THE WEEKLY NEWSMAGAZINE



ATOMIC ENERGY CHAIRMAN SEABORG

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AP

Vol. LXXVIII No. 19

TIME

THE WEEKLY NEWSMAGAZINE

November 10, 1961

THE NATION

THE ATOM

Testing

(See Cover)

While grey autumn clouds obscured the sun over the nation's capital last week, the President of the U.S. closeted himself in the White House conference room for a crucial meeting with the members of the National Security Council. The Soviet Union's continued nuclear testing, climaxed by a 50-plus megaton explosion, left room for only one topic on the usually crowded agenda: how the U.S. should act to protect its own interests. After listening gravely to his advisers, John F. Kennedy walked briskly into his oval office to meet waiting reporters. Rarely had they seen him so grim, so abrupt. "Just wait a moment," he said. "Just stop taking pictures for a minute." Then Kennedy laid two heavily edited pieces of paper on the green blotter before him and began to read.

"In terms of total military strength," said Kennedy, "the U.S. would not trade places with any nation on earth. We have taken major steps in the past year to maintain our lead—and we do not propose to lose it." Because the Soviet tests might produce improved nuclear weapons for the Soviet Union, the U.S. will "proceed in developing nuclear weapons to maintain this superior capability. No nuclear tests in the atmosphere will be undertaken, as the Soviet Union has done, for so-called psychological or political reasons. But should tests be deemed necessary to maintain our responsibilities for free-world security, they will be undertaken only to the degree that effective progress is not possible without such tests. In the meantime, as a matter of prudence, we shall make necessary preparations for such tests so as to be ready in case it becomes necessary to conduct them."

Pandora's Box. Behind the President's carefully qualified words lay a decision already made: the U.S. will resume atomic testing in the atmosphere as soon as it can get ready to do so. For two months, the U.S. had patiently waited, staging only underground tests that produce no fallout, while the Soviet Union set off some 31 nuclear blasts, the biggest of them in defiance of a United Nations plea to spare the world the most monstrous man-made explosion in history. Now U.S. patience was exhausted.

By his rupture of the three-year moratorium on nuclear testing, Nikita Khrushchev had forced the U.S.—and the whole free world—to cope with a Pandora's box of questions. What military advance had the Russians achieved by their tests? What could the U.S. hope to gain by resumed atmospheric testing, and how far should it go? Had world reaction to the Russian tests permanently shifted any allegiances? How great is the danger of fallout from testing?

Mysterious Force. Many of those questions could not be fully and decisively answered because, in the 16th year of the Atomic Age, men were still seeking to penetrate the secrets of a mysterious natural force—as well as the inscrutable designs of an ironfisted dictatorship. But big hunks and hints of the answers lay about, ready to be fitted together and weighed to guide the U.S. on its course. The man whose job it is to weigh most of them—and to prepare the U.S. for renewed testing—is Glenn Theodore Seaborg, the craggy-faced chairman of the Atomic Energy Commission.

For many weeks Seaborg had been quietly, resolutely helping to shape much of the substance in the President's

TEN QUESTIONS & ANSWERS ABOUT FALLOUT

What Is Fallout? Fallout consists of radioactive debris produced by a nuclear explosion and borne into the air.

What Damage Can It Cause? Scientists agree that it can cause cancer, leukemia, sterility, and mutations in future generations.

How Does It Reach People? Either by penetrating their bodies externally if in the explosion area or, more often, by contaminating food they eat.

How Does Fallout Cause Its Damage? By giving off rays that can destroy human tissue.

How Much Fallout Does Testing Cause? All the world's fallout except that from the Hiroshima and Nagasaki bombs has been produced by testing. The Russian series alone doubled the amount of fallout in the world.

Has the Danger Point Been Reached? Scientists disagree, but most feel that current fallout levels are not a clear and present danger to human health. They feel that danger is a long way off.

Could Testing Produce a Dangerous Level? Probably, if it was continued at a rapid rate or for a long period.

Could Fallout Be Avoided? Not completely, so long as explosions continue, but it could be made negligible by cleaner nuclear devices, which the U.S. has already worked on.

Will Fallout Affect Future Generations? Yes, but scientists do not agree to what extent. Most feel that the effect of fallout to date will be small, but only time will prove them right or wrong.

Can People Protect Themselves from Dangerous Fallout? There are many ways that the effects of fallout can be muted, but none of them are needed yet. Scientists believe that changing the diet to avoid radioactivity might do more damage than fallout itself.

statement. By phone and by personal contact almost daily with the White House, he had offered the President, who is untrained in the nuances of nuclear arming, the advice derived from a lifetime of distinguished scientific service (*see box*). Nobel Prizewinner Seaborg had helped usher in the Atomic Age—and he knows the perils of the atom as well as its promise. He has no illusions about the task that the U.S. faces. Says he of the Russians and their test series: "They were preparing a good deal of the time while we were negotiating in good faith with them."

Clues from the Air. Much information about the Russian tests is already filtering into the AEC, but Seaborg and his colleagues will be picking up clues for weeks to come before they get the detailed answers as to what the Soviet Union actually tested and accomplished. Known is the fact that Russian tests at three different sites—northern and southern Novaya Zemlya and Semipalatinsk in the Soviet Arctic—have totaled more than 110 megatons of yield, bringing the total Russian test yield to date to about 160 megatons *v.* 125 megatons from known U.S. and British tests since 1946. The Soviet tests ranged from about 10 kilotons (10,000 tons of TNT) to slightly more than 50 megatons (50 million tons), were shot off on the surface, below water and in the atmosphere (but not above it). The shots came in such rapid succession that U.S. air-scooped atmospheric samples often picked up radioactive debris from two or more explosions at once—thereby complicating the task of analysis.

The U.S. decision to resume atmospheric testing is based on the conviction that the Soviet Union has made some substantial advances in nuclear strength in its test series. Some military and scientific leaders fear that the Russians have made important breakthroughs in nuclear technology, including the testing or development of an anti-missile missile that could weaken the effectiveness of the U.S.'s retaliatory power. But there is no actual evidence yet to indicate any such giant Russian strides. What worries the AEC more is that the Russian tests may have severely reduced the atomic lead that the U.S. now enjoys, thus strengthening the Soviet Union's military and political position.

As Glenn Seaborg sees it, the U.S.S.R. probably had several good nonpolitical reasons for testing. Among them: to reduce the weight of Russia's large and clumsy atomic warheads, thus getting more punch for a small load; to improve the range and effectiveness of Soviet battlefield atomic weapons; to test entire weapons systems by mating new warheads to missiles; and to conduct "proof" tests of weapons already in the Soviet stockpile. The current test series is almost certainly providing the Russians with valuable data for development of small- and medium-yield weapons, an area where they have been weak. At least one underwater blast, totaling 10 kilotons, was probably the developmental test of a depth charge geared with an eye on the threat of U.S. Polaris missiles.

Political Act. Many U.S. military thinkers believe that the Russian blast of a 50-megaton bomb indicates weakness rather than strength: it could mean that the Soviet Union does not have enough missiles to deliver large numbers of smaller, but perhaps more effective, nuclear warheads. But whatever the Soviet military motives for exploding the monster bomb—and not everyone was as optimistic as the military—the free world had no doubt that one of Khrushchev's chief aims was purely and simply to terrorize and intimidate the world.

For this reason, President Kennedy called the 50-megaton test "a political rather than a military act," pointed out that the U.S. could make a 50-megaton bomb any time it wished (for that matter, each SAC B-52 carries two 25-megaton bombs, which the U.S. considers more effective than a 50-megatoner). But, said John Kennedy, such a bomb would presently be "primarily a mass killer of people in war" rather than a nuclear weapon of any real military use. "Fear is the oldest weapon in history," said Kennedy. "Throughout the life of mankind, it has been the resort of those who could not hope to prevail by reason and persuasion. It will be repelled today, as it has been repelled in the past—not only by the steadfastness of free men but by the power of the arms which men will use to defend their freedom."

UPI

BAN-THE-BOMB DEMONSTRATORS IN MANHATTAN
But what happens when a rattlesnake is loose?

Calculated Risk. Just how well did Khrushchev's terror tactics work? Though he gloried in his role of modern-day Genghis Khan, the Soviet dictator took a calculated risk that his tests might so enrage the uncommitted nations that they would openly turn on Russia.

As it turned out, almost all the neutralist nations professed disillusionment—although often couched in perfunctory language. "It is regrettable that Russia has proceeded with the test in spite of the appeal of the United Nations and other countries not to do so," said India's Nehru. "No amount of argument that it was done in self-defense would wash off the wrong." Brazil's President João Goulart protested "against all forms of international coercion, including the threatened atomic destruction of humanity." Malaya's Prime Minister Abdul Rahman called the Soviet tests "deplorable," said that they showed "utter contempt and disregard for world opinion."

From New York to Los Angeles and from Copenhagen to Delhi, demonstrations were held to protest the Soviet tests. But they seemed, somehow, to have little more fervor than such anti-U.S. demonstrations as those generated by the executions of convicted Atom Spies Julius and Ethel Rosenberg and Abductor Caryl Chessman. In this sense, Khrushchev appeared to have won his gamble.

Sadly Mistaken. On the other hand, if Khrushchev expected that he could bully and stampede the free world into a state of defenseless fear, he was sadly mistaken. "We must not be cowed," said Secretary General Shigesaburo Maeo of Japan's ruling Liberal-Democratic Party, "but must reaffirm our determination to continue resistance against such inhuman conduct." Said Philippines President Carlos P. Garcia: "If Russia does not stop her defiant disregard of the feelings of entire humanity, she will inevitably reap what she has sown." Britain's Prime Minister Harold Macmillan spoke for the entire free world when he said: "If Khrushchev's reason was to spread panic among our people, then he has signally failed."

Nowhere was that truer than in the U.S. itself, where Americans, far from being frightened or cowed, were fighting mad. "When a rattlesnake is loose in the house," said the Dallas *News*, "you get down your gun and go after it." Said Robert J. Holton, 55, a Columbus, Ohio,

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grocer: "We should start testing some of our own bombs just as close as we can to Russia, and let them have some of that fallout." "Among the people I've talked to," said University of California Professor Harry B. Keller, "there's a hardening of attitudes. Now that the Russians have done their bit, people tell me, it's time we got cracking ourselves—even if it means atmospheric testing." Detroit's Police Commissioner Herbert Hart felt that the Russians may have done the U.S. a service: "I believe that the Russian superbomb angered our people and succeeded only in placing them more firmly behind any decision that President Kennedy might now have to make."

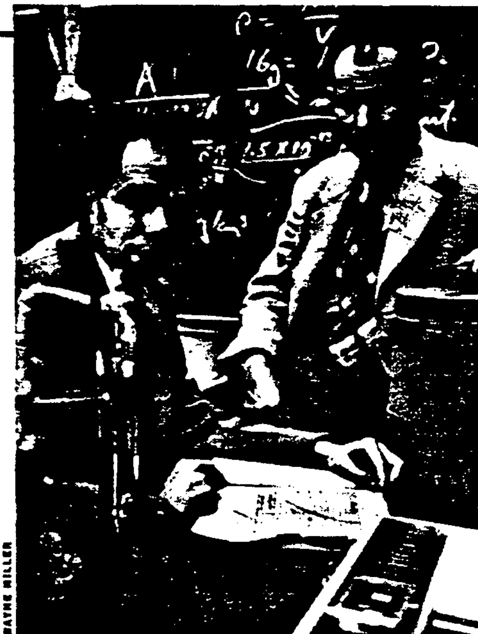
Radioactive Clouds. What frightened the world more than the specter of Soviet military might was the reappearance, after a three-year absence, of a much-feared, fiercely debated and vastly misunderstood phenomenon: radioactive fallout. With radioactive clouds from the Soviet tests spinning around the earth, fallout was on almost everybody's mind. U.S. housewives worried that their milk might be contaminated by the tests or that their children might get cancer. The Finns worried that their reindeer meat might become radioactive when reindeers munched on contaminated lichen. Great Britain set up plans for rationing baby foods and dried milk if radioactivity became too high. And in India, some people stopped buying chicken and other fowl because they feared radiation poisoning.

What was the force they feared? When a nuclear bomb explodes, the triggering process called fission—the splitting of atomic nuclei—produces some 200 radioactive products that are quickly sucked up into the troposphere and the stratosphere. Some of these fall to earth quickly, causing dangerous fallout around the blast area; others drift around the earth in the troposphere, like the clouds of radioactive ash from recent Russian tests; still others —the great majority—may stay in the stratosphere for months or even years before dropping to earth. A "dirty" nuclear explosion is one that depends heavily on the fallout-producing fission process (used as a trigger for H-bombs), especially when it is exploded so low that it sucks up dirt, which causes radioactive materials to fall to earth more quickly than in a nuclear high-air burst.

Most of the fallout from the Russian tests will not return to earth until late winter or spring. By that time, most of the particles will have lost their radioactivity, but others will still be active. The active fallout is dangerous because of its abilities to emit gamma rays and high-speed particles that can destroy living tissue. Unlike local fallout, which falls on those downwind from the test site and penetrates the body externally, delayed fallout enters the human body through food supplies, particularly milk, meat and vegetables.

The chief villains in fallout are three radioactive isotopes known as strontium 90, cesium 137 and iodine 131. Strontium 90 and cesium 137 remain active for 28

GLENN SEABORG: From Californium to the AEC



WAYNE MILLER

NOBELMEN SEABORG & McMILLAN

"I DISCOVER elements," Glenn Theodore Seaborg once told an interviewer. And he certainly does: in less than 20 years, Chemist Seaborg shared in the discovery of nine new elements, all of them in the heavy, transuranium field. In 1940, when he was just 28, Seaborg and Physicist Edwin McMillan identified plutonium, and with it, the key to the atomic bomb; in 1951 Seaborg and McMillan received the Nobel Prize for their discovery. Working in a University of California laboratory, Seaborg and his associates gradually extended the periodic table of elements, usually named their discoveries for their place of origin (americum, berkelium, californium), or for fellow scientists (curium, einsteinium, fermium). But Seaborg modestly discounts his achievements: "It was just a matter of being there. After all, we had the cyclotron."

Inelastic Scattering. A tall (6 ft. 3 in.), shambling man, Glenn Seaborg, 49, comes from solidly Swedish stock, was born in the little mining town of Ishpeming, Mich. When Glenn was ten, his father, a machinist, transplanted the family to California. In high school, Glenn at first majored in literature, but during his junior year he took a course in chemistry and found his career. "My God," he said, "why didn't someone tell me how wonderful it was?"

Seaborg worked his way through U.C.L.A. with a multitude of jobs ranging from stevedore to apricot picker, then moved on to the University of California at Berkeley for graduate work. He won his Ph.D. in chemistry with a learned thesis: *The Inelastic Scattering of Fast Neutrons*. After graduation he stayed on at Berkeley, went happily into the laboratory of the late great chemist, Gilbert Newton Lewis, as an assistant. A popular teacher, Seaborg advanced swiftly up the academic ladder, finally becoming chancellor of the university in 1958. At the same time, he was a leading figure in the university's Lawrence Radiation Laboratory: he served for 13 years as its pioneering director of nuclear chemical research.

With the discovery of plutonium, Seaborg moved into the forefront of nuclear science. In 1942 he went to Chicago as one of the key figures in the development of the atom bomb, spent the war years directing chemical research at the University of Chicago Metallurgical Laboratory—under the Army's Manhattan Project. Seaborg was largely responsible for the chemical separation processes used in the manufacture of plutonium at Oak Ridge, Tenn., and Richland, Wash., in the tense months before Hiroshima.

After the war, Seaborg served as a member of the General Advisory Committee of the Atomic Energy Commission, gave his reluctant support to the crash program that developed the hydrogen bomb—a program that split the nation's scientific community. "Although I deplore the prospect of our country putting a tremendous effort into the H-bomb," he said, "I must confess that I have been unable to come to the conclusion that we should not."

Planned Parenthood. Although he is a registered Democrat, Seaborg has been politically passive, served both Harry Truman and Dwight Eisenhower as an adviser. In 1959 the AEC gave him the $50,000 Enrico Fermi Award—the highest honor the Government can bestow on an atomic scientist. Last January, four days before he took office as President, John Kennedy appointed Seaborg chairman of the AEC—the highest federal administrative post a U.S. scientist has ever attained.

Seaborg is married to the former secretary of the late Dr. Ernest O. Lawrence, one of his campus colleagues at Berkeley, inventor of the cyclotron and a Nobel laureate. Seaborg and his wife agreed that it would be nice to have a family of six children —and they have six, including one boy, who was calmly and tidily delivered by his father. With characteristic resourcefulness Glenn Seaborg had already studied obstetrics and knew exactly what to do in such an emergency. Such scientific foresight should serve him well in his present job.

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years, iodine 131 for only eight days. Strontium 90 is the greatest threat of all because it concentrates in the bones of children, where it is believed to cause bone cancer and leukemia. In its brief life, iodine 131 is suspected to cause cancer, chiefly in children's thyroids. Cesium 137 may course through the entire body, sowing the seeds of possible future mutations.

Raging Controversy. Scientists agree that radioactivity in any quantity is bad for the human body. But a controversy rages about the actual effects of fallout and the level at which it becomes intolerably dangerous to human health. At one extreme is Dr. Linus Pauling, Caltech's Nobel Prizewinning chemist, who believes that the fallout danger point was reached when the U.S. exploded the first atomic bomb in the New Mexico desert in 1945 to usher in the Atomic Age. Pauling estimates that one 50-megaton bomb alone would cause 40,000 babies to be born with physical defects in the next few generations, and 400,000 more defective or stillborn babies over the next 6,000 years—or slightly more than one a week. He also expects uncounted cases of bone cancer, leukemia and other physical defects to appear in humans now alive. At the other extreme is Dr. Edward Teller, professor of physics at the University of California and a developer of the H-bomb, who insists that there is no worldwide danger from fallout as a result of nuclear testing. Says Teller: "The fallout danger is grossly and improperly exaggerated."

Last week the U.S. Public Health Service, guardian of the nation's health, announced that fallout levels in the U.S. as a result of the Russian tests "do not warrant undue public concern." The agency charged that the Soviet tests would indeed add to the risk of health damage and genetic effects in future generations, but added: "At present radiation levels, and even at somewhat higher levels, the additional risk is slight, and very few people will be affected."

Unlucky Dragon. Though the Atomic Age is not yet old enough to produce definitive information on the long-term results of fallout, many scientists consider the problem far less serious than they thought it only a few years ago. Says Nuclear Scientist Bo Lindell of Sweden's Royal Caroline Institute: "No one needs to worry over the global fallout from nuclear tests. That can be said and must be said again and again." Says Dr. Merril Eisenbud, director of the environmental radiation laboratory of the New York University Medical Center: "Fallout is not a good thing. But of all the sources of man-made exposure to ionizing radiation, this is among the smallest. The total dose from fallout to the present time has been about 5% of the dose the average person receives from natural radioactivity. It's probably less than 5% of the dose delivered to the average person as the result of the improper use of X rays. It would be relatively simple for our physicians to improve their X-ray techniques, and thus reduce exposure by a much larger amount."

YOSHITO MATSUSHIGE—ATOM BOMB NO. 1

HIROSHIMA TEN MINUTES AFTER THE BLAST
Fear is the oldest weapon.

No one denies the potential dangers of fallout, but the statistics fail to show so far that the danger has been realized. The only man thought to have died as a result of testing fallout was a seaman on the Japanese fishing boat, *The Lucky Dragon*, which came too close to U.S. Pacific testing grounds—and doctors are not even sure of that. Public health figures show that the frequency of bone cancer or leukemia in adults as a result of fallout is practically negligible. Since the recent Russian tests, most U.S. children carry about ten units of strontium 90 in their bodies, far less than the top tolerance of 50 units, which has to be maintained steadily in the body before scientists consider it hazardous. Since strontium 90's effect declines as a child grows, both the U.S. and the Soviet Union would have to explode a tremendous number of bombs in succession even to get near the danger level.

As for the genetic effects of test fallout, says Professor Cyril L. Comar, head of the physical biology and radiation field lab at Cornell University, "As I see it, the absolute effect, in terms of the numbers involved and human suffering, will be very small. It will be of no significance." Scientists point out that people already unwittingly do many things that can produce mutations. Men who wear tight shorts or athletic supporters may produce genetic mutations by causing the testes to be maintained at a higher temperature than normal. And Norwegian scientists believe that people living in houses made of concrete get some 300 milliroentgens of radioactivity annually, three times more than the radiation from nuclear testing expected in 1962. Reason: concrete carries a higher rate of natural radioactivity than most building materials.

Milk in the Freezer. When they speak of fallout, the scientists are sanguine only about peacetime fallout from testing, which is not carried out in populated areas.

The only examples of wartime nuclear devastation that the world has to go on are the A-bombings of Hiroshima and Nagasaki. The single bomb that fell on Hiroshima, packing only 20 kilotons of power, almost completely wiped out everything within 4.4 square miles, killed 70,000 to 80,000 people (total pop. 245,000) and injured an equal number. Some 62,000 of the 90,000 buildings in the urban area were leveled. Fires broke out instantly as far as 13,700 ft. from ground zero. Though thousands died that day from the effects of initial radiation, those outside the Hiroshima and Nagasaki areas have showed no ill effects from fallout, and there has been no later widespread incidence of cancer, sterility, cataracts or defective births.

Still, the world must obviously prepare for the day when fallout, even from tests, may rise beyond tolerable levels. The U.S. is improving a vast detection system that will enable it to give public warning to its citizens if radiation becomes a real danger. Should the level of radioactivity rise markedly, babies could be kept on processed food longer to avoid radiation; milk and other vulnerable foods could be kept 38 in freezers for a longer time before consumption, allowing short-lived radioactive materials to decay. Contaminated milk could also be diluted with uncontaminated milk, bringing radioactivity below the danger point. People could be protected from radioactive iodine by taking potassium iodine in their diet to block out or neutralize radioactivity. Farmers could use stored feed grain for their cattle during periods of high radioactivity. As for the vital water supply, most potable U.S. water sits in huge reservoirs for years before it is consumed, giving plenty of time for short-lived radioisotopes to die; the addition of chemicals in treatment plants would further cut radioactivity. Says University of California Professor Everett R. Dempster: "Fallout is a thing to be avoided, but we're not at the danger point yet. To me the issues of peace and war are very much more important than fallout and mutations."

Polishing the Adjectives. It is in the interests of those issues that the U.S. finds itself with little choice but to resume atmospheric testing. Though the Administration has not yet decided just when to begin testing, pressure grew in Congress for a quick test resumption. New Mexico's Senator Clinton P. Anderson and California's Representative Chet Holifield—the two senior Democrats on the Joint Congressional Committee on Atomic Energy—called last week in strong words for atmospheric tests. Said Anderson: "We must conduct atmospheric tests because the underground tests have not given us all the answers we need." Connecticut's Democrat Senator Thomas J. Dodd demanded a crash program of testing to develop a deadly neutron bomb (TIME, July 7), which scientists still consider several years away from reality. Added Georgia's Democratic Senator Richard B. Russell: It is essential to "conduct some atmospheric tests—until we perfect the neutron bomb."

Opposition to renewed testing was not based so much on fear of fallout as the feeling by some Government officials that the U.S. will suffer an international political disaster if it resumes atmospheric tests. The notion is that many unaligned nations and wavering neutrals will be glad to stop yelling at Khrushchev, who frightens them and pays no attention to them, and start yelling at the U.S., which acts the part of a gentleman and in the past has taken their complaints with utmost seriousness. Says USIA Chief Edward R. Murrow: "Editorial writers in the non-Communist-bloc countries have just about exhausted all the known adjectives in expressing their condemnation of the Soviet nuclear tests—but they'll polish up some new ones when we begin testing." Yet the U.S. may certainly be pardoned for feeling that this transitory expression of world opinion—including new Afro-Asian adjectives—is less important than its own security and the future of freedom everywhere in the free world.

Waiting: 30 Weapons. That security and that future have been shaken by the Russian test series. Although the U.S. still leads in the quality, sophistication and number of its nuclear arsenal, few in Washington doubt that the lead has been badly cut during the three-year moratorium and by the current Soviet tests. Most military experts and scientists believe that the Russians could not have resumed testing at such a brisk pace without preparing for the tests for at least a year, and some suspect that they have been setting off underground explosions all along. While the U.S. was penalized by its adherence to the moratorium, the Russians planned, prepared for, and executed the most intensive and impressive test series in the world's history.

Because of more advanced techniques. the U.S. atmospheric tests will produce

YOSUKE YAMAHATA—ATOM BOMBED NAGASAKI

NAGASAKI SURVIVOR
Real examples are few.

a mere fraction of the fallout that has accompanied the Russian shots. The U.S. does not intend to resume atmospheric testing for the mere hellishness of it. But there are plenty of practical reasons why the U.S. does need to resume tests. In its labs, the U.S. has developed some 30 weapons with nuclear capability since the moratorium went into effect in 1958—and scientists are anxious to test them fully. The military would like to improve the weight-yield ratio of its weapons and try to come closer to a completely "clean" bomb. High-altitude testing could produce information about how to defend against incoming H-bomb missiles. Scientists, in need of advanced tests on weapon structure, may explore the effects of setting off more than one bomb simultaneously to see what happens when the two blast waves collide.

Most of these require atmospheric testing—and even though the decision has essentially been made by President Kennedy, there remain considerable problems. Starting almost from scratch because of its three years of inactivity, the U.S. has yet to prepare sites both above and below ground, get devices ready for testing, set up schedules, and move personnel to potential test sites. Estimates are that the U.S. will not be able to perform any meaningful atmospheric testing until midsummer. In fact, the U.S. does not even have a good test site for atmospheric testing, is scouring the Pacific to find one. The U.S. is, among other things, reluctant to resume testing at the Eniwetok Atoll because of the political furor that it feels would be caused among Africans and Asians by south-blown fallout.

Changed Emphasis. The huge and vital job of preparing the U.S. to resume testing falls heavily upon the AEC and Chairman Seaborg. Though Seaborg is a civilian who would rather concentrate on the peaceful uses of the atom, the responsibility of preparing the U.S. for possible nuclear war can never be out of his mind. Seaborg's AEC was established in 1946, when Congress decided to take control of atomic power away from the War Department. The AEC was set up as an independent agency of civilians charged with guiding a national program to convert atomic energy for peaceful uses and, at the same time, ensuring that such energy could be used if necessary to defend the U.S. from any nuclear aggressor.

Under David Lilienthal, its first chairman, the AEC's emphasis in a world just recovered from war was on the atom's peaceful use. But when the Soviets turned down a U.S. plan (presented by Bernard Baruch) for international control of atomic energy—and shortly thereafter set off their own A-bomb—the emphasis changed. Though the U.S. continued to work on nuclear power projects and medical uses of the atom, the military face of the atom loomed larger and larger. Under AEC Chairmen Gordon Dean and Lewis Strauss, the U.S. began devoting its energy to turning out nuclear submarines, developing more powerful nuclear warheads, and setting off a whole testing series for the H-bomb.

Three Hats. To do his job properly, Glenn Seaborg must wear three hats. There is Seaborg the AEC chairman, involved in all the technical complexities of that job. There is Seaborg the adviser to the President on nuclear and atomic matters. And there is Seaborg the top Government spokesman for the scientific and industrial community. Though he has only the same single vote in the AEC as its other four commissioners, Seaborg must make the day-to-day decisions that keep the AEC pulsating, still be able to explain the facts of the nation's nuclear stance to such searching inquirers as President Kennedy, Defense Secretary McNamara or the Members of the Joint Committee on Atomic Energy.

The realization that he must devote most of his energies to preparing for the possibility of war saddens Glenn Seaborg. But the choice is not his—or that of the U.S. For the Soviet Union has made it necessary for the U.S. to meet ruthlessness with strength.

WORLD TELEGRAM
New York, N. Y.

DEC 3 1961

Seaborg Asks More For Basic Research

Glenn T. Seaborg, chairman of ~~the Atomic Energy~~ Commission, said last night the United States was not adequately supporting scientific research although it could spell the difference in the cold war.

Speaking at the windup dinner of the 66th annual Congress of the National Assn. of Manufacturers in the Waldorf-Astoria, he also questioned whether top officials of government and business were equipped to make national decisions which were becoming increasingly based on technical knowledge.

He said he would not consider that the United States follow the Russian Communist government. But he noted that eight of the 15 members of the Soviet Presidium had a technical background. He said the same was true for the powerful Communist party secretariat.

Bids Business Spend.

Mr. Seaborg warned that U.S. business was not pulling its own weight in supporting basic research.

"The frightening thing is that the levels of support of basic research and of education in the United States are still inadequate," he said. He also said basic research was responsible in some part for the increase of all production and goods.

"Therefore, it would pay us to substanitially increase our national investment in basic research," he said.

He said that in 1959 universities spent an estimated 50 percent of their research and development funds on basic research. The U.S. government spent about 12 percent and industry about 4 percent, he said.

Earlier, John M. McGivern, 1961 NAM president, warned this country is drifting toward a super-state.

However, Mr. McGovern said he was encouraged to think that the tide toward centralized government may be turning. "One of the most encouraging signs, is the resurgence of individualism and faith in America" on college campuses," he said.

Judd Sees Vacillation.

In another address, Rep. Walter H. Judd, (R., Minn.) called upon the Kennedy administration to stop its "vacillation, indecision, and defensiveness" and demonstrate to Russia "our willingness to stand at the brink." He said "every time we have stood firm at the brink, in the past no one has gone over." He said that such a stand has always forced the Soviets to back down.

Rep. Judd, who recently returned from an extensive tour of the Far East, said he found "less confidence in the United States" than he did there two years ago. He said small nations in that area "feel we have let them down," and may be preparing to abandon them to the Communists.

N.Y. HERALD TRIBUNE, SATURDAY, DEC. 9, 1961

AEC Head Declares:

Science and Education Can Win the Cold War

By M. Jay Racusin

Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission, said last night that if the present struggle with the Communist bloc is won peaceably by the Western powers' "forces of freedom," it will be the result largely of scientific and educational superiority.

"It is a frightening thing, therefore," he said, "that the levels of support of basic research and of education in the United States are still in adequate."

'Possibility of War'

Dr. Seaborg offered his observations at the annual dinner of the sixty-sixth Congress of American Industry sponsored by the National Association of Manufacturers at the Waldorf-Astoria.

The Commission chairman said it was urgent that "the levels of education must be raised all along the line, and therefore support for education must be increased at all levels."

"While the possibility of a nuclear war cannot be dismissed," said Dr. Seaborg, "it is possible that, instead, we will live in a state of continuing crisis for a number of years. During such a period, the victory would take place gradually and the identity of the victor would not become known until long after the precise moment had passed."

The strength of the victor, he added, would lie not only in forces of arms but in the quality and number of very highly trained minds at his disposal.

"The ribbons on his tunic," Dr. Seaborg insisted, "would include a long list of scientific accomplishments."

John W. McGovern, outgoing president of the N. A. M., warned that if the "unconscious" drift toward centralized control of the economy continued, Premier Nikita S. Khrushchev's prediction that our grandchildren will live under socialism could come true. He was encouraged to think that the tide may be turning, he said, in the "resurgence of individualism and faith in America" found on college campuses.

N. Y. TIMES DEC. 22, 1961

KENNEDY REVIEWS SOVIET ATOM GAIN WITH MACMILLAN

N. Y. Times

They Open Bermuda Talks in Accord on Berlin and Congo—Hear Experts

12-22-61

Kennedy's statement and reply by Macmillan. Page 8.

By TOM WICKER

Special to The New York Times

HAMILTON, Bermuda, Dec. 21 — President Kennedy and Prime Minister Macmillan of Britain met for five hours today and, among other topics, heard their nuclear experts agree that the Soviet Union had made progress toward an anti-missile missile.

In the first day of their two-day conference at Government House, the capitol of this British island, they did not discuss the question of the British and United States response to the gains they agreed the Russians had made in a recent nuclear test series.

The entire discussion of nuclear testing was limited to an exposition of facts on the Soviet tests.

In addition, Mr. Macmillan and Mr. Kennedy discussed Berlin and the Congo.

De Gaulle Invited

President de Gaulle of France received a last-minute invitation to participate in the conference, it was learned. The invitation was issued him by James M. Gavin, the United States Ambassador to France.

Mr. Gavin saw General de Gaulle a few hours before the conference was announced about two weeks ago. As yet no answer has been received from General de Gaulle.

British and United States press was "full agreement" between Mr. Kennedy and Mr. Macmillan on all three subjects they discussed. They emphasized however, that the phrase referred only to those phases of the three subjects that actually were discussed today.

Differ on Negotiations

On the Berlin situation, a shade of difference in the British and American approaches to negotiations developed, despite a public statement of "complete agreement."

Mr. Macmillan and his party presented the view that if grounds for useful negotiations with the Soviet Union could be discovered, a foreign ministers' conference ought then to be held.

Mr. Kennedy and the Americans held back, however, partly because of the adamant opposition of France to any negotiations at this time.

The British had not pressed the point nor particularly opposed the United States' view, but nevertheless a difference in approach was evident.

The essential question appeared to be as follows: if the Russians make a positive response to the British-American willingness to negotiate on Berlin, what course should the West then take?

The question of the Congo was discussed for only fifteen minutes, and that on the basis of scant information gathered in the last twenty-four hours. Both sides considered as promising the eight-point program presented by Moïse Tshombe, President of Katanga province, in his talks with Cyrille Adoula, the Premier of the central Congolese Government.

It was noted, however, that Mr. Tshombe had made the important reservation that he could not personally agree to bring Katanga back into the Central Government but would need the agreement of his associates in Elisabethville.

The "complete agreement" of Mr. Kennedy and Mr. Macmillan pertained only to what John Russell, the British press officer, called a hope that a satisfactory solution in the Congo was "in course of achievement on the spot."

Few Details Provided

Mr. Russell and Pierre Salinger, the White House press secretary, gave reporters a sketchy picture of what had happened at today's conference, but filled in few details.

They said the nuclear report had taken an hour and five minutes. It was given to Mr. Kennedy and Mr. Macmillan by Glenn T. Seaborg, chairman of the United States Atomic Energy Commission; Dr. Harold Brown, chief of the Defense Department's Division of Research and Engineering, and Sir William Penny, the member for scientific research of Britain's Atomic Energy Authority.

The longest period of the afternoon conference, an hour and fifteen minutes, was reserved for Berlin.

The President and the Prime Minister will resume their talks at 10:30 A. M. tomorrow and will meet twice. Mr. Russell said Berlin and nuclear testing would be discussed again.

Goa Likely to Come Up

The Indian conquest of Portuguese Goa, he said, also was "likely to come up" tomorrow. He added that it was possible there would be discussioins of the European Economic Community, which Britain hopes to join, and of trade problems.

Mr. Kennedy is scheduled to return t oPalm Beach, Fla., at 5 P. M. tomorrow.

The conversations took place in an informal atmosphere in a large pink-ceilinged room of Government House. Mr. Kennedy and Mr. Macmillan sat in arm chairs before a white tiled fireplace.

The room looked out on the wes tterrace of the rambling oyster-colored stone building. As members of the British and American parties came and went, they gathered on a long sofa before the fireplace or in chairs behind the President and the Prime Minister.

Mr. Kennedy and Mr. Macmillan met alone from 2:50 P. M. to 3:40 P. M., when they were joined by Secretary of State Dean Rusk, Lord Home, the British Foreign Minister, McGeorge Bundy, the President's Special Assistant for National Security Affairs, and Philip de Zulueta, Mr. Macmillan's private secretary.

The Congo discussion ensued, but was broken off at 3:55 P. M. for the Berlin discussion. That brought in Charles E. Bohlen, the State Department expert on Soviet affairs; William R. Tyler, a Deputy Assistant Secretary of State for European Affairs; David K. E. Bruce, United tSates Ambassador to the Court of St. James's; Sir Evelyn Shuckburgh, a European affairs specialist in the British Foreign Office, and Ian Sandhurst, Lord Home's private secretary.

At 5:10 P. M. the group, being on British soil, recessed for tea. During this break Mr. Kennedy called Palm Beach to inquire about the condition of his father, Joseph P. Kennedy, who is in the hospital there.

Mr. Kennedy suffered a stroke last Tuesday. The President was told today that his condition remains serious.

At 5:20 the nuclear report was started, and it went on until 6:25 P. M., when the day's conference ended.

The talks will resume tomorrow.

Mr. Kennedy's jet landed at Kindley Air Force Base, an American installation on Bermuda, after a flight of two hours and four minutes from Palm Beach International Airport.

PHILADELPHIA INQUIRER DECEMBER 28, 1961

Science Molding Life Of Man, Seaborg Says

Challenge Is Cited by AEC Chief

From Our Wire Services

DENVER, Colo., Dec. 27.—Dr. Glenn T. Seaborg, Nobel Prize winning nuclear physicist and chairman of the Atomic Energy Commission, told the national scientific community Wednesday that "the scientific society has arrived."

Changes that scientists are making and will continue to make in the fabric of man's life, he said, will "run wide and deep." Such changes can be expected to meet resistance, he said, but the march of science over the last five centuries has made everything that followed "virtually inevitable."

CRITICAL PERIOD

"The critical breakthrough" was made during the Renaissance when man achieved "the right to search for truth," he told the American Association for the Advancement of Science, which is meeting here.

The major role of scientists in society today began largely in the atomic laboratories during the Second World War, he said.

Paradoxically as science has become more important to society, it sometimes seems to have become less important in the liberal humanistic education, he said.

"Who in our times can make an adequate criticism of life without knowledge of ideals, the methods and the dynamics of science?" Dr. Seaborg asked.

EMPHASIZES EDUCATION

He called for increasing emphasis on educating citizens in science.

NEW YORK TIMES 1/8/62

Science and Public Policy

A fundamental problem facing modern democracies was spotlighted by Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission, in an address to the American Association for the Advancement of Science.

The problem is this: Major issues of public policy are increasingly becoming dependent, in whole or in part, upon questions of scientific fact; yet the voters at large—and often also the men who must make the immediate decisions—have little or none of the scientific background required to weigh the technical evidence. In such a situation how are we to enjoy anything approaching intelligent democratic control over policy and the policy makers? The dilemma becomes even more difficult in those areas where the basic scientific information is classified, so that even competent scientists without access to the facts cannot make dependable judgments.

The practical immediate solution, as Dr. Seaborg noted, has been for scientists to assume even greater importance as advisers to policy makers. This undoubtedly is a major aid in the reaching of decisions, but it still does nothing by itself to create an informed public opinion capable of critical and intelligent evaluation of the alternatives.

The ideal solution would be for all of us to know enough science and mathematics—say mathematics through functions of a complex variable, plus a solid grounding in nuclear physics, radiation chemistry, celestial mechanics and similar subjects—to understand the technicians talking in their own language. But since most of us are unlikely ever to be able to deal with the technicians on their own ground, the only alternative is to develop better ways to educate ourselves in at least the essentials of science required for minimum effective citizenship in this scientific age. The expert popularizer of science is the man to whom we must look. The necessary educational advance is not easy and certainly will not be accomplished in a short time, but progress is being made.

LOUISVILLE COURIER-JOURNAL FEBRUARY 9, 1962

State Becomes First To Control A-Activities

A.E.C. Chief, Combs Sign Nuclear Pact

Louisville

Courier-Journal Bureau.

Washington, Feb. 8.—With the aid of three ceremonial pens, Governor Combs and Atomic Energy Commission Chairman Glenn Seaborg Thursday launched Kentucky into the Atomic Age.

While some 60 State and federal officials looked on, the Bluegrass State officially became the first in the Union to take over control of most of the nuclear activities within its borders.

The A.E.C. had been a bit grudging about giving up its authority, but it finally did so Thursday with grace and showmanship.

'Rare Day' Arrives

"I've heard it said that it is a rare day when the federal government relinquishes any power to the states," Seaborg said. "Well that rare day has arrived. True to its pioneering tradition, Kentucky was the first state to enact enabling legislation and the first to submit a program."

Combs said that he hopes and expects the program made possible by approval of the agreement will bring vast new opportunities to the state in the fields of agriculture, medicine, and industry.

Predicts California Pact

"I am happy to be here today to witness this signing of the first federal-state agreement under the Atomic Energy Act," said Representative Chet Holifield (D., Cal.), chairman of the Joint Committee on Atomic Energy.

Holifield, born in Mayfield, said he is "especially delighted that Kentucky, the state of my birth, has come forth to take these responsibilities." He predicted that California "will be the second state to step up to the altar with the A.E.C."

Congressmen There

The ceremony, which took place at the commission's headquarters, was also attended by seven members of Kentucky's Congressional delegation. Senator John Sherman Cooper and Representatives Frank Burke (D., Louisville), and Eugene Siler (R., Williamsburg) were the only absentees. Cooper, in bed with influenza, sent congratulations.

Representing the White House at the ceremony was Lawrence F. O'Brien, special assistant to the President. Also on hand were the three other A.E.C. commissioners, representatives of the Council of State Governments, the U. S. Public Health Service, and the A.E.C. staff.

Combs was accompanied by Attorney General John B. Breckinridge and James N. Neel, Jr., Kentucky's atomic coordinator. "These two handsome boys," Combs said, "really are responsible for working up this program and they deserve most of the credit."

To Regulate Licensing

Industrial Development Director Leonard Kernan and Dr. Russell Teague also flew here with the Governor. Teague is Kentucky's commissioner of public health.

His department will be responsible for regulating the licensing of radioactive materials when the agreement goes into effect March 26. Kernan is in charge of luring Atomic Age industries into Kentucky.

After the ceremony A.E.C. and Frankfort officials lunched at the Metropolitan Club. Seaborg will address a joint session of the Kentucky Legislature at 10:15 a.m. Friday. Afterward he will attend a reception at the Capitol, dine at the Governor's Mansion, and tour Calumet Farm.

Associated Press Wirephoto

ATOMIC ACCORD SIGNED . . . Governor Combs of Kentucky and Glen Seaborg, right, chairman of the Atomic Energy Commission, are pictured in Washington yesterday signing an agreement giving Kentucky control of some atomic-energy operations in the state. Looking on, from left, are James Neel, Kentucky coordinator of atomic activities; Dr. Russell Teague, Kentucky commissioner of health, and Kentucky Attorney General John Breckinridge.

Cincinnati Enquirer Friday, Feb. 9, 1962

At Edison Dinner

Science Careers Lauded By Chairman Of AEC

BY JACK SMITH
Of The Enquirer Staff

"A career in science does not require you to be a genius," Dr. Glenn T. Seaborg, chairman of the U. S. Atomic Energy Commission told 110 young science students here last night.

The Nobel Prize-winning chemist spoke at the sixth annual Science Youth Day Dinner, part of the International Edison Birthday Celebration, held this year in Cincinnati. It commemorates the 115th anniversary of the birth of inventor Thomas Alva Edison in Milan, Ohio.

Dr. Seaborg, with the University of California at Berkeley until he was named to head the AEC a year ago, shared the 1951 Nobel Prize in Chemistry with Prof. E. M. McMillan, also of the University of California, for discovery of atomic fuel plutonium.

"Science has unfolded many wonders in the more recent past, but is impact in so short a space of time is only an indication of its potential for increase and multiplication. While we cannot appraise this mathematically, we know that it will be vast," Dr. Seaborg told an audience of some 500 persons at a dinner in the Pavilion Caprice of the Hotel Netherland Hilton. Besides the student who got certificates for their scientific scholarship, teachers and school officials attended the affair.

It was sponsored by the Thomas Alva Edison Foundation and the Cincinnati Gas & Electric Co.

Besides work in plutonium, Dr. Seaborg is credited with discovery or co-discovery of other elements heavier than uranium, including 95 (americium), 96 (curium), 97 (berkelium), 98 (californium), 99 (einstinium), 100 (fermium) and 101 (mendelevium).

Illustrating his comments on the scientists' ability to do hard work is the fact that he has written some 200 scientific articles and several books on chemistry and the elements.

In his talk, Dr. Seaborg said that while he was in general sympathy with modern trends, "this matter of hard work runs counter to the trend of modern times, with its emphasis on more leisure time, shorter work weeks, and more leisure time activities . . . I cannot feel that the 35-hour week has much relevance for a creative scientist.

"I believe that every person has a deep psychological need to feel that what he is doing is of some importance, aside from the money he is paid for doing it," he said.

—Enquirer (Straub) Photo

Dr. Glenn T. Seaborg, Right, Greets William A. Tolin
. . . bust of Edison watches scientist and student

PHILADELPHIA, Thursday, February 15, 1962

Temple Awards Honorary Degrees at Commencement

THE EVENING BULLETIN

Dr. Millard E. Gladfelter (right), president of Temple University, presents honorary degrees to (from left) Walter A. Munns, Russell Conwell Cooney, Dr. Glenn T. Seaborg and Dr. Margaret Mead.

World Must Learn to Live Without War, Grads Told

Nations must learn to defend themselves and their ideals in ways other than war, Dr. Margaret Mead, noted anthropologist, said here today.

"Steadfastness and ability to stand continuous stress and threat have taken the place of willingness to fight and die," she told 623 graduates at Temple University's midyear commencement.

Dr. Mead was one of four recipients of honorary degrees at the exercises in the Baptist Temple, Broad and Berks sts. She was awarded the honorary degree of doctor of letters.

Other Award Winners

Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission, received an honorary doctor of science degree.

Honorary doctor of laws degrees were awarded to Walter A. Munns, president of Smith Kline & French Laboratories, Inc., and Russell Conwell Cooney, general counsel for the university and nephew of Temple's founder, Dr. Russell H. Conwell.

The degrees were conferred by Dr. Millard E. Gladfelter, Temple president.

Curator in New York

Dr. Mead, who is associate curator of ethnology at the American Museum of Natural History in New York, said the most common view of the psychological problems of establishing a peaceful world is that aggression, hostility and destructiveness must be controlled.

"It is, however, now being recognized that although such behaviors do play a part in warfare, the human desire to protect is even more deeply involved," she said.

"So the problem arises how to enlist man's protectiveness in peacekeeping activities that will include the entire human race.

"The enemy will then be no longer other human societies, but rather disease, natural disaster and war itself, and the problem will be how to join with other societies in keeping our disastrously expanded warmaking capabilities in check. This is a task that will be with us throughout the foreseeable future."

President Kennedy turns to his guests last night during the first event of the social calendar at the White House and gestures to have them spread out for a picture. Left to right: The President, Mrs. Kennedy, Vice President and Mrs. Johnson and House Speaker and Mrs. John McCormack. In background behind Mr. Johnson, the President's military aides, Brig. Gen. Godfrey T. McHugh (left), Maj. Gen. Chester Clifton and Capt. Tazewell Shepard (right), turn to Chief Justice and Mrs. Earl Warren to usher them up front.—Star Staff Photo by John Horan.

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Kennedys Are Hosts

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The Evening Star, February 21, 1962 (Continued)

By BETTY BEALE and DAISY CLELAND
Star Staff Writers

"It's been a great day for orbit. I've been in orbit too." said the President of the United States last evening at a White House state dinner.

He was addressing his remarks to the company of

Grace Bumbry's Recital Thrills White House Guests. Page B-1[illegible]

120 assembled to do honor to the Vice President, the Speaker and the Chief Justice of the United States.

LT. COL. JOHN GLENN'S accomplishment was on everyone's lips at the white tie dinner and was referred to by the host and his three honor guests in their after-dinner toasts.

Said the Vice President, "Tonight climaxes a memorable day for John Glenn and one for the free world."

The Speaker and the Chief Justice also paid tribute to the feat that caused Col. Glenn to whip through three Tuesdays in a few hours.

Mr. Kennedy smilingly told his guests that two of the men at the dinner had been "in orbit" yesterday. The Senate's vote on the Urban Affairs department had put both him and the Vice President in that state, he said, according to a White House staff member who was at the dinner.

IT WAS QUITE APPARENT that the defeat on Capitol Hill came in for almost as much discussion as the victory in space. Representative Mills, chairman of the powerful Ways and Means Committee, told the President last evening that the Urban Affairs bill would be defeated in the House today by 90 votes.

Mr. Kennedy in his after-dinner comments said that it might appear rather unusual and out of tradition to honor the Vice President, Speaker and Chief Justice simultaneously at a White House dinner, but he felt by doing so he was pulling together the strands of history. The traditional separate dinners for the three men was artificial, he said, in that the Speaker's dinner had been established by Theodore Roosevelt largely to appease Speaker Joe Cannon.

And the dinner for the Vice President had resulted from Herbert Hoover's inability to arbitrate the protocol claims of Dolly Gann, sister of Vice President Curtis, and Alice Longworth, wife of the Speaker, continued Mr. Kennedy drawing chuckles from his guests.

HE THOUGHT, THEREFORE, he was not injuring tradition by consolidating the three in one party and besides, he noted, Mrs. Kennedy would soon be leaving for India and Pakistan and wanted to be present when each man was honored.

There were two other events of the day that might be overlooked in the light of the Glenn mission, he said as he terminated his remarks. One was that Gen. Lyman Lemnitzer, Chairman of the Joint Chiefs of Staff, had flown back from Honolulu in a record of 8 hours and some minutes. The other was that Mrs. Hubert Humphrey was celebrating her birthday.

Although the new protocol that puts the Speaker ahead of the Chief Justice was clearly defined by the order in which Mr. Kennedy called on his honor guests for their remarks, it was difficult to tell by the seating arrangement which of those two gentlemen ranked the other.

Guests were seated at three tables in the State Dining Room, the President host at one with Mrs. Lyndon Johnson on his right and the Chief Justice opposite him; Mrs. Kennedy, hostess at another with Speaker McCormack on her right; and Mr. Johnson, host at the third with Mrs. Earl Warren on his right and Mrs. McCormack as his hostess.

JOHN McCORMACK, in fine spirits last evening, told an amusing story when he rose for a toast. He recalled the time he went over to President Franklin D. Roosevelt's office on a patronage matter and overheard the President saying over the telephone, "No, I can't do that. No, mother, it's against the law."

Jacqueline Kennedy looked beautiful and very slim in a new Cassini sheath of heavy apricot silk linen with a train-like panel that fell the full length of her gown in back. With it she wore a three-stand pearl necklace almost hidden in front by the high neckline of her dress, and drop earrings of emeralds surrounded by diamonds. After dinner she put back on her long white kid gloves for the demi-tasse period and musicale that followed.

Noted Negro mezzo-soprano Grace Bumbry was the concert star of the evening and presented an enthusiastically-received program of eight songs and one encore in four different languages—Italian, German, French and English.

ONE OF THE FRENCH SONGS, "L'Invitation au Voyage" by Henri Duparc, seemed to be a favorite of Mrs. Kennedy's, who seated beside her husband in the front row in the East Room, leaned toward him and very quietly sang the words to him.

Mr. Kennedy particularly applauded Miss Bumbry's rendition of Aaron Copland's "Boatmen's Dance," which had the lilt and warmth of a Negro spiritual.

As soon as the concert was over at 11:10, the President thanked the singer and introduced her to everyone in the first row. Miss Bumbry, who sang in Paris Sunday night, is returning to Europe today to sing in Lyons, France tomorrow.

Last evening's party seemed more casual than most White House state affairs. The fact that these were all U. S. government leaders who were "old hat" to each other probably had something to do with it. Everybody was relaxed and having a comfortable, congenial time.

Almost everyone there had been to the White House before and many may have felt a new familiarity with it after Mrs. Kennedy's TV program of last week. Concerning that program she said she was glad that it could be filmed in one day although she did get quite tired by the end of the day. She minimized her memory feat, saying the names of the donors were not hard to remember because some of their gifts had come so far apart and were impressed all the more in their minds.

FIRES GLOWING in the hearths of the Red and Green Rooms added to their richness, and there was richness in the color of the women's gowns. Mrs. Warren wore red chiffon embroidered on the bodice with iridescent sequins, and Mrs. Arthur Goldberg was in deep brilliant red satin. Mrs. James Webb, wife of the head of NASA who said he went to sleep as soon as Glenn emerged from the capsule, wore emerald green satin, and Mrs. Alben Barkley was in emerald green peau de soie.

Mrs. Fred Vinson, wearing a new hairdo with bangs, and an olive green dress, was her usual chipper self. "There were lots of laughs at my end of the table," she said. There always are in the vicinity of Roberta Vinson.

When the musicale was over the First Lady remained in the East Room having brief chats with guests who came up to say good night. While out in the entrance hall the President, who had escorted Mrs. J. Hamilton Lewis to the door, was shaking hands with everyone individually as each took his leave. The Air Force Strolling Strings, who lined the corridor, broke into such spirited music at the end that one or two felt inclined to do a dance step. By midnight the party was over.

GUESTS AT THE DINNER from the Supreme Court included Justice and Mrs. Black, Justice and Mrs. Douglas, Justice and Mrs. Clark, Justice and Mrs. Harlan, Justice and Mrs. Brennan, Justice and Mrs. Stewart and Justice and Mrs. Reed.

The Cabinet was represented by Secretary of Interior and Mrs. Udall, Secretary of Agriculture and Mrs. Freeman, Secretary of Commerce and Mrs. Hodges, Secretary of Labor and Mrs. Goldberg and Secretary of Health, Education and Welfare and Mrs. Ribicoff.

Others were Chairman of the Atomic Energy Commission and Mrs. Glenn T. Seaborg, Budget Director and Mrs. David E. Bell, and Acting Director of the Office of Emergency Planning and Mrs. Edward A. McDermott.

From the Senate were Majority Leader Mike Mansfield; Senator and Mrs. Hubert H. Humphrey; Senator and Mrs. Estes Kefauver, Senate Minority Leader and Mrs. Everett Dirksen and Senator and Mrs. Thomas Kuchel.

The House of Representatives was represented by the Majority Leader and Mrs. Carl Albert, the Majority Whip and Mrs. Hale Boggs, Minority Leader Charles Halleck, Minority Whip and Mrs. Leslie Arends, former Speaker of the House Joseph Martin, Representative Carl Vinson, Representative Francis E. Walter, the Chairman of the Ways and Means Committee and Mrs. Wilbur D. Mills and Representatie Thomas L. Ashley.

Others there were Chairman of the Board of Governors of the Federal Reserve System and Mrs. William McC. Martin, jr., Deputy Attorney General and Mrs. Byron R. White, Director of Defense Research and Engineering and Mrs. Harold Brown, Chairman of the Joint Chiefs of Staff and Mrs. Lyman Lemnitzer and Director of the Central Intelligence Agency John A. McCone.

Also on the large dinner list were Mr. and Mrs. Fowler Hamilton, (he is the administrator for the Agency for International Development); Administrator of the General Services Administration and Mrs. Bernard L. Boutin and Administrator of the Federal Aviation Agency and Mrs. Najeeb E. Halaby.

SPECIAL ASSISTANT to the President and Mrs. Lawrence O'Brien were there as were Deputy Special Counsel to the President and Mrs. Myer Feldman, Chairman of the Civil Service Commission and Mrs. John W. Macy, jr., Chief Judge of the United States Court of Appeals for the District and Mrs. Wilbur K. Miller, and Chief Judge of the United States Court of Appeals for the Fourth District and Mrs. Simon E. Sobeloff.

Others on the list were Judge of the United States Court of Appeals and Mrs. William H. Hastie, Chairman of the United States Tariff Commission and Mrs. Ben D. Dorfman, Chairman of the Federal Deposit Insurance Corporation and Mrs. Erle Cocke, sr., and President of the Export-Import Bank and Mrs. Harold F. Linder.

Also present were the youthful Chairman of the Federal Communications Commission and Mrs. Newton N. Minow, Administrator of the Federal Housing and Home Finance Agency and Mrs. Robert C. Weaver, President of the Board of District Commissioners and Mrs. Walter N. Tobriner and Director of the Federal Bureau of Investigation J. Edgar Hoover.

Among the "non-Government" guests there were Mrs. Margaret Aicher of Pasadena, Calif., Mrs. Alben W. Barkley, widow of the famed "Veep"; Miss Grace Bumbry, the singer-performer of the evening; Mrs. T. Jefferson Coolidge, quoted on the White House list as "a friend from New York City" but who with her husband was a donor of five original Stuart portraits to the White House and the Editor of Newsweek and Mrs. Osborn Elliot and Dr. Rosa Gragg, president of the National Association of Negro Women.

Others were the Publisher of the Houston Chronicle and Mrs. John T. Jones, Mrs. J. Hamilton Lewis, widow of the Senator from Illinois; Miss Mary McGrory of The Washington Evening Star, Mr. William I. Nichols, editor and publisher of This Week, the Sunday Supplement, and Mrs. Nichols; Mr. Charles Wadsworth, New York accompanist for Miss Bumbry, and Mr. Frederick L. Holburn, special assistant, White House office.

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NEW YORK TIMES, MARCH 20, 1962.

Kennedy Asks A.E.C. Appraisal Of Future Nuclear Power Role

Special to The New York Times.

WASHINGTON, March 19 — President Kennedy has directed the Atomic Energy Commission to take "a new and hard look" at the need for nuclear power and at its future commercial role.

The principal purpose of the study will be to set forth new guidelines for the scope and objectives of the nuclear power program to meet both domestic and international requirements.

The reappraisal of the atomic power program was ordered in a letter, dated last Saturday, from President Kennedy to Glenn T. Seaborg, chairman of the Atomic Energy Commission. The exchange of letters between the President and A. E. C. chairman was made public today by the White House.

The timing of the publication of the letters assumed political significance since the Joint Congressional Committee on Atomic Energy is scheduled to start tomorrow its annual hearings on the growth and state of the atomic energy industry.

Criticism Expected

During the hearings, the Administration is expected to come under considerable Congressional criticism for cutting back on the scope of the atomic development program.

For budgetary reasons, the A. E. C. in recent months has canceled two atomic reactor projects. In next year's budget, the Administration has provided no funds for any new experimental power plant projects.

Representative Chet Holifield, Democrat of California, and chairman of the joint committee, has made clear that one of the principal objectives of the hearing will be to determine how the Administration proposes, under this reduced program, to achieve the long-established goal of achieving economically competitive nuclear power in some areas of the nation by 1968.

The Administration's apparent purpose in ordering the reappraisal at this time was to blunt this criticism and to indicate its continuing long-range interest in the atomic power program.

Reverse May Materialize

From the private comments of some committee members, however, it appeared that the net effect might only be to sharpen the criticism on the grounds that the much studied, much reviewed atomic power program was being subjected to still another delaying reappraisal.

Mr. Kennedy asked that the A. E. C. report by Sept. 1, if possible. It was noted in Congressional circles that a report on this date would be too late for any Congressional action this session to expand and accelerate the program.

The President said the commission study "should identify the objectives, scope and content of a nuclear power development program in the light of the needs and resources and advances in alternate means for power generation."

The commission, the President said, should recommend "appropriate steps to assure the proper timing of development and construction of nuclear power projects," including the construction of prototype power stations.

Aside from studying domestic needs and resources, the commission also was directed to evaluate "the extent to which our nuclear power program will further our international objectives in the peaceful uses of atomic energy."

SAN FRANCISCO CHRONICLE, Saturday, March 24, 1962

A Secret Meeting With A-Scientists

Taking part in the secret session were (from left) Norris Bradbury, director of UC's atomic weapons center at Los Alamos; John S. Foster, director of the Livermore Radiation Lab; Edwin M. McMillan, director of the Berkeley Radiation Lab; Atomic Energy Commission Chairman Glenn Seaborg; President Kennedy; H-bomb pioneer Edward Teller; Defense Secretary Robert S. McNamara, and Harold Brown, assistant secretary of defense for research and development

—United Press International Photo.

WITH SCIENTISTS — At the Lawrence Radiation Laboratory yesterday, Kennedy spoke with UC scientists. With the President (from left) are Dr. Edwin M. McMillan, laboratory director; Dr. Glenn T. Seaborg, AEC chairman; famed physicist Dr. Edward Teller, partly obscured behind the President, and Defense Secretary Robert S. McNamara

TIME OUT—Dr. Glenn T. Seaborg, center, chats with James W. Archer, left, and Lt. Gov. Glenn Anderson, right, during a break in ceremonies observing the 94th anniversary of University of California.

Seaborg Sees Need To Push Education

By BILL HARTLEY

The United States is not utilizing fully the resources of the intellect, Dr. Glenn T. Seaborg yesterday told an audience celebrating the 94th anniversary of the University of California.

"As a nation, we can ser— ly question whether we ar — panding and building higher institutions of learning at a rapid enough rate," Seaborg, the chairman of the Atomic Energy Commission, said.

300 Attend Ceremony

Seaborg spoke before 300 persons at Sherwood Hall in the La Jolla Art Center. The occasion also marked the 1— anniversary of the Morrill L— Grant Act, which gave land to states for colleges, and the 50th anniversary of the Scri— Institution of Oceanography — part of the University of California.

"Like the country of the Red Queen (in Alice in Wonderland), we must run very fast to stay in the same place; and we must run much faster to get somewhere," Seaborg said.

He said the United States is evolving into a scientific society and that this society has a strong dependence upon brain power for its progress.

'Strengthen Defenses'

"Our ultimate reliance upon the institutions of higher lea— ing and the citizens trained inthem is hardly less in th cold war than in the development of our new scientific society," he sai.

"Scientific and technological achievement themselves strengthen our military defenses and give prestige to our free system abroad," Seaborg said. "Out of the universities come those upon whom we rely to provide technical help . . . to underdeveloped nations."

Seaborg said the intellectual and the scientist can be used both to maintain close ties with Western allies and to open doors to scientific and cultural exchanges with Communist nations.

Praises Planning

Seaborg said that his own agency has an almost total dependence upon universities and said other sections of the federal government are similarly dependent.

The federal government provided $7.5 million of the $8.5 million spent on research by the Scripps Institution of Oceanography in 1961, he said.

Seaborg, a Nobel Prize winner in 1951, praised the planned academic development of the local campus of the University of California in the direction of science and engineering.

'Dynamic, Fast Growing'

"In some ways, San Diego is a kind of microcosm of our developing scientific society," he said. "It has early links to the air age and is planted firmly in the age of space.

"San Diego has industries of high technology. It values intellectual enterprise. It is dynamic and fast growing."

The Washington Post

AN INDEPENDENT NEWSPAPER SATURDAY, MARCH 31, 1962 PAGE A10

U. S. to Open 4 Reactors to World Scrutiny

By Endre Marton
Associated Press

The United States pledged yesterday to permit international inspection of four atomic reactors in this country. Officials expressed hope that the Soviet Union will follow suit.

An agreement, described by U. S. specialists as unique, was signed by Harlan Cleveland, Assistant Secretary of State for International Organizations Affairs, and by Sigvard Eklund of Sweden, director general of the International Atomic Energy Agency (IAEA).

It permits experts of the international organization, a 77-nation agency under the aegis of the United Nations having headquarters in Vienna, to verify on the spot that the reactors are used only for peaceful purposes.

The reactors to be opened to inspection are only a few of those the United States has in operation. Figures on the total number of American reactors were not available.

Officials said this country was not obliged to accept such inspection. Normally IAEA's control personnel have access only to reactors the agency helped to establish.

Glenn T. Seaborg, chairman of the Atomic Energy Commission, who accompanied Eklund to the White House, said the voluntary U. S. action would show other nations the reactors are operated for peaceful purposes and do not produce material for nuclear weapons.

Eklund will name the inspectors, probably three employes of IAEA. There is no restriction concerning nationality. But the IAEA must submit the names for acceptance to the U. S. Government.

The four reactors are: The Brookhaven graphite research reactor, Brookhaven National Laboratory, Upton, Long Island, New York; The medical research reactor, Brookhaven; The experimental boiling water reactor, Argonne National Laboratory, Argonne, Ill.; and Piqua organic-cooled and moderated power reactor, Piqua, Ohio.

The agreement will take effect on June 1.

By Wally McNamee, Staff Photographer

Atomic Energy Commission chairman Glenn Seaborg, second from right, poses with three of the top winners in the Prince Georges County Science Fair. The winners, from left, are Michael Bey, 14, of Oxon Hill Junior High School; Linnea Stewart, 17, High Point High School, and George Kenney 2d, 18, Oxon Hill High.

Aim High, Seaborg Tells Youths

By Virginia West
Staff Reporter

"You don't have to be a genius" to have a useful and exciting career as a scientist, a Noble Prize-winning chemist told participants in the 14th annual Prince Georges Area Science Fair at the University of Maryland yesterday.

Glenn T. Seaborg, chairman of the Atomic Energy Commission, told the junior and senior high school students that science is now moving so fast on so many fronts that many of them can expect to contribute to "significant scientific advances."

"Don't underestimate your abilities," Seaborg said. "Set a high goal and strike out to achieve it."

Most important to learn in high school are "proficiency in reading, writing and understanding the English language and a sound proficiency in mathematics," he told them. Courses should be chosen to give a broad foundation of learning to meet college entrance requirements.

Prospective scientists should aim as high in their education as their marks and money will allow. They should consider studying for a doctor's degree, which is "the rule today" in positions of responsibility in science, Seaborg said.

Early specialization is a mistake, he warned because students may cut themselves off from fields they will want to go into later.

Linnea Stewart, a junior at Beltsville's High Point High School, won the grand prize honor at the fair — for her botany project on "Chemical Structure and Biological Activity."

She and second-place winner George Kenney II of Oxon Hill High School each won a trip in May to the national science fair at Seattle, Wash. Winner in the junior division was Michael Bey of Oxon Hill Junior High School.

A-Detectives Hint Napoleon Slain

WASHINGTON — (UPI) —Atomic detectives suggest that Napoleon Bonaparte may have died not of cancer, as officially reported, but of arsenic poisoning.

They indicate that Eric XIV, Sweden's mad 16th century king, was done in while a prisoner of state by someone who laced his pea soup with mercury.

They establish that certain potters of ancient Italy forged a famous trademark for gain.

These services of modern science of history were cited by Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission, in a talk at Villanova University.

The AEC chairman discussed, among other atomic fact-finding techniques, a method called "neutron activation analysis." This method makes it possible to measure quantities "much too small to see with the most powerful microscope."

Seaborg said that for many years questions have been raised about the death of Napoleon in 1821 on the island of St. Helena. The de-throned and exiled emperor was reported to have died of cancer. But, said Seaborg, "some have interpreted the symptoms of his illness as being due to other causes."

"If we want to think of it in terms of a historical detective story," he said, "we can say that the case of the imperial prisoner has recently been re-opened by the discovery of new evidence."

This evidence was first reported in the British scientific journal, "Nature," on Oct. 14, 1961. Seaborg said neutron activation analysis was made of "a lock of hair reportedly taken from Napoleon's head immediately following his death."

"The hair," Seaborg said, "contained 13 times as much arsenic as is normal for human hair. This, added to other symptoms of his final days, has raised an inference that Napoleon may have suffered from arsenic poisoning."

Sweden's King Eric imprisoned his half-brother, John, executed many members of his nobility, proposed marriage to Elizabeth I of England, and went violently insane before his subjects rebelled and threw him in prison.

Several years later Eric suddenly died — after eating a dish of pea soup, it was said.

"Recent neutron activation studies of the remains of King Eric give support," Seaborg said, "to the theory that the soup may have contained substantial amounts of mercury."

Pottery made in the ancient city of Arezzo was popular in the Roman Empire because of its high quality. The Arezzo potters put a special mark on their wares. By means of the neutron technique, Seaborg said, 4-26-62

New York Times

U.S. OPENS A-TESTS IN AIR WITH BLAST OF MEDIUM YIELD

N. Y. Times 4-26-62

DAWN SHOT FIRED

Device Is Dropped From a Plane Near Christmas Island

By JOHN W. FINNEY

Special to The New York Times.

WASHINGTON, April 25—The United States resumed nuclear testing in the atmosphere today by setting off an intermediate-size explosion near Christmas Island in the Pacific.

The explosion took place at about 10:45 A. M. (Eastern Standard Time), just as dawn was beginning to light the overcast skies above the equatorial atoll in the Central Pacific.

Rising through the overcast, the mushroom-shape cloud symbolized a new competitive phase in the atomic arms race and the frustration of more than three years of effort to reach an international agreement to prohibit atomic testing.

It was the first atmospheric explosion by the United States since Oct. 30, 1958, just before the voluntary moratorium went into effect. The moratorium came to an abrupt end Sept. 1, 1961, when the Soviet Union resumed atmospheric testing, a step that led to today's long-debated action by the United States.

25 to 30 Tests Expected

The explosion today was the first in a series called "Operation Dominic." The series is expected to include from twenty-five to thirty explosions over the Pacific in the next two to three months.

In the first test, the nuclear device was dropped from an airplane and was detonated high over one of the coral atolls of the British-controlled island.

The explosion was described by the Atomic Energy Commission as being in "the intermediate yield range." This meant that its explosive force was more than twenty kilotons—the equivalent of the force of 20,000 tons of TNT—and less than one megaton, or 1,000,000 tons of TNT.

Christmas Island is just north of the Equator and is 1,200 miles south of Hawaii.

Statement Is Terse

The test was announced in this terse, one-paragraph statement issued by the Atomic Energy Commission about three hours after the explosion took place:

"A nuclear test detonation took place at 10:45 A. M. E. S. T. today in the vicinity of Christmas Island. The detonation was in the intermediate yield range. The device was dropped from an airplane. The test was the first detonation in Operation Dominic, now under way in the Pacific."

In line with its desire to hold to a minimum publicity about the experiments, the Administration supplied no statement explaining why the United States had resumed atmospheric testing. Rather, it rested its case on President Kennedy's speech March 2. In that speech, Mr. Kennedy declared that it would be militarily necessary to resume testing by the latter part of April if no agreement was reached by then on an effective test-ban treaty with international controls.

President Kennedy, who yesterday gave the order for the tests to resume, was informed of the initial explosion at about 1:20 P. M. He was cruising aboard the Presidential yacht Honey Fitz in Lake Worth near the vacation White House in Palm Beach, Fla.

The White House had said beforehand that there would be no statement from the President and that any announcement would come from the commission.

Notified by A. E. C. Head

Dr. Glenn T. Seaborg, commission chairman, called the President last night to notify him that the first test would be held today unless weather interfered. The Weather Bureau said that shortly before the test the weather had been cloudy, with some showers and a northeast wind at ten miles an hour.

The commander of the task force for the tests is Maj. Gen. Alfred Dodd Starbird.

In Congress, the general reaction was that the United States had no choice but to resume testing because of the significant advances made by the Soviet Union in some fifty explosions last fall.

"We have no choice in the matter," the Senate Democratic leader, Mike Mansfield, said. "The President has shown great forebearance. I fully concur in his decision."

The Senate Republican leader, Everett McKinley Dirksen, also supported the President's action. Noting that the Congressional Republican leadership had for the last year been urging a renewal of testing, he said, "We want it to be done and we applaud the decision."

At the same time, there were grumblings in Congress about the probably critical reaction of neutral countries.

Russell Decries Reaction

Richard B. Russell, chairman of the Senate Armed Services Committee, said such a reaction was "incomprehensible" becaus "their [the neutrals'] safety and security is as much dependent upon our maintaining superiority in nuclear weapons as is our own."

Senator Kenneth B. Keating, Republican of New York, said, "The reaction to America's reluctant resumption of nuclear testing will provide one very interesting indication of who our friends really are in the world . . . and which ones just parrot Khrushchev's line."

Administration officials were braced for a wave of adverse reaction abroad, particularly in Africa and Europe. On the basis of some opinion polls in the last month, however, officials were hopeful that there would be some understanding of the United States' position and that the reaction would not be so critical as when the Soviet Union resumed testing.

The State Department spokesman, Lincoln White, said it was hoped that peoples around the world would ralize the United States was resuming atmospheric tests reluctantly. In view of the Soviet termination of the moratorium and its failure to agree to an effective test ban, the United States had no choice if it was to fulfill its responsibility as to the main defender of the non-Communist world, he said.

Recalls Offer by U. S.

"The United States understands and shares the regret that many governments and peoples feel about this — that the world has not seen an end to the testing of nuclear weapons," he said. But he said the world should "never lose sight of the fact that the United States had repeatedly offered" to call off the tests if the Soviet Union would accept an effective test-ban treaty.

Senator Hubert H. Humphrey, the assistant Senate Democratic leader, touched on one problem that is causing considerable concern within the Administration. This is the fear that fall-out from the last Soviet tests is likely to be attributed to the United States.

Soviet fall-out will reach a peak in the next two months, while the bulk of the fall-out from the American tests will not come down for another year, Senator Humphrey said. He predicted, "If world opinion reacts as it has in the past, we will get stuck with the blame for a double dose of radioactive fall-out."

A. E. C. Cites Precautions

In an attempt to allay world fears about fall-out, the Atomic Energy Commission issued a supplementary statement reemphasizing that the United States tests "will be conducted under conditions which will restrict the radioactive fall-out to a minimum, far less than that from the Soviet Union's series of nuclear weapons tests in the fall of 1961."

Two principal measuers are being taken to l mittihe amount of fall-out. One is to confine the tests to those demed absolutely necessary. The other is to conduct the tests at relatively high altitudes, so that much of the radioactive debris goes into the stratosphere, where it will remain several years.

Depending upon the size and altitude of the explosions, some of the debris will remain in the troposphere—or lower atmosphere—and will be carried around the world by the prevailing winds. This debris will return to earth in a matter of months, probably in a 3,000-mile-wide band north of the Equator.

The commission statement said that the long-lived radioactive substances, such as strontium 90 and cesium 137, in fall-out this spring ans summer "will be largely from the Soviet tests of 1961."

Debris to Be Short-Lived

The statement said that some short-lived radioactive debris, such as iodine 131, from the United States tests "will be detectable" shortly after the series. This material will come primarily fom tropspheric fall-out, it said.

"However," the statement said, "since the nuclear yield [energy release] of the United States tests will be less than that of the Soviet 1961 tests, fall-out levels from the United States tests will be considerably lower."

The statement also said, as the President did in his speech March 2, that "the total [radiation] effects from the United States test series are expected to be roughly equal to only about 1 per cent of those due to natural radiation to which people always have been exposed."

This estimate, commission spokesmen said, was based on the average radiation a person would receive in his lifetime.

The commission did not rule out the possibility that there would be transient rises in fall-out, as there have been in past tests, in which the level of radioactivity would approach or exceed that received from natural radiation.

Energy Data Secret

The total energy expected to be released in the series was being kept secret by the Administration. However, officials indicated that the amount would be about one-half or one-third of that released in the Soviet tests last fall. The Soviet tests had a total force of about 120 megatons. Of this, some twenty-five megatons came from the fission process, which is primarily responsible for producing fall-out.

The American explosions are expected to range in yield from scores of kilotons to several megatons. None of the tests will approach in size the fifty-five-megaton explosion set off by the Soviet Union.

Highly placed officials said that the exact number of tests had not yet been fixed. The number will partly depend upon the results of the testing.

One purpose of the series will be to proof-test warheads and delivery vehicles that are entering the nations atomic arsenal. For example, there will be a test firing of a Polaris missile from a submerged submarine as well as firings of warheads for such missiles as the Atlas, Titan and Minuteman.

Another objective will be to test new weapon designs and concepts.

The reference to a "nuclear device" in the test today might indicate that the explosion was a development shot rather than a proof test.

In the opinion of defense officials, the most important objective of the series will be to test the effects of nuclear explosions at high altitudes. Such explosions might be used to jam radar and radio communications or neutralize warheads of incoming missiles.

The explosions at altitudes of thirty miles or more will be set off primarily at Johnston Island, a small United States possession 900 miles southwest of Hawaii.

A rectangular danger area, 800 by 600 miles, has been declared around Christmas Island. Around Johnston Island, a danger zone resembling a cone has been declared, effective April 30. The circular zone has a radius of 470 natucial miles around the island at sea level and a radius of 700 nautical miles at 30,000 feet.

The Atomic Energy Commission issued today a regulation prohibiting United States citizens from entering the danger zones.

EXCLUSIVELY YOURS

Historic White House Dinner

The Kennedys Honor 49 Nobel Prize Winners

The men and women who came to dinner at the White House last evening —49 Nobel Prize winners were among the guests—made it one of the most extraordinary collections of talent ever gathered together in the Executive Mansion. Above, Mrs. Ernest Hemingway, President Kennedy and Mrs. George C. Marshall.—Star Staff Photo.

By BETTY BEALE
Star Staff Writer

The mental giants of the country, who dined at the White House last night, are gay, talkative, congenial, socially uninhibited, and, in some cases, lightfooted people.

President and Mrs. Kennedy's dinner for Nobel Prize winners was barely over when some of the brainy scientists, hearing the Air Force Strolling Strings playing a lilting waltz, suddenly swept their partners into a gay twirl around and around in the north entrance hall.

This was right after President Kennedy's after-dinner remarks when he said to his guests: "I want to welcome you to the White House. Mr. Lester Pearson informed me that a Canadian newspaperman said yesterday that this is the President's 'Easter egg-head roll on the White House lawn.' I want to deny that," said Mr. Kennedy when the laughter had subsided.

HE DESCRIBED THIS first such dinner in history as "the most extraordinary collection of talent, of human knowledge, that has ever been gathered together at the White House, with the possible exception of when Thomas Jefferson dined alone."

"Someone once said," he continued, charming his high I.Q. audience, "that Thomas Jefferson was a gentleman of 32 who could calculate an eclipse, survey an estate, tie an artery, plan an edifice, try a cause, break a horse and dance the minuet. Whatever he may have lacked, if he could have had his former colleague, Mr. Franklin here we all would have been impressed."

Noting that Mr. Nobel had so stipulated in his will, President Kennedy said, "There is no nationality in the Nobel prize. I know that every man here who has won the Nobel prize, not only builds on the past. . . . on the efforts of other men and women, but he also builds on the efforts of those in other countries; and therefore, quite rightly, the Nobel Prize has no national significance."

Forty per cent of the Nobel Prizes in the last 30 years have gone to men and women who pursue knowledge in the free atmosphere of this hemisphere, he averred, and 13 of them were Nobel Prizes for peace.

"I regard this as the most distinguished and significant dinner that we have had in the White House since I have been here, and I think in many, many years," he added, proposing a toast to the "Nobel Prize winners of this year and other years—and perhaps more widely, to all those people everywhere whom they serve."

IT WAS A FABULOUS EVENING of famed names ranging from Pearl Buck to Astronaut John Glenn; from the man who picketed the White House against nuclear tests before coming to dinner, Dr. Linus Pauling, to the man who saw this dinner as another indication of the flowering of America under the Kennedy administration, Van Wyck Brooks, who wrote about the age of Emerson, Thoreau and Hawthorne in "The Flowering of New England" ...

It was the largest dinner the Kennedys have given. There were 175 guests seated at 14 round tables in the State Dining Room and five more in the Blue Room, each attractively decorated with a low centerpiece of multi-colored spring flowers.

The President sat at the center table in the dining room with Mrs. George C. Marshall, widow of the general, on his right, and Mrs. Ernest Hemingway on his left. Others at his table, in counterclockwise fashion, were Dr. Rudolf Mossbauer, 1961 Nobelist for physics; Mrs. George W. Beadle, wife of the 1958 winner for medicine and physiology; Poet Robert Frost; Mrs. Lester Pearson, wife of the leader of Canada's Liberal Party and peace winner for '57; Poet Alexis Leger, author of "Anabasis" and "Chronique"; Mrs. Gunnar Jarring, wife of the Swedish Ambassador, and Carl Anderson, physics prize winner in 1936.

MRS. KENNEDY, IN A LOVELY SEAFOAM CHIFFON Cassini gown, crushed into many folds in the bodice and draped from one shoulder, sat at the center table in the Blue Room. Norwegian Ambassador Paul Koht sat on her right, and Mr. Pearson on her left.

Others seated with her were Mrs. Ralph Bunche, wife of the 1950 peace prize winner; Col. Glenn, Vassar President Sarah Gibson Blanding; Dr. Melvin Calvin, Nobelist for chemistry, 1961; Mrs. Robert Hofstadter, wife of the physics winner in '61; Pearl Buck or Mrs. Richard Walsh, literature prize winner for '38; and Dr. George von Bekesy of Harvard, '61 winner for discoveries on the inner ear mechanism.

Conversation at every table must have been fascinating. There were Reinhold Niebuhr, the Lutheran theologian; John dos Passos, author of "USA"; Katharine Ann Porter, whose first full length novel, "Ship of Fools" came out last month; Rear Admiral Samuel Eliot Morison, historian and author of "Christopher Columbus, Admiral of the Ocean Seas"; James T. Farrell, author of "Studs Lonigan"; Dr. Detlev Bronk, president of both the Rockefeller Institute and National Academy of Sciences; Dr. Alan Waterman, director of the National Science Foundation; President Nathan Pusey of Harvard; President Clark Kerr of the University of California; and Dr. Robert Oppenheimer, director of the Institute of Advanced Studies in Princeton.

It was apparently like old home week. Knowledgeable types have a way of gravitating together just as social types or movie people, and so forth. Dr. and Mrs. Pauling said they knew everybody there except two people.

DESPITE HIS PICKETING of the White House, Dr. Pauling, Nobelist for chemistry in 1954, said the President said he was happy to see him and was glad that he continued to express his opinions.

But Mrs. Kennedy, he said, asked him, "Do you think it's right to picket out there where Caroline can see you? Then she asks, 'What's Daddy done wrong now?'"

Dr. Pauling said he believes "we have to have a balanced deterrent until we achieve disarmament." He supports international controls and inspection, but he believes that we already are ahead of Russia in nuclear tests, and that if we had not started last week's tests, Russia would not have tested again.

Dr. Pauling was one of those who broke into a fast waltz right after dinner, twirling Mrs. Gerard Piel, who afterwards smoked Attorney General Bobby Kennedy's cigar, which she later returned to him. Mrs. Piel is the wife of the editor of the Scientific American. Dr. Isidor Rabi, physics winner for 1944, danced with his wife, and Dr. Edward Tatum, '58 winner for medicine and physiology, danced with his spouse.

After champagne had been served to all the guests at the black tie affair, they began to take their places in the East Room for the reading by actor Frederic March of excerpts from Sinclair Lewis' works (Nobel literature prize, 1930); of the four paragraphs in Secretary of State George Marshall's "Marshall Plan" speech; and of a chapter from a Hemingway novel that, said his wife, was written five or six years ago, will be twice as long as "Old Man of the Sea" and "was typical of the sort of thing Papa did so well."

BEFORE MR. MARCH'S SUPERBLY DRAMATIC reading, however, Dr. William Shockley, physics Nobelist for 1956, of Palo Alto, Calif., took the microphone in the East Room to reply to the President's toast, "because something should be said about this evening which is an historic occasion."

"I, as a Nobel Prize winner, feel that we are not an elite group," he said. "We are a symbol of the importance of the technical progress of the welfare of the country." The evening, he added, would lead to "much greater progress in terms of making use of the intellectual capital of the country."

With the exception of a soft light that sparkled on the crystal prisms of the three beautiful chandeliers in the East Room, the room was darkened for Mr. March's performance, with a spotlight on his face.

When he had finished the vivid word picture of Hemingway's writing, Dr. Wendell Stanley of the University of California, chemistry Nobelist of 1946, exclaimed, "My, he was fantastic!"

SAID PRESIDENT KENNEDY to his guests after thanking the handsome actor, "I am very much indebted to Mr. March for bringing this literature alive."

Said Mr. March, it was his first performance in the White House, though he recited the Gettysburg address at a joint session of the Congress three years ago.

Said Mrs. Hemingway, "Papa" had left a list of four or five titles to go on the book which he did not publish several years ago for tax

The Evening Star, April 30, 1962

reasons. Down from her New York apartment, she will leave on May 20, she said, for a safari in Africa with a woman friend.

Said Mrs. Marshall as she took her leave, she had not known anyone in this administration before last night and she had a wonderful time. "I was very happy to get out of the briar patch," she said, referring to her rustic life in Southern Pines, N. C.

Said all the scientists and writers, the dinner was a fine thing.

OTHER NOBEL PRIZE WINNERS and their wives attending were Dr. and Mrs. John Bardeen ('56, physics), Dr. and Mrs. Felix Bloch ('52, physics), Dr. and Mrs. Walter H. Brattain ('56, physics), Dr. and Mrs. Owen Chamberlain ('59, physics), Dr. and Mrs. Carl Cori ('48, medicine and physiology), Dr. Andre F. Cournand ('56, medicine and physiology), Dr. and Mrs. Peter J. W. Debye ('36, chemistry), Dr. and Mrs. Edward A. Doisy ('43, medicine and physiology), Dr. and Mrs. Vincent du Vigneaud ('55, chemistry), Dr. and Mrs. John F. Enders ('54, medicine and physiology), Dr. Joseph Erlanger ('44, same field), Dr. and Mrs. William Giauque ('49, chemistry), Dr. and Mrs. Donald Glaser ('60, physics); Dr. and Mrs. Phillip Hench ('50, medicine and physiology), Dr. and Mrs. Victor Hess ('36, physics), Dr. and Mrs. Edward C. Kendall ('50, medicine and physiology), Dr. and Mrs. Arthur Kornberg ('59, same field), Dr. and Mrs. Polykarp Kusch ('55, physics), and Dr. and Mrs. Tsung-Dao Lee ('57, physics).

Former head of the AEC, Dr. Willard Libby ('60 chemistry) and his wife were there, as were Dr. and Mrs. Fritz A. Lipmann ('53, medicine and physiology), Dr. and Mrs. Edwin McMillan ('51 chemistry), Dr. and Mrs. Hermann J. Muller ('46, medicine), Dr. and Mrs. William Murphy ('34, medicine), Dr. and Mrs. Severo Ochoa ('59, medicine), Dr. and Mrs. Edward Purcell ('52, physics), Dr. and Mrs. Frederick Robbins ('54, medicine), AEC Chairman and Mrs. Glenn Seaborg ('51, chemistry), Dr. and Mrs. Emilio Segre ('59, physics), Dr. and Mrs. Albert Szent-Gyorgyi ('37, medicine), Dr. and Mrs. Harold C. Urey ('34, chemistry), Dr. and Mrs. Selman Waksman ('52, medicine), Dr. and Mrs. Thomas H. Weller ('54, medicine), and Dr. and Mrs. Chen Ning Yang ('57, physics).

Still other guests were Vice President and Mrs. Johnson, Norman Cousins, editor, Saturday Review of Literature, and his wife; James Baldwin, author; New York Producer and Mrs. Arthur Cantor, University of California President and Mrs. Clark Kerr; Dr. James Killian of MIT, and his wife; Dr. George Kistiakowsky of Harvard and his spouse; Mr. Samuel Newhouse, N. Y. publisher, and Mrs. Newhouse; Dr. Clarence Pickett of the American Friends Service Committee which received the '47 Nobel peace award; Presidential Assistant and Mrs. Arthur Schlesinger; Dr. and Mrs. Julius A. Stratton of MIT; Writer William Styron; Critic Lionel Trilling and Mrs. Trilling; and Scientific Adviser to the President and Mrs. Jerome Wiesner.

AEC Head Says Science Vital To Freedom

Dr. Seaborg Keynotes Ceremonies

WILLIAMSBURG—The chairman of the U. S. Atomic Energy Commission warned Saturday there must be no moratorium on scientific knowledge if America's scientific-democratic society is to bring universal freedom and a better way of life.

"To limit science," said Dr. Glenn T. Seaborg, "would be to limit the whole spirit of freedom."

The Nobel prize-winning scientist observed there is no way "we can predetermine what we shall allow ourselves to learn and what to leave in darkness." Furthermore, he noted, there is no way to "muzzle man's unleashed curiosity."

Knowledge will expand and man's power will continue to grow, he stated. "Man must adapt to his growing power or civilization may perish."

Seaborg spoke at Colonial Williamsburg's Prelude to Independence ceremony, which marks the legislative events which took place during the six weeks in 1776 that led up to the July 4 Declaration of Independence.

Seaborg, the first scientist to give the annual address, said the new powers that science has given man—both for his betterment and his possible destruction — have forced him to cultivate, though education, his capacity for rational, humane and ethical conduct.

Raising of Grand Union flag heralding Prelude to Independence observed by, l. to r., Rep. Chet Holifield, chairman, Joint Congressional Committee for Atomic Energy, Lt. Gov. Mills Godwin, Dr. Seaborg, and Winthrop Rockefeller.

"The central issue now being tested by civilization," he reported, "is the validity of the most basic premise of freedom: That man has the capacity for rational conduct. The question is whether man can use his growing power only for his own benefit."

The AEC chairman delivered his speech in the air-conditioned House of Burgesses chamber of the reconstructed colonial Capitol before a small audience of invited guests which included Lt. Gov. Mills Godwin and officials of Colonial Williamsburg. In other rooms and outside the building, several hundred watched and listened over closed circuit television.

Colonial militiamen escorted Seaborg and Winthrop Rockefeller, chairman of Colonial Williamsburg's board, to the capitol building for the late afternoon program. The British flag which generally flies atop the colonial legislative hall was replaced by the Grand Union, America's first nationa colors.

The annual Prelude to Independence celebration started May 15, the anniversary of Virginia's convention of delegates whice declared Virginia to be a free and independent state, passed George Mason's Declaration of Rights, later to become part of the federal Constitution, and adopted a state constitution which became a model for other states.

Seaborg took note of the historic events which he said were the first of three American revolutions. The first was the war for independence, the second the industrial revolution and the third, the current establishment of a scientific-democratic society.

The present scientific revolution has brought the problem of existence with nuclear weapons and other issues such as unemployment due to technological advances.

Another current problem of pressing importance is the relative lack of mathematics and scientific content in the popular concept of a liberal education and the poor preparation of the citizenry for modern decision-making.

"An informed citizen should be conversant with the larger principles of science, the dynamic potential of scientific research, the main contemporary currents of scientific effort and their relationship to social forces."

Seaborg, in a scholarly address, made it clear he believes the U.S. must continue to "export to other nations our capacity to provide the material foundation for happiness."

He said that although the U.S. has contributed much aid, "I believe we must do more, particularly in those ways that will give other peoples, especially in emerging nations, the ability to build their own scientific-democratic societies."

Speaking on the strength of freedom's ideals, he said they are "so powerful" that "no government may ignore" them and that even the communists have been "forced to describe their tyrannies as democracies and their chains as freedom."

NEW ORLEANS STATES-ITEM
SIX May 28, 1962 MONDAY

Confer 959 Degrees In Tulane Graduation

Degrees were conferred on 959 graduates of Tulane university today in commencement exercises at the Tulane central building.

Commencement speaker was Dr. Glenn T. Seaborg, chairman of the U. S. Atomic Energy Commission. His topic was "A Challenge to the Graduate and Tulane."

Graduates received their diplomas from Dr. Herbert E. Longenecker, president of the university.

Members of the class of 1962 were presented for their degrees by the deans of the various schools of the institution.

Class of 1912

Following this ceremony, 59 members of the Tulane class of 1912 were presented second diplomas in honor of their 50th graduation anniversary.

Members of the class of 1912 were presented by Miss Beatrice M. Field, director of alumni activities at Tulane.

The university awarded doctor of philosophy degrees to 21 graduate students.

Honorary doctors degrees were awarded to Dr. Seaborg, Dr. Erneset Carroll Faust, emeritus professor of parasitology at Tulane, and to Dr. Elizabeth Wisner, emeritus dean of the Tulane school of social work.

Dr. Seaborg received an honorary doctor of science degree, and Drs. Faust and Wisner, honorary doctorates of law.

In baccalaureate ceremonies in McAlister auditorium yesterday, Tulane graduates were challenged to respond to a call for men of faith.

Religious Faith

The Rev. Frederick V. Poag, minister of the St. Charles Avenue Presbyterian church, urged students to prepare for the future armed with a strong personal religious faith.

"No dry-as-dust faith will do," the Rev. Mr. Poag said. "Religion which has become a dull habit is sterile. We must be personally involved in this faith. It must be something in which we can participate."

Dr. Poag told students they should be able to look back on their graduation as a "great moment" and "the beginning of a new era."

He said when recalling the event after the passage of many years students should be able to tell themselves:

Respond to Call

"This world in its crisis called for volunteers, for men of faith and life, of patience and service, of charity and insight.

"I responded to this call however I could. I volunteered to give myself to my Master. I studied, I loved, I labored unsparingly and hopefully to be worthy of my generation."

THE MILWAUKEE JOURNAL Monday, June 4, 1962

Great Change Possible by 1992, Seaborg Says

Scientist Pictures Things to Come in Graduation Talk at Northern Michigan

Marquette, Mich.—AP—Computers to shape family life, self-reproducing materials, drugs to alter and maintain personality, nuclear-electrical power from the oceans' waters, climate control—all this by 1992? Quite possibly, according to Dr. Glenn T. Seaborg, chairman of the atomic energy commission and one of the nation's top scientists.

Seaborg

In a speech prepared for Sunday's commencement at Northern Michigan college, Seaborg invited the graduates to their 30th class reunion and then suggested some of the things he believes science may have brought about by then if there is adequate support for basic research.

List of Wonders

Seaborg said these wonders may well include:

In nearly every home there may be "a control center of electronic computation, for keeping budgets, planning menus, figuring income taxes . . . and even helping the family to arrive at policy decisions." In the broader area of national policy "computers may be making the most important decisions on many levels."

". . . Man, starting from raw chemicals, may some day be able to produce materials with the ability, given the proper environment, to reproduce themselves. Should this become possible, one of the greatest mysteries of all time, the mystery of life, would be brought into sharper focus."

"Pharmaceuticals which change and maintain human personality at any desired level can easily be imagined as part of the 1992 scene. It may thus become necessary to establish new legal and moral codes to govern those who prescribe the use of these materials."

New Energy Sources

"The production of electrical power by thermonuclear devices is within the realm of possibility. . . . All waters of the seas and oceans are available as an energy source once this process is worked out."

"Self-lubricating metals will have been developed by 1992. . . . Wood, brick and concrete are common materials today, probably just as common 30 years from now will be newly developed materials with now unattainable qualities of strength, insulation and heat transmission."

"Today, we have a common synthetic food in the oleomargarine on our tables. By 1992 we may expect to find synthetic proteins, carbohydrates and fats, all nourishing and palatable foods."

". . . As our knowledge of weather and climate grows, we should be able to detect, to avoid, to divert, or possibly to deactivate disastrous storms. It may be possible . . . to control the weather to permit major rearrangements of the world's rainfall."

Life on Mars?

"By 1992, we should know whether there is life on Mars . . . if we do not fruitfully develop Mars in the next three decades, certainly there will be a large increase in the use of Arctic and Antarctic regions — perhaps using nature's iceboxes for the long term storage of foodstuffs."

"The peaceful uses of nuclear explosives may include deepening the Straits of Gibraltar or opening up the Sierra Nevada passes."

"Will it be possible to illuminate huge outdoor areas by yet undiscovered techniques? . . . There may be enough energy existing to produce daylight at night from the sky."

If you set a goal and do nothing about it," he added. "You must learn to use the subconscious mind to overcome obstances and learn to turn frustration to opportunity."

By Dick Darcey, Staff Photographer.

Receiving honorary degrees at George Washington University commencement exercises were, from left: Glenn T. Seaborg, chairman of the Atomic Energy Commission; Defense Secretary Robert S. McNamara, and Robert R. Gilruth, Project Mercury director. A total of 1071 persons received degrees.

Graduates at GW Hear Seaborg

By Rasa Gustaitis
Staff Reporter

One of the Government's top chemists last night urged that scientists be brought into "the chambers where our national policy is created," rather than "stand in the corridors where it is discussed."

Glenn T. Seaborg, a Nobel Prize winner and chairman of the Atomic Energy Commission, made the observation before the 1071 members of George Washington University's graduating class.

"Men who know science and technology—whether or not they are scientists or engineers—must join in creating our laws, in forming our social order and in establishing our National policy," he said.

The scientist's primary role in government now is advisory, and that is not enough, he said.

"Looking at the broad spectrum of science and technology it must be apparent that in today's world there is no department in an industry, no division of a commercial enterprise, no level of governmental activity which does not require scientific information scientific advice and scientific guidance."

Listening to the commencement speaker were not only young men and women who had completed college studies in the usual four years but also a goodly number of night owls whose quest for a degree had spanned a decade.

The University this year had 5755 part-time students and 3379 full-timers. One of its major services is to those who must hold down a job or care for a family while studying.

It took 11 years for Donald Bridges, 28, of 4804 Taney ave., Alexandria, to get his B. A. In that time he got married and had three children, plugging along all the while at a two-course-a-semester pace and working for the Navy Department.

"It got to be such a habit, the studying, I don't know how we're going to kick it," his wife said.

Mrs. Oakland Pemberton, 55, a substitute teacher in Montgomery County, finished the college career that her marriage interrupted about 30 years ago.

Robert H. Hansen, 34, of 4517 Sangamore rd., Bethesda, studied part-time for seven years while working at the Army Map Service and last night received the first B.S. in cartography ever awarded by the University.

George Washington's expanding curriculum also brought about the award of the first B.A. with a major in Russian literature, the first three master of fine arts degrees and the first 27 masters of business administration in the hospital administration program.

Five honorary degrees were presented. Seaborg and Secretary of Defense Robert S. McNamara received doctorates of public service; Robert D. Calkins, president of the Brookings Institution, doctor of laws; Marjorie Hope Nicholson, chairman of the English and Comparative Literature Department at Columbia University, doctor of letters, and Robert R. Gilruth, director of Project Mercury, doctor of science.

The degree candidates filed into the University Yard to a march played by the University Orchestra. Later they filed out to join the University's 30,000 graduates as alumni.

Seaborg and Transuranium

New Elements Reshaping History

By Howard Simons
Staff Reporter

The Laboratory Casebook

GLENN T. SEABORG, chairman of the Atomic Energy Commission, has taken part in the discovery of more man-made chemical elements than any other scientist. This achievement earned him, together with Edward M. McMillan, the 1951 Nobel Prize in chemistry.

In a speech before the American Iron and Steel Institute recently, Seaborg gave what is essentially the clearest and most concise history of these significant discoveries. The man-made elements are called "transuranium elements" because they have atomic numbers greater than that of the heaviest natural element, uranium.

Less than 25 years ago the transuranium elements were unknown to those who taught or studied chemistry. Nonetheless, in the short time since discovery of the first such element, the transuranium elements have played a key role in the twin technological revolutions that are reshaping history. A transuranium element, for all intents and purposes, made possible the first atomic bomb. And transuranium elements have formed the first link between atomic energy and space science.

TRANSURANIUM elements, Seaborg explained, are essentially synthetic in origin and must be produced by transmutation, starting in the first instance with uranium, and then using other transuranium elements. They are all radioactive and most have fleeting lifetimes.

The first such element was discovered in 1940. It was assigned the atomic number 93 and was called neptunium after the planet Neptune and in keeping with the fact that its antecedent, uranium (No. 92 on the Periodic Table) had been called after the planet Uranus.

In the intervening years 10 other man-made chemicals have been discovered and identified and have been named after planets, places and people. These are (with their atomic numbers) plutonium (94); americium (95); curium (96); berkelium (97); californium (98); einsteinum (99); fermium (100); mendelevium (101); nobelium which may be re-named (102); and lawrencium (103).

SEABORG said that it may still be possible "to synthesize, separate and identify a half-dozen or so additional transuranium elements; but barring unknown experimental breakthroughs . . . the end should come somewhere in the region of element 110."

The history of how nuclear chemists and physicists changed one element into another or created a new element, as Seaborg related it, is filled with descriptions of painstaking years-long effort and seeded with boldness bordering on chance.

With some exceptions, the transuranium elements were last discovered by bombarding uranium or other transuranium elements in giant atom-smashers or nuclear reactors and sifting through the results to find the newly created element. Thus, berkelium was found in December 1949 as a result of the bombardment of miligram amounts of amercium-241 with 35 million electron volt helium atoms accelerated in the 60-inch cyclotron at the University of California at Berkeley.

THE EXCEPTIONS were the discovery of both einsteinium and fermium in the debris from the first large hydrogen bomb detonation in the Pacific in November, 1952. In this instance, the H-bomb explosion achieved what it would normally take scientists years to have accomplished.

Discovery and isolation of the other man-made elements, however, were done in the laboratory, where they required several new techniques not the least being "ultramicrochemical studies" calling for analysis of extremely small volumes of radioactive material. In one instance, Seaborg cited the need to develop new techniques to separate one atom of mendelevium from approximately one billion atoms of einsteinium.

Seaborg called the discovery of mendelevium "in many ways the most dramatic of them all." As such, it serves to illustrate the entire, wonderful world of man-made elements.

"The plan of attack," he said, "involved the bombardment of the maximum available quantity of einsteinium, element 99, in the form of the isotope einsteinium—253, with helium ions in the Berkeley 60-inch cyclotron. On gathering together all of the einsteinium that was available as a result of its production in nuclear reactors, the total quantity was found to amount to less than one-trillionth of an ounce . . . placed on a gold foil in an invisibly thin layer. The helium-ion beam produced in the cyclotron was sent through the back of the foil so that the atoms of element 101 (mendelevium), recoiling due to the reaction with the impinging helium ions, could be caught on a second thin gold foil. This second gold foil, which contained the recoiled atoms, and which was relatively free of the einsteinium target material, was dissolved, and the chemical operations performed began with this solution."

IN THE SEARCH for a spontaneous fission event that would signal the production of a single mendelevium atom, the scientists, at one point, connected a fire bell in the hall of the chemistry building to the counting circuit. This was done so that a loud "clang" sounded when one of these rare events was registered. As Seaborg related this anecdote, he said that "this sport was put to a justifiable end when it came to the attention of the fire department.")

"The definitive experiments," Seaborg continued, "were performed in a memorable, all-night session. Three successive, 3-hour bombardments were made, and—in turn—their transmutation products were completely and quickly separated . . . A total of five spontaneous fission counts were observed in the element 101 chemical fraction. . ."

Thus was mendelevium discovered.

THE SEARCH for new transuranium elements is continuing both here and abroad. Recently, Seaborg noted, the AEC initiated a program to produce relatively large amounts of such elements to use as starting material for finding those elements beyond lawrencium (103). This effort, however, will take several years. A discussion of what is entailed as well as possible alternative efforts will take place this week during the American Nuclear Society's annual meeting in Boston.

There is too, Seaborg noted, the possibility of producing new transuranium isotopes, "and perhaps even new elements" in the debris from the explosion of specially designed thermos nuclear devices."

Historically, Seaborg concluded, what was essentially basic research—"a quest for further knowledge and understanding of the atomic and nuclear properties of the elements"—developed into an outstanding example of the important effect such discoveries "have on people everywhere." Here, of course, the AEC chairman was making reference to the use of plutonium in nuclear weapons.

BUT SEABORG also emphasized the fact that the uses of the transuranium elements is not limited to military applications. He cited the promise of plutonium-fueled power reactors, particularly "breeder" reactors which theoretically should produce new fissionable material in excess of the amount

BUT SEABORG also emphasized the fact that the uses of the transuranium elements is not limited to military applications. He cited the promise of plutonium-fueled power reactors, particularly "breeder" reactors which theoretically should produce new fissionable material in excess of the amount
consumed in the process.

He also cited the increasing uses of isotopes of transuranium elements for powering compact generators. The first of these atomic power sources was flown in space aboard the Navy's Transit navigational satellites. Others will fly to the moon, and still others are already providing power for remote weather stations and floating navigational beacons.

"It is quite evident," Seaborg said, 'that even further applications will be found for these transuranium elements. Of even greater importance is the contribution which the study of their chemical and nuclear properties have made to the store of human knowledge. . ."

BALTIMORE SUN JUNE 28, 1962

Atomic Generator Going Strong After Year's Orbit

Cape Canaveral, Fla., June 27 (AP)—The world's first satellite-borne atomic generator still is going strong after one year in orbit, laying the groundwork for future nuclear-powered space systems.

The grapefruit-sized generator was shot aloft a year ago tomorrow as a power source for the Transit 4-A experimental navigation satellite. After 5,000 orbits and 142,000,000 miles of space travel, it continues to provide electrical current to run two of the satellite's radio transmitters and some instruments.

A similar flawless performance is being given by a second nuclear generator fired into orbit last November 15 aboard Transit 4-B, the Atomic Energy Commission reports.

No Word From Russians

The successful launchings propelled the United States into a significant lead over the Soviet Union in harnessing atomic power for space exploration.

At the time of the Transit 4-A launching, speeches and articles by Soviet scientists indicated development of a nuclear power unit for space was an important goal and that a launching was expected late in 1961. If the Russians succeeded in orbiting such a package, they did not announce it.

Now the United States is pushing ahead with more sophisticated generators to power advanced manned and unmanned satellites and space vehicles bound for the moon, Mars and Venus.

Dr. Glenn T. Seaborg, AEC chairman, calls the first anniversary of the Transit 4-A firing a "most significant milestone" in the development of atomic energy for space purposes. He said the 4.5-pound generator is "doing the job which at one time would have required thousands of pounds of batteries.

Plutonium 238 At Cores

"I firmly believe," Seaborg commented, "that nuclear energy provides the most feasible means of accomplishing long voyages in space and many other ambitious missions in our national space batteries."

The two orbiting atomic generators have at their hot cores small amounts of plutonium 238, a radio-isotope which generates heat up to 1,050 degrees fahrenheit. Thermo-electric rods convert the heat to electrical energy providing power output of 2.7 watts.

The units could generate sufficient power for 90 years, but probably will cease sending signals to earth in another four years, the anticipated life of the satellite electronic systems.

The Martin Company is building a more powerful version of the earlier generators for use on operational transit satellites, the first of which is scheduled for launching later this year.

Working On Surveyor Unit

The AEC also has commissioned Martin to develop a nuclear power unit for the Surveyor spacecraft. The first Surveyor is slated to land on the moon in 1965 to probe a great number of lunar mysteries in preparation for manned landings.

Several other spaceships will use nuclear power plants, which offer light weight, long life and uninterrupted performance. Experiments also are being conducted to develop nuclear power for booster rockets.

Satellites using conventional solar cell-battery power systems cannot operate in the earth's shadow. Probes headed for Mars would have to depend on rapidly-diminishing sunlight for power. And solar cell packages which land on Venus would be cut off from sunlight by the cloud-jammed atmosphere.

Atomic power sources would have no such problems.

Major disadvantage of space atomic units is the great cost of all nuclear fuels, ranging from $1,000 to $25,000 a gram and often totaling many pounds. But the AEC feels it will be able to salvage nuclear elements which normally would be lost as waste in operation of its nuclear plants.

THE WASHINGTON POST
Thursday, July 26, 1962

U.S. Weighs New A-Ban Proposals

2 Cabinet-Level Meetings Are Set For Review of Data

By Murrey Marder
Staff Reporter

The Kennedy Administration has scheduled two Cabinet-level meetings during the next two days to weigh the political and scientific wisdom of a new overture to the Soviet Union for a nuclear test ban.

This judgment will necessarily involve an assessment of current Soviet intentions in East-West relations, which have followed a highly erratic pattern in recent weeks, informed sources said.

Secretary of State Dean Rusk, who returned last night from more than 10 hours of talks in Geneva with Soviet Foreign Minister Andrei Gromyko, will give President Kennedy a first-hand evaluation of the Kremlin's moves on Berlin, nuclear testing and disarmament. Each is related to the test decision which the President is now contemplating.

If the Soviet Union really believes, as Gromyko publicly told the Geneva disarmament conference yesterday, that the United States is bent on an "arms race" above all else, any new approach toward a nuclear test ban can be doomed before it begins. Nevertheless, the United States might decide to make the effort anyway, to spike the Soviet Union's attempt to portray itself as the champion of peace.

Meetings Scheduled

Meetings are scheduled this afternoon and Friday to prepare for the President's decision on whether the United States should make a sizeable cut in its terms for a nuclear test ban treaty.

The first will be at the Cabinet-level today, at the State Department, to review the new scientific data showing how much the United States might safely reduce the amount of inspection and controls it previously demanded inside the Soviet Union. The United States has no intention of eliminating inspection of Soviet territory entirely, as the Soviet Union presently demands. But there are varying views among Government departments about what is a "safe" cut in the existing Anglo-American position.

On Friday, the President will meet with key Cabinet officers and security and scientific advisers at the White House for a conference covering both the political and scientific implications of modifying the Western test ban offer.

The President's decision on what course to take will require weighing not only the East-West implications of a renewed push for a test ban, but the domestic implications in an election year.

In talks which William C. Foster, director of the U. S. Arms Control and Disarmament Agency has been conducting for several days on Capitol Hill with members of the Joint Congressional Committee on Atomic Energy, he has encountered strong misgivings about any significant reduction in present United States conditions for control and inspection.

Today's meeting at the State Department will consist of what is known as the Committee of Principals in the Government.

It will include Rusk, Foster, Secretary of Defense Robert S. McNamara, Atomic Energy Commission Chairman Glenn T. Seaborg, Central Intelligence Agency chief John A. McCone, United States Information Agency Director Edward R. Murrow, or their alternates.

The central issue in their meeting will be consideration of a scientific review of the preliminary findings made public July 7 on Project Vela. That project, to perfect methods of detecting underground nuclear explosions, produced data indicating that new methods may be used to distinguish more clearly between distant earthquakes and nuclear explosions.

Many officials inside Government doubt that any final decision can be made by this weekend. British Foreign Secretary Lord Home told Parliament yesterday that he is hopeful that new and easier Anglo-American conditions may be proposed soon.

Senate Majority Whip Hubert H. Humphrey (D-Minn.) said following a meeting of Foster yesterday with the Senate Disarmament Subcommittee, which Humphrey heads:

"It is hoped that by late this week, or early next week, a final decision can be made as to whether any modification can be made relating to detection and inspection . . ." Humphrey stressed that the United States has no intention of giving up its insistence on adequate on-site inspection of the Soviet Union. This means periodic checks of suspicious events by international inspectors.

There is no disagreement on that inside the Kennedy Administration. But there are differences on whether the United States can eliminate its present demand for permanent, fixed control posts on Soviet territory.

The Atomic Energy Commission reportedly is taking the firmest position against major trimming of present inspection and verification requirements. At another level, Rusk and Foster reportedly agree that the control post demand cannot be "cut to zero," while in the White House itself, several Presidential advisers reportedly favor just that.

There are differing views also on other elements of a new proposal. These include the manner of staffing on-site inspection teams and the form of an international test detection system.

Friday, August 17, 1962 The Seattle Times

A. E. C. Firm in Its Support of Test Ban

DR. GLENN T. SEABORG AT THE FAIR

The Atomic Energy Commission remains firm in its agreement with national policy calling for a nuclear-test ban, even though there are "not many grounds for optimism," the commission chairman said here today.

Dr. Glenn T. Seaborg, in Seattle to visit the World's Fair, said he and other commission members are "in thorough agreement with the policy of having a test ban.

"But that requires complete assurance that neither side is testing," Dr. Seaborg said.

"I admit there are not many grounds for optimism, but I hope so. We just about have to have it. The many factors that motivate us must eventually motivate the Russians."

DR. SEABORG said he was disappointed when Congress rejected plans to generate electricity with waste steam from the Hanford atomic works.

"I was very much in favor—this would have been good," he said. "I don't see any obvious next step."

Dr. Seaborg said the Federal Science Pavilion, which he helped plan as a member of the National Science Planning Board, was "one of the best" he has seen.

The House of Science movie in the first unit of the federal exhibit is "the best movie yet done in popular science," he said.

DR. SEABORG said he thought future use of the pavilion as a national science museum would be "a very good thing."

"We are entering a scientific society—the third revolution, I call it—and I believe we must have scientific literacy widespread through the population. One way of doing this is through science museums like this one." Dr. Seaborg said.

Dr. Harvey White, left, director of the Lawrence Hall of Science, shows the plans for the privately-financed University of California program to Dr. Glenn Seaborg, seated, center, "father" of the Hall of Science idea, on leave from the University as chairman of the Atomic Energy Commission, and Thomas J. Cunningham, University vice president, chairman of the fund campaign and general counsel of the Board of Regents. Standing, from left, are Dr. Edwin McMillan, Nobel laureate and member of the Hall of Science Committee; E. Lee McLean, coordinator of special projects for the statewide University, and Donald McLaughlin, chairman of the Board of Regents committee for the hall.

—Gazette photo

<u>BERKELEY</u> <u>GAZETTE</u> - Tuesday, August 21, 1962 - Page 1

UC Lists Plan to Spur Scientific Education

By WIN CURRIER

An ambitious campaign designed to make the University of California the center of a nationwide program to upgrade science education is underway today.

The outgrowth of an idea conceived by Dr. Glenn Seaborg, former Chancellor of the local campus, Nobel laureate and present chairman of the Atomic Energy Commission, the program has become a reality in the form of the Lawrence Hall of Science, a research center for science education.

Heading the Hall of Science is Dr. Harvey E. White, world famous professor of physics and member of the University faculty.

Under Dr. White's guidance, the Hall of Science will ultimately become a center devoted exclusively to bettering science education primarily at the college and secondary school levels.

The Hall of Science is named in tribute to the late Dr. Ernest Orlando Lawrence, inventor of the cyclotron, Nobel Laureate and recipient of the United States Atomic Energy Commission's Enrico Fermi award. The University's famed scientist died in 1958.

A unique feature of the hall is the fact that while it is part of the University's program, it is financed entirely by private capital.

Dr. Seaborg first presented the idea to the University's Board of Regents when he became alarmed at the United States' shortcomings in scientific education. He felt that the University could take the lead in the United States in spearheading a nationwide program, particularly in that the University occupies a unique position with nine Nobel Laureates on the Berkeley campus alone, and with its world-renowned research staffs and facilities.

The Regents decided that the plan should be financed entirely on a private basis and no tax money of any kind would be used for any part of the enterprise.

A committee, headed by Dr. White, embarked on a two year study assessing the total picture of science education in the United States and designing a program which can hopefully make the United States first in technology.

Dr. White is quick to point out that this is not an overnight program. It is a project which will take many years to bring to full fruition.

OBVIOUS NEED

The obvious need for a physical structure which would be the center of this program was met by the Board of Regents, which authorized the construction by private capital of the Lawrence Hall of Science of Vista del Cerro, overlooking the Lawrence Radiation Laboratory and the campus of the University.

The building is 300 feet above the radiation laboratory, and is near the biology research and space research facilities. The site is identified by the public today by two green tanks visible on the hillside.

Six basic need were drawn up by Dr. White and his committee, most important of which was "permanent space for year round activities," which will be met by the new structure.

Other needs include improvement of science education for everyone, better training of science teachers at all levels, experimental research in mass education, development of audio and visual aids for better learning and the development of a science service center.

MAJOR PROGRAMS

The Lawrence Hall of Science will have five inter-related major programs as outlined by Dr. White:

1—Science teacher training. Classrooms, laboratories, manual workshops, auditoria and programmed teaching areas, designed especially for the training of large numbers of secondary and college teachers will form the major part of the entire project.

Nationwide talent scout programs for teachers and students will be used to bring many groups to the Hall of Science. While most of the teachers will come for programs of one or possibly two semesters during the school year, some will come for summer only and others for even shorter periods of time.

Teachers will be taught how to make inexpensive visual aids and demonstration equipment and how to best use them in teaching situations, they will be allowed to keep the equipment they make and return with it to their own schools throughout the nation.

2—Programmed teaching. This phase of the plan will provide a number of self-teaching devises designed to give instruction in astronomy, biology, chemistry, geology, mathematics, nuclear science, physics and space science. The teachers wil carry on research in developing teaching devices, programming them and testing them through many high school students coming daily.

3—Research in and development of new visual aids and demonstration equipment aimed at teaching large numbers of students. Dr. White points out that in many areas, students are without sufficent science instructors to meet their needs on a personal basis.

TV STUDIO

4—New television studio equipped for producing science films and teaching secondary school teachers many uses of television in instruction. This will be the first such studio ever built, devoted exclusively to science. Films will be produced to be distributed throughout the nation to educational television stations. A feature of the television studio will be its seating facilities for 50. Teachers and others can learn how to produce such films in their own areas.

5—Science Service Center, an information center which Dr. White believes will fill one of the greatest needs today. Serving as an experimental development, such a center will provide schools and the public with science information and materials of all kinds and will serve as a pattern for others elsewhere in the workshops and teaching laboratories will provide much of the material.

The building will be equipped with an amphiteater-type laboratory for research in laboratory instruction. Individual work benches will be set up in laboratories and workshops for the teachers and students.

One feature of the auditorium will be a rotating stage, 40 feet in diameter, which, while employed in theatrical work for years, is new in this kind of use. Chemistry, physics, biology and possibly general science will be taught on a daily basis. Television cameras and monitors will be situated in the room.

Dr. White will not wait for the building to be completed to get the program underway. He plans to start early in spring with research in programmed education devices and laboratory equipment. He will continue teaching as a member of the faculty in addition to his duties with the Hall of Science.

QUALIFICATIONS

Dr. White has special qualifications for his assignment, having taught physics on the television Continental Classroom, which has been translated into foreign languages for world-wide use, and having written a number of texts including a basic physics text used in more universities than any other similar work. He also served as an advisor on the United States scientific exhibit at the Seattle World's Fair.

The fund campaign is under direction of Thomas J. Cunningham, University vice president.

E. Lee McLean, coordinator of special projects for the statewide University, is directing the campaign for the program.

It is pointed out that the project is designed to meet the continually increasing nationwide shortage of scientists and engineers as well as science teachers. Industrial leaders, Dr. White notes, are coming more and more to the realization that greater numbers of our talented youngsters have the potential for productive careers in science and technology.

Industry's present costs of recruitment of scientists and engineers from a limited supply are far greater than the results warrant. The real need, Dr. White says, is more scientists and this means more teachers, better equipped with effective methods and devices to stimulate greater numbers of qualified yqouth to point their careers in this direction.

This new institution can become, therefore, the break-through in mass science education that is so urgently needed.

U.S. News & World Report
The United States News ® World Report ®
tributed During Week of August 20 On Newsstands Until Cover Date
25 CENTS AUGUST 27, 1962

HOW STRONG IS THE BUSINESS RECOVERY?

Analysis of the President's Address to the Nation

THE ATOM OF TOMORROW

Interview With Dr. Glenn T. Seaborg, Chairman, Atomic Energy Commission

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THE STORY OF STEEL—WHAT REALLY HAS HAPPENED

LATEST IDEAS ON PLANNING YOUR LIFE INSURANCE

Interview With Dr. Glenn T. Seaborg
Chairman, Atomic Energy Commission

THE ATOM OF TOMORROW

With the Russians launched on a new series of tests, what's ahead for the atom?

Khrushchev boasts his nuclear missiles can hit a "fly in the sky." Does that mean the Russians have outstripped the U. S. in atomic defenses? Exactly what is revealed by the Soviet explosions in the atmosphere?

As for the atom, are weapons the full story? Whatever became of Atoms for Peace?

The distinguished scientist who heads the U. S. program puts atomic energy in perspective in this exclusive interview, conducted by members of the staff of "U. S. News & World Report" in the magazine's conference room.

Q Dr. Seaborg, can you say why the Russians have resumed testing nuclear weapons at this time?

A I wouldn't regard this as the ideal time for them to start testing again. There are other factors—political factors.

Q Do you think it's political rather than scientific?

A Political and scientific reasons both are involved.

Q Have the Soviets had time to prepare a whole new series of tests in the relatively short period since their last tests ended?

A We don't know how extensive this series will be, but the field of weapons is a dynamic science and technology—fast moving—and they had a base upon which to build because of their tests last fall, so that they certainly can make a number of meaningful tests.

I think the United States, however, with our policy of trying to get the absolute maximum out of tests, so that we can hold testing to the minimum, would want to wait longer between test series than the Russians have.

Q Are their tests rather "dirty"?

A We don't know that yet.

Q What of the first series? Have the Russians done much to try to reduce fallout?

A You'll recall that their series last year was rather clean. At the beginning there were claims around the world that these huge weapons would lead to a great amount of fallout. But when the results were in, they were found to be relatively clean tests. Nevertheless, because of the extensive nature of their series, they added about 25 megatons' equivalent of fission products to the environment—and this is more than one fourth of the total produced by all tests by all nations prior to 1961.

Q Can the U. S. do as well or better in clean tests?

A I don't think that I can respond directly to that as regards the design of weapons. We are holding fallout to a low level by a variety of precautions. As you know, many of our tests have been held underground.

Q Have U. S. tests been meaningful—the series that is now being completed?

A Oh, yes.

Q Why does the U. S. have to keep testing?

A If both sides would agree to stop, and we could be sure that both sides were living up to the agreement, we wouldn't have to keep testing. And I think it would be very good if we didn't have to keep testing.

Q Are there still new weapons of such great advantage that testing is worth it?

A The aspect that bothers many people is the possibility of a breakthrough in the antimissile area or in the defense area. There you can conceive, at least, of a change in the military balance of power.

Aside from the defense aspects, there are other arguments —on the offense end—because it is possible to increase the weight-to-yield ratio so that more of the total weight of the missile could be used for decoys and other "penetration aids."

Q You say we have made progress in those areas in our recent tests—

A Yes, we have.

Q Can you describe any of this?

A I can't at the present time.

Q In view of the new series of Russian tests, will the U. S. have to test again later?

A We would have to make that decision after we've had a look at the results of the Russian tests.

Q Are you fairly able at present to tell what are the results of Soviet tests?

A Oh, yes. We have the capability of learning a great deal. We will be able to learn enough, I feel, to make an assessment, as we did of the Soviet tests in 1961.

You'll recall that the President, in his March 2 statement, made a general assessment of the gains that the Russians had made in their test series last September and October.

Q Does this arms race seem to have no end at this time?

A I would hope that it will have an end. The United States is certainly trying to bring it to an end with a meaningful test-ban treaty.

Q Have the Russians made real progress toward an antimissile missile? Khrushchev said they can hit a "fly in the sky"—

A I think that was an exaggeration. That statement was overdrawn. We don't know just how much progress they've made in the antimissile-missile field, because that's a little harder to assess. A mere assessment of the type of weapon that has been exploded, which is the kind of information we get, isn't sufficient—

Q You don't know what the precise result is at the other end?

A No. We don't know what the precise result is at the missile end. The effect of a nuclear explosion on their missile and their electronics and their radar and detection capability, and so forth, is not something we can assess in the same way that we can assess what has gone on in a nuclear explosion.

Q Is an antimissile missile a practical concept?

A This is a matter of numbers and statistics. Certainly an antimissile missile can be developed that will, under certain circumstances, shoot down an incoming missile.

The problem is the efficiency, how many of the incoming missiles you face, what proportion of the incoming missiles can be shot down, and what the cost is to distribute a sufficient number of antimissile launching sites to achieve any desired probability of shooting down the incoming missiles.

Q Yet Khrushchev's warning that he already has one doesn't frighten you?

A No, it doesn't. It doesn't scare me at this time. I just can't see how he could have a missile with the capability that he contends he has, although it should be noted that his is a very vague statement.

I don't know that we can deduce from a statement like that just what he means.

Q Can you say whether the Russians are ahead of the U. S. in developing antimissile missiles?

A I don't believe that anyone in the United States really knows for certain.

Q In an antimissile defense, might some cities be saved?

A Yes, depending on the size of the attack. Certainly you could save large parts of some cities.

If you mean might we prevent all incoming missiles from landing on any particular city, then you have a problem. Some will probably get through any defense that has been conceived so far—and I think with anything that has been conceived so far by either side—and that's why I have doubts that Khrushchev has anything ultimate in an anti-missile-missile capability.

Q When you talk of an antimissile missile, are you talking about a "bullet" hitting a "bullet," or of setting up a nuclear screen in the sky which would, in effect, have a crippling influence on the approaching enemy missile?

A It doesn't have to make physical contact. The antimissile missile depends on a nuclear explosion also, and that has a range of influence that can be rather large.

Q Can you give an idea of about how many miles that range of influence is?

A I cannot—but it's in the range of miles, depending on what kind of device we're talking about.

Q Dr. Seaborg, how much has the U. S. got invested in atomic development—in all its phases?

A Are you talking about operating and plant equipment?

Q The whole atomic-energy program, starting with the Manhattan Project—

A Including expenditure of about 2 billion dollars for the Manhattan Project, the total expenditures for operations and plant and equipment will total about 30 billion dollars by the end of fiscal 1963 [June 30, 1963]. The current rate of expenditure is about 3 billion dollars per year.

Q Is most of that military?

A A good part of it is civilian, but most of it still is military.

Q Is the military investment continuing to grow in size each year?

A It has leveled off in actual dollars and is diminishing in proportion to the total. It has leveled off at about 2 billion dollars a year. That includes all aspects that go into the military—the ore procurement, the treatment of the uranium extracted from the ore to make fissionable material—that is the uranium 235 and the plutonium—the fabrication of this material into weapons, and the accompanying research.

(continued on page 66)

Dr. Glenn T. Seaborg, 50, is a top-rank physicist whose codiscovery of plutonium led to a Nobel Prize—and the first atom bomb. He has been Chairman of the Atomic Energy Commission for one and a half years. His views on the atom—for war or for peace—are from firsthand experience.

—USN&WR Photo

"We will have nuclear power on a large scale within five to 10 years, and it will steadily increase in importance"

(continued)

INTERVIEW WITH DR. GLENN T. SEABORG, CHAIRMAN, ATOMIC ENERGY COMMISSION

—USN&WR Photo

"Use of isotopes in the diagnosis of disease and in therapy has been spectacular"

Q Does the AEC pay the bill for all military weapons? That is, do you pay the bill and then give the weapons to the Pentagon?

A That is the way it's been done all these years. That is the way it started historically. I think this system had its roots in the desire to have civilian control over atomic energy. This gave a certain amount of fiscal control, and this contributed in a positive sense to the concept of civilian control—

Q Have you ever told the military they can't have this or that atomic weapon?

A Civilians have, on occasion, questioned the size of the requirement.

Q Is that happening more and more, recently?

A My experience doesn't go back far enough to enable me to say whether it's been happening more and more, recently.

Q You mentioned 3 billion dollars a year as the total. Where does the other billion go?

A Into all of the civilian activities. There are many of these, including the development of civilian nuclear power; nuclear propulsion and other uses of nuclear energy in space; physical, biological and medical research; development of new ways to use radioisotopes in medicine, industry and agriculture; and then, in smaller amounts, in support of nuclear education and training programs.

Q Has the civilian development progressed to the extent that scientists expected?

A It hasn't emerged on the scale that was expected by some who, in my view, were overoptimistic. A number of my scientific friends and engineer friends and I find that it is on about the schedule that we predicted some 10 or 15 years ago.

I recently reread a speech that I made just 10 years ago to the American Institute of Chemists, and found that I had predicted just about the schedule that we're on now.

Q What do you foresee for the next five years?

A I expect that, in about five years, there will be large water-cooled reactors which will be competitive, over the life of the reactor, with conventional power plants in parts of the country where the costs of fossil fuels are high. Such places are the New England States and the Far West, especially California.

Q Is the need for large reactors?

A I say "big reactors" because they're more economical than small ones. It's the nature of nuclear power. To some extent this is also true of electrical power from conventional fuels—the power is more economical when it is produced in large plants.

Q Would costs come down—electric rates—in those areas?

A Nuclear power would just begin to become competitive. I don't think that it would be any lower cost than conventional power at the start.

Q Do you see a time when there will be lower costs?

A I think so, yes, but that will start in the 1970s, and, of course, in high-cost areas.

Q Is it fair to say that this country is behind both Britain and the Soviet Union in development of atomic energy?

A Not at all. It certainly hasn't been true in recent years.

Q Is England supplying more atomic power now, proportionately, to its plant than the U. S.?

A Yes, I believe it is. But it's not an economically competitive source of electrical power.

Q Is the U. S. method of producing atomic power different from theirs?

A One important difference is that we tend to use enriched uranium—that is, uranium containing more of the fissionable isotope uranium 235 than the concentration in natural uranium—and England tends to use natural uranium.

Q Which type of reactor is most advanced in the U. S.?

A The water-cooled reactor is the most advanced type, but perhaps the least flexible, the least suited to meet our needs in the long run. We are working on other types that are more suited to the long-term problem.

An important point here is that most of the present reactor types, including the water-cooled reactors, depend on the rare fissionable isotope, uranium 235, as fuel. Only about seven tenths of 1 per cent of natural uranium consists of this isotope.

If only the uranium-235 isotope is used as fuel, it will not add an appreciable amount to the energy resources of our country. We need to use as fuels the abundant isotope of uranium—uranium 238—and thorium, through what we call the "breeding process."

Q People used to hear a lot about breeder reactors. What's happened to them?

A I might say a word about this. Uranium 238, the abundant isotope of uranium, is relatively nonfissionable—but it can be transmuted to a fissionable isotope of another element, plutonium 239, in a reactor. In this way, uranium 238 can be indirectly utilized as a fuel. This means that the amount of fuel that is available at the same cost would be multiplied about 100 times.

In addition, the uranium 238 is so cheap, compared to the cost of the more expensive enriched fuel, that it would be economical to use lower-grade uranium ore. So, on top of the factor of 100, due to the greater abundance of the uranium 238, there is another increase of 100 or 1,000 in usable uranium resources, so we may have 10,000 or 100,000 times more usable fuel through the breeding process.

Q You mean you create fuel by using fuel?

A In a sense. Actually, what we're doing is indirectly using uranium 238 as the fuel by having it absorb neutrons and form the intermediate plutonium 239, which is fissionable with neutrons and is a fuel. In order to do that you have to

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. . . "There will be increasing use of nuclear power in space"

build a breeder in which more plutonium 239 is produced than is consumed in the reactor in making it. The net result of this, if you think about it, is that you're indirectly burning uranium 238.

Q Does this present a very difficult problem technically?

A Yes, indeed. Many scientific and engineering problems remain to be solved. These are more long-range than the problems that must be solved in order to produce competitive power from the less-efficient reactors of the water-cooled type – the converter type, as we call them – that are more immediately on the horizon. But, in the long run, we must have breeder reactors.

Q Will those go into underdeveloped countries, too, do you think?

A In the long run, yes, but it will be decades before we'll have a big breeder-reactor industry. Reactors of other types will be used in the meantime.

Q Might those go into areas like Latin America or Africa?

A Yes. Those people need more power. However, the problem of using nuclear power in those countries depends on making it economically competitive with other sources of fuel. I think this is on the verge of being the case in a number of countries–India, Japan, Italy.

But when you come to quite underdeveloped countries, the problem is that reactors are an advanced technology and the technical know-how must be available to cope with it. Many countries don't have this technical ability as yet.

EXPECTING TOO MUCH—

Q At one time much hope was held out for getting enormous power from a controlled-fusion process–involving the hydrogen atom. What has happened to that?

A There again, the hope was not general among scientists. Although interesting research is being done and much information is being developed, the major concept on which to base machines that develop such energy on a practical basis has not yet been found.

Q So we can't look forward to harnessing the power of the oceans—

A It's still possible, but it isn't analogous to the discovery of nuclear fission a little more than 20 years ago and the first operation of a nuclear chain reaction on fissionable material –just 20 years ago, Dec. 2, 1942.

Once that was done, then the scientific basis for nuclear power from fission had been laid. The nature of the self-perpetuating, nuclear chain reaction, where a neutron causes uranium to undergo fission, releases more neutrons which, in turn, can cause more uranium to undergo fission, and so forth, is such that we had the means at hand. It was only a matter of building a machine that you still needed to describe in detail. The only question really was, would it be economically competitive?

Q What is the big problem in the fusion process?

A With the hydrogen atom you don't have the built-in mechanism you have with the neutron for perpetuating the chain reaction which you can do even at room temperature.

In the nuclear-fission chain reaction, it can be perpetuated and kept going at low temperatures, if you cool it. The reason you develop high temperatures is deliberately in order to increase the efficiency for the conversion of the heat to electricity.

You have nothing quite like that in the fusion reaction. The only way the fusion reaction will perpetuate itself is by heating the fusion material–the heavy hydrogen, for example –to very high temperatures in the range of millions, multi-millions of degrees.

Q This can't be done for sustained periods?

A That's exactly the difficulty. It's done in the nuclear weapon for short periods by using the fission reaction to heat the fusion material high enough to get a rapid thermonuclear –that is, fusion–reaction or an explosion. But, of course, the reaction isn't contained. The energy is released in a time and in a way that doesn't make the recovery of heat feasible.

WHAT FUTURE WILL BRING—

Q Dr. Seaborg, you've described what is *not* around the corner. Can you look ahead 10 years and say what is?

A I didn't mean to imply that civilian use of nuclear power isn't around the corner. I mean very definitely to tell you that it *is* around the corner.

We will have civilian nuclear power on a large scale, competitive under the conditions that I have mentioned, starting within five to 10 years, and it will steadily increase in importance. We know how to do it; it is only a matter of how much it costs. We know that the world will run out of other fuels in time. Therefore, it is an absolute certainty that we will have large-scale use of nuclear power, particularly to develop electrical power, in the future. I want, definitely, to put that on the positive side.

Q Is there anything else?

A Many other things. Certainly there will be an increasing use of nuclear power in space. It has two uses: One is for the direct propulsion of rockets, of space vehicles. This is being investigated in our Rover project, in which a nuclear reactor is used to heat hydrogen as the propellant. For the long-range, heavy-payload missions, probably the missions beyond the moon, the nuclear source of propulsion will be developed and will be needed.

That is one use of nuclear energy in space. The other is the use of nuclear energy for auxiliary power in space vehicles and satellites. This is the so-called "Systems for Nuclear Auxiliary Power"–our SNAP program. This is already here. The first SNAP device, which develops power in the range of 2½ watts, was sent aloft on a Navy Transit navigational satellite on June 29 of last year. We just celebrated the anniversary. The second nuclear device of this type was sent aloft on another Navy Transit navigational satellite on November 15 last year.

Q What is the purpose of that?

A The purpose is to power some of the equipment for sending radio information back to earth, to ships, for navigational purposes. That battery, which weighs five pounds or so, has delivered an amount of electrical energy in its first year already equal to thousands of pounds of conventional batteries, and will last, we think, for five years and maybe more.

One SNAP device using curium 242 will be used on the Surveyor satellite for the first soft landing on the moon. These devices also are beginning to be used for many terrestrial purposes where power is needed for long periods of time–at remote stations which must remain operating even though unattended, such as installations in the Antarctic region, Arctic region or underwater, or for navigational buoys.

Looking further into the future, we're beginning to work on a SNAP device that will deliver up to a megawatt [a million watts] of power, a compact reactor in this case, which might be used to provide the power needed for really advanced methods of propulsion–space vehicles with elec-

(continued)

INTERVIEW WITH DR. GLENN T. SEABORG, CHAIRMAN, ATOMIC ENERGY COMMISSION

—USN&WR Photo

"I doubt that Khrushchev has anything ultimate in antimissile-missile capability"

trical propulsion, in which ionized material is used as the propellant.

Q Once in space, will it keep a spaceship going?

A It will keep it going on out to other planets, for example. It will provide the means for turning on and off power for propulsion once the crew and ship are up. Electrical propulsion doesn't provide as much thrust as other types, but a thrust of almost indefinite duration can be utilized.

Q You see spacemen going a long way, then—

A Yes. And here's another use—in advanced communications satellites. For example, when you get to the point where you want to broadcast from space directly to the home—not to a sensitive terrestrial receiver and then television stations which rebroadcast to the home, as is the case with Telstar, but directly to individual homes—then you need power in the tens of kilowatt range. The satellite would receive the signal from anywhere on earth in sight of the satellite, and then, with this power source, could transmit it directly to homes all over the world.

Q Is this in effect a type of engine you're talking about?

A It's a compact reactor. It develops heat which is converted to electricity immediately.

Q Could you put one of those in an automobile and drive it?

A No, because any reactor continuously emits radiation—neutrons and gamma rays and so forth. This is controlled in the reactors as we use them—in central-station power plants or in satellites—by shielding material. But the amount of shielding material required for a reactor of sufficient power to operate an automobile would weigh perhaps 50 tons, so it isn't practical.

Q Is there enough uranium in the world to take care of all these needs—both peaceful and military?

A Yes, if for civilian nuclear power we develop the breeder process. If we use only the fissionable rare isotope, uranium 235—present only to about seven tenths of a per cent in uranium—then there isn't enough. But if you learn how to breed and use the uranium 238, therefore, through the intermediate of fissionable plutonium, then there's plenty.

Q Does this come out cheaper in the end than the use of raw uranium?

A Yes. This would be a breakthrough, economically.

Q And you said earlier that you thought that this would become cheaper and cheaper over a period of time—

A Yes, but more important than that, it will make nuclear energy an important source of energy in the future. Without developing breeding, nuclear power will add only an increment to the total energy resources of our country which will be substantially less than the energy that we now expect to obtain from coal and oil and gas in the future.

But, if we develop breeding, then we have an increment which is hundreds of times, or maybe thousands of times, more than all the coal and oil and gas. Breeding would make it possible to burn indirectly the nonfissionable uranium 238 and thorium. Look at it that way. That's the easiest way to look at it.

Q What use is being made of isotopes?

A They are being used in medicine, in research in general, in agriculture, in industry, in many ways—I don't think that it is generally realized what an impact isotopes have made already.

Take medicine alone. The use of isotopes in studying the mechanism of disorders and disease, the use in the diagnosis of disease, and the use in therapy has been almost spectacular.

The one isotope alone, iodine 131, has saved thousands of lives.

Q Can you give an example of how that works?

A Take thyroid disorders. Iodine 131 is ideally suited to the treatment of a hyperthyroid condition [overactive thyroid gland]. The iodine is used doubly. First it is a tool for diagnosing the condition by measuring the rate of uptake. This is done by putting a counter near the thyroid. The rate-of-uptake curve shows whether the patient has this condition, which the doctor usually already suspects because of the palpitating heart, sweating and chronic distress. Then the iodine 131 is given in larger doses. It goes to the thyroid, destroys the active portion and reduces the activity to a normal level. The whole metabolism of the person is returned to normal.

Q How is it taken?

A You drink a tasteless glass of water for both—for the diagnosis and for the therapy.

There are many other uses of the iodine itself that I won't try to go into, but it makes it possible to diagnose the malfunctions of many organs of the body.

Several other isotopes also are important in medical research and practice. Iron 59, for example, is used in studies of anemia. Much information on metabolism is being gained through the use of isotopes. I can only touch on the subject here.

Q Are isotopes being used in treating cancer?

A Isotopes are used in the treatment of cancer, yes, in two ways. First, the external treatment using cobalt 60, just like high-energy X rays. In fact, so far as the patient knows, it's almost like being under an X-ray machine. He is under a big shielded device that directs a stream of gamma rays from the cobalt. That's one way in which they are used.

The other way is through internal administration, where the radioactive isotope seeks the point that needs to be treated with radiation within the body.

I should emphasize, of course, that this hasn't led to a solution of the cancer problem. That has not yet been solved, but isotopes have been helpful in some cases. 80

. . . "I feel that we are ahead" of Russia in atomic weapons

Q What do radioactive isotopes do to the normal areas of the body?

A They are not administered in doses that cause adverse effects to normal areas of the body. At least that's the aim. The usual therapeutic dose of radioactive iodine, for example, is many-orders-of-magnitude above the suggested limit for nuclear fallout, yet it has not led to any adverse effects that we know about.

Q Does that indicate that perhaps fallout isn't as great a danger as has been claimed?

A It indicates that we can have a good deal of confidence in the present radiation-safety standards.

Q Can both sides continue testing indefinitely without any harmful effects on people?

A Oh, I think not. I think that if both sides test indefinitely, which implies rather high levels for a long period of time, the number of people who are affected by fallout, even though it is a small proportion of the whole population, would become appreciable.

Q What is holding up a nuclear-test ban? Why can't the U. S. and the Russians come to terms?

A Well, we feel that a large factor is the Soviet unwillingness to agree to on-site inspections.

NEED FOR TEST INSPECTION—

Q Is such inspection inside the borders of Russia needed?

A Yes, it is needed if we want to assure ourselves that nuclear tests are not being conducted.

Q Couldn't the tests be detected without inspection? People keep hearing about new and improved methods of detection—

A Some explosions can't be identified. Some events suspected of being nuclear explosions can't be identified as such, cannot be distinguished from earthquakes, definitely, without on-site inspection.

Q Those are underground explosions?

A Yes, underground.

Q Can you detect everything in the atmosphere?

A There's a limit below which you cannot detect even in the atmosphere, but it's a very low limit. It's a limit that we would not be very worried about.

Q If you don't get a test ban, what is the likelihood of a great many other countries' developing atomic weapons?

A I think it's quite likely. Any country with a technical sophistication about equivalent to Israel or Sweden could. I think that would be one way of putting it.

Q Does Red China meet that specification?

A Definitely. With Red China it's only a matter of time.

Q This would seem to give urgency to the need for a test ban. Aren't the Russians driven by the desire to keep the "nuclear club" small?

A Well, we would think so.

Q Do you think that if the U. S. agreed not to insist on on-site inspection, there would immediately be a test-ban agreement, or would the Russians think up some other reason for not having one?

A I don't know whether that one concession would be sufficient, but I think that if we came close enough to their terms, they would agree—

Q What are their terms?

A They are, essentially, that we cease nuclear testing and rely on national systems, nationally manned, to monitor possible tests. Each nation would monitor itself, with no inspections. We feel that that wouldn't offer us sufficient security that they were indeed not testing.

Q Do you share the feeling that the Russians are not going to "talk turkey" until they've caught up in nuclear armaments with the U. S.?

A This is what makes the problem so difficult. Each wants to be sure that the other hasn't surpassed him.

Q Isn't there a saturation point in sight at which both sides have sufficient numbers of warheads to hit every known target in either the Soviet Union or the U. S.? Is this the point at which perhaps some understanding can be reached?

A I don't know—I hope so. But the question will then be asked: Has one side advantage over the other on delivery-on-target and on prevention-of-delivery-on-target? And will it be necessary to test in order to be sure in each case that this advantage hasn't been obtained by one side, unilaterally, or in large part in advance of the other side?

Q Does the U. S. hold the advantage in weapons and the means to deliver?

A The concept of who is ahead is a very imprecise one. It has to do with so many factors—the sophistication of weapons, both tactical and strategic; the numbers of weapons, both tactical and strategic; the delivery capability of weapons, and the defense capability. It really is difficult to make assessments as to who is ahead in a situation like that.

I might go on to say that, in the aggregate, within the boundaries of that imprecise situation, I feel that we are ahead at the present time.

Q Is there ever any time when a nation feels secure in the weapons that it has? In short, is testing to go on and on and on and on?

A We would hope that it would be possible to come to the realization that going on and on doesn't lead to security.

IF ARMS RACE WIDENS—

Q Is it seriously considered that, in time, it may not be the Russians with whom the U. S. is racing; it may be somebody else?

A Certainly one of the reasons for wanting a test ban is this "*n*th country" problem—the problem of other nations who might produce nuclear weapons and who might use them in a way that would involve the large powers.

This is certainly a strong argument in favor of a test ban. The effect which it might have on the diminution of the arms race is certainly the main reason and a very good reason why we should do everything we can to negotiate a nuclear-test ban.

Q Did you mean to imply that you didn't expect the Russians to accept a test ban until they were in a position to deliver more on target, and prevent more from reaching their targets, and thus be in a position to dictate to the world?

A No, I didn't mean to make the judgment that I felt that to be a national aim on their part.

Q But the country with that advantage, though, could dictate the peace terms, couldn't it?

A If it's possible to develop that unbalance. It isn't clear that such a defense—unilaterally acquired—or such a capability to penetrate with nuclear weapons—unilaterally acquired—in comparison with the other side, is possible. It just isn't clear that's at all possible.

Q Dr. Seaborg, have the Russians ever made any real moves toward agreement in the test-ban negotiations?

A At one time they appeared to agree to three on-site inspections a year.

Q Did they back away from that?

A Yes, they backed off. Their present position is: no on-site inspections. [END]

NEW YORK TIMES SEPTEMBER 17, 1962.

Head of A.E.C. Honored in Sweden

Special to The New York Times.

STOCKHOLM, Sept. 16 — Dr. Glenn T. Seaborg, chairman of the United States Atomic Energy Commission, was honored today as the Swedish-American of 1962.

Dr. Seaborg, whose mother and paternal gradparents were born in Sweden, was selected by the Vasa Order of America for its annual award. The order seeks to foster goodwill between the United States and Sweden.

A certificate was presented at the annual Swedish-American Day festivities at Skansen National Park. Dr. Seaborg came here on his way to the sixth general conference of the International Atomic Energy Agency which opens Tuesday in Vienna.

The New York Times

Dr. Glenn T. Seaborg

TIMES-UNION * Albany, Sat., Oct. 27, 1962

Regents Told of Need To Revamp Education

"Science has given us unprecedented and paradoxical power" and to cope with it a thorough revamping of the educational system — from first grade through graduate studies — is necessary, the chairman of the Atomic Energy Commission said last night.

Earlier, a special arts consultant to President Kennedy had said: 'I believe in liberal studies as the most practicable for the individual and as the most fitted to the needs of a period as changing as our own."

These views were given to a distinguished audience of educators at the 91st Convocation of the State Board of Regents in Chancellor's Hall. The convocation had for its theme: "New Directions in Education."

Scientific Emphasis

Dr. Glenn T. Seaborg, AEC chairman, advised taking the direction of scientific emphasis. To match the new emphasis in curriculum, he also counseled a new emphasis in teacher training — toward subject matter and away from teaching methods — and a wholesale increase in teacher salaries.

August Heckscher, director of the 20th Century Fund who also serves as arts consultant to the President, put emphasis on the role of arts in a liberal arts education.

Later Mr. Seaborg and Mr. Heckscher were given honorary degrees. And Howard Hanson, directer of the Eastman School of Music, left the podium where the had been conducting the Eastman Philharmonia, to receive an honorary degree. The Regents also conferred honorary degrees on Millicent Carey McIntosh, president emeritus of Barnard College, and Henry T. Heald, president of the Ford Foundation.

"We have gone far toward the integration of science into the total social effort," said Dr. Seaborg. And he prescribed going even further to determine: "What resources do we have for coping with the new environment? Can we control our new power or will it control us? What can we do . . . to make the new forces serve a society dedicated to freedom?"

To provide the right answers, Dr. Seaborg suggested a number of changes in the educational system, ranging from greater emphasis on English and mathematics in elementary and high schools, to establishment of a college science course for non-scientists, higher pay for teachers, expansion of the use of television in teaching, and use in science departments of specialists in the arts, humanities and social sciences.

"The task of tooling up to train our most talented people for the sophisticated task ahead is often too great for local government agencies," he said. "The measures I have suggested . . . are required, I believe, by school systems generally throughout the nation. . . . They require . . . more money. They call for the development of arrangements for accepting federal funds for new uses, without sacrificing local autonomy"

Opens Pathway

Mr. Heckscher traced the re-entry of the arts into liberal arts to the same point where Dr. Seaborg called a milestone in scientific education progress—the end of World War 2.

"This revitalizing of the concept of a liberal education . . . is the opening of a pathway by which the humanist and the scientist can come to know each other," he said.

"We read . . . of great events and great crises, of marvelous technical advances and fascinating personalities," he said. "But somehow all these seem like incidents and persons in a dream, removed from our control and only dimly affecting our lives. . . . In such a world the arts are . . . the means, quite literally, by which modern man can save his soul."

CINCINNATI ENQUIRER, November 10, 1962

Scientist Gives Views

Atomic Energy Holds Key To Space Probes

Put atomic energy in a portable, powerful package and you have the key to the conquest of space, Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission, indicated in a speech here last night.

Dr. Seaborg spoke at the annual dinner of the Cincinnati Post, American Ordnance Association, at the Hotel Netherland Hilton.

Even early models of nuclear rockets now envisioned, Dr. Seaborg said, will be twice as effective as the best chemical rockets of today and even surpass the theoretical capacities of "exotic" chemical rockets, using the most energy-packed fuels possible.

However, even atomic rockets may not be good enough for some of the most distant spots of the solar system, he said. For this, electrical rockets will be needed. They are incredibly miserly with fuel, although they lack brute force, and can boost a space vehicle to great speeds.

Atomic reactors appear to be the best potential sources of electricity for such rockets," Dr. Seaborg said.

He described atomic rocket research as well as work on atomic power packages for use in space.

The United States has put two atomic "batteries" into orbit thus far, he said, and the AEC is developing larger and larger atomic batteries and generators. These devices get energy from spontaneous decay of radioactive materials.

Rocket power sources probably will have to use the greater energies generated by a slowed version of the atom splitting chain reaction of atomic bombs, Dr. Seaborg indicated.

"For the bigger electric loads, the compact reactor appears to be the only answer. A compact, high-powered, nuclear reactor must provide the electrical power required in the electrical propulsion concepts being developed by NASA (National Aeronautics & Space Administration) and the Department of Defense.

"For deep space missions—including voyages to the outer planets—electric propulsion seems necessary, since it is the most efficient potential means of space propulsion. Further, only nuclear energy is feasible to meet the power requirements," Dr. Seaborg said.

CINCINNATI POST-TIMES-STAR
November 10, 1962

Space Probing Vital to Survival, AEC Chairman Urges "Go" Effort

Dr. Glenn Seaborg, chairman of the Atomic Energy Commission, says space exploration—no matter how huge and expensive a venture—is vital to America's survival "as a dynamic and creative people."

"Our forebears were adventurous people who broke with the old ties to come to the New World and conquer a new continent," Dr. Seaborg told members of the Cincinnati Post of the American Ordnance Assn. here last night.

"It is now feasible to explore space," he said. "We cannot draw a curtain over a New World that is within our grasp. We cannot sit at home, so to speak, and hear, second-hand, of new wonders that men have pondered through the ages.

"OUR ENTHUSIASTIC participation on the frontier, wherever the frontier exists, is necessary for our continuation as a dynamic and creative people," he added.

Dr. Seaborg spoke at a dinner meeting where he was awarded the Ordnance Post's Charles L. Harrison Award for distinguished ordnance service, an annual award named after the first chief of the Cincinnati Ordnance District.

Dr. Seaborg, discoverer of Plutonium 239 and head of Plutonium Research for the Manhattan Project during World War II, was named chairman of the AEC in 1961.

In Dr. Seaborg's view, nuclear power will provide the most feasible method of powering deep space flights The U. S., he added, is well on the way toward developing it. The AEC expects to flight test the first nuclear rocket engine by 1967, he said.

THE ENGINE, the NERVA (for Nuclear Engine for Rocket Vehicle Applications) is being developed by the Westinghouse Corp. The vital nuclear reactor which goes into it is being developed under Project Rover, a joint effort of the AEC, the National Space and Aeronautics Administration and the Defense Department, Dr. Seaborg said.

Although optimistic about U. S. space progress, Dr. Seaborg said that the USSR currently enjoys a head start in "spectacular" accomplishments in space.

"Success in our space effort is within our reach," Dr. Seaborg added.

Monday, Nov. 19, 1962
San Francisco Chronicle

Salute to a New Era

By Jack Foisie

A merchant vessel venting no smoke, with her cargo masts and superstructure slanting in rakish style, was welcomed to San Francisco yesterday.

She was the Savannah, the world's first nuclear-powered commercial ship.

Because she was a "first," a herald of the day when steam-propelled and diesel-motored ships disappear as did the coal-burner and sailing vessel before them, the Savannah was welcomed by thousands of the curious on shore, a fleet of pleasure craft and fire boats afloat, and a mix of scientists and civic leaders who came aboard.

Gliding into the Bay at reduced speed under handily-controlled output of her 1700 pounds of fissionable material—she runs on uranium 235—the experimental combination passenger-cargo liner poked her nose under the Golden Gate bridge at 1:25 p.m.

She was immediately surrounded by a covey of boats, manned by Sunday sailors who stared curiously at the Savannah's nuclear symbol amidships, commented favorably on the ship's super-streamlined design, and appeared not at all frightened by the theoretical danger of explosion in the vessel's nuclear furnace.

This textbook possibility—a nuclear reactor that runs "wild"—has been so thoroughly stymied by built-in controls and safety devices that the ship is regarded by her designers as "over-safe." Nevertheless, in some seafaring nations, a visit by the Savannah or—for that matter by America's nuclear submarines or its newly-built atomic carrier—is not welcomed.

Governor Edmund G. Brown, who ended his post-election vacation to resume his official duties.

Also participating in the shipboard ceremony were Major George Christopher and Cyril Magnin, chairman of the San Francisco Port Authority.

The Savannah was built and tested by the Federal Government over a five-year period and cost $53 million. Her co-sponsors are the Federal Maritime Administration, represented yesterday by Lloyd Fleming, and the Atomic Energy Commission. Its chairman, Dr. Glenn Seaborg, was present.

In an informal chat with reporters, Seaborg said the experimental Savannah had not been intended as a vessel that could compete commercially in the fight for low-cost voyages and full cargoes that makes the world-wide maritime industry so cutthroat.

THE COST

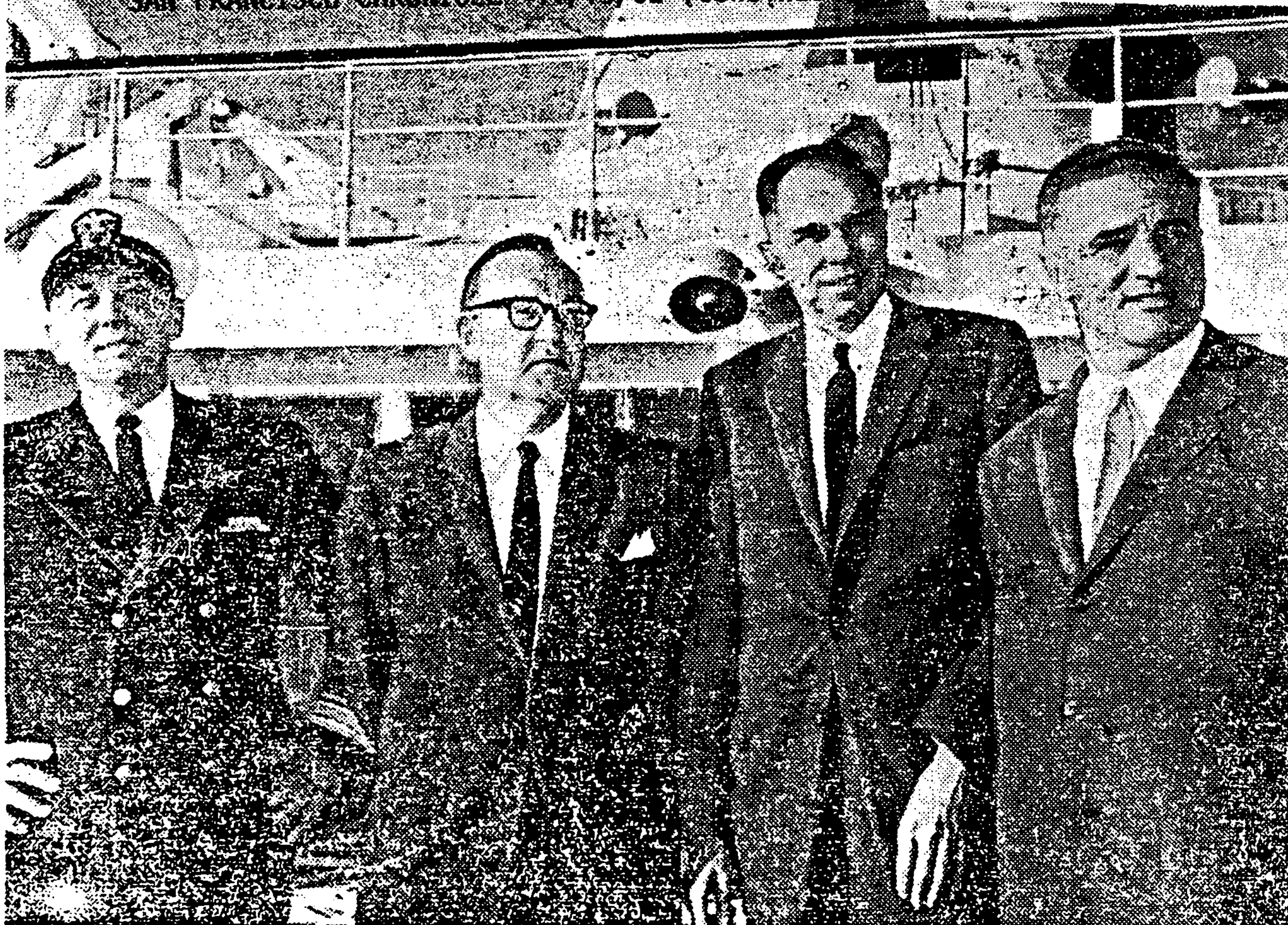
Dr. Seaborg and Richard Godwin, who was the Savannah project engineer during her formative years and was a passenger aboard the vessel yesterday, conceded the cost of operating this ship was beyond what any commercial operator could expect to carry.

"But if I must make a guess, I think a nuclear ship with an economically-designed reactor could be started by 1965," Dr. Seaborg said.

Seaborg said the Savannah would remain in service for years under a commercial operator but with the bills being paid by the Government.

"Excellent schooling for merchant mariners of the future," said the Savannah's skipper, Commodore Gaston R. DeGroote.

The ship presently is sailed by the States Marine Line of New York.



Commodore Gaston R. DeGroote (from left), Governor Edmund G. Brown, Dr. Glen T. Seaborg and Mayor George Christopher looked over Savannah as she pulled into the Bay. The public will see the ship starting tomorrow.

NEW YORK TIMES NOVEMBER 26, 1962

SEABORG DEPICTS ATOM ERA IN 80'S

N. Y. Times

Manned Trip to Venus and Polar Colonies Foreseen

11-26-62

WASHINGTON, Nov. 25 (AP) — Spectacular peaceful applications of atomic energy in the next 20 years were forecast today by Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission.

They ranged from a manned expedition by nuclear rocket to the planet Venus or Mars to limited colonization of polar regions on earth.

However, Dr. Seaborg said, unless a controlled ban is achieved on nuclear weapon tests, the next two decades will also see the development of "pretty frightful" weapons, "very advanced over what we have now."

The Nobel Prize winner was asked in an interview to make his predictions. The A.E.C. is planning to celebrate the 20th anniversary of the first controlled, self-sustaining chain reaction. That event, achieved in Chicago Dec. 2, 1942, started the first "20 years of nuclear progress," the commission has said.

Clothes From Paper

Dr. Seaborg repeated predictions he had made about spectacular developments in other fields, resulting from the fast pace of technology.

The next 30 years, he said, may see such a development of paper that "durable and fashionable clothes made inexpensively of paper will be widely worn."

He also spoke of self-lubricating metals; home-style electronic computers capable of figuring income taxes and family budgets; computers capable of translating a foreign language automatically and "great progress in predicting storms, earthquakes and other natural hazards."

In the atomic field he said:

"We'll be well advanced in the use of nuclear power in space both for propulsion of rockets and for auxilary power within orbiting satellites.

"Around the year 1982 we will have already made, or be seriously planning, a manned journey to one of the near planets [Venus or Mars].

"And we'll be using nuclear energy rather routinely in satellites as an auxiliary source of [non-propulsive] electric power.

World TV by Satellite

"For example, by then, we'll probably be able to have [world] television broadcasts relayed by satellites brought directly into homes, instead of the present indirect method."

With the pioneering Telstar satellite, he explained, telecasts relayed to earth by the sphere must be received by highly sensitive receivers, then rebroadcast to homes over other electronic relays.

"Within 20 years it might be possible to get reception direct from a satellite wherever a television set was located, even in the darkest part of Africa," he said.

Portable, compact and powerful nuclear reactors for furnshing electric power and heating for buildings may open polar regions limited colonization, he declared.

"Maybe some people would want to live there," he said. Concelvable, he added, may be jobs for people in tending to food caches that meay be set up in the natural ice-boxes for long-term storage of perishable foodstuffs.

Isotopes in Medicine

He lavisaged a continuing and broadening application for radioactive isotopes to diagnosis and treatment in medicine and to the exploration of the mechanism of disease.

He also saw great gains in agriculture through the use of isotopes, including improved crops.

Cr. Seaborg depicted long-lasting batteries for automobiles charged with nuclear-generated electricity, and the use of "fuel cells" that is, energy-producing chemicals that could propel a car for a certain period, then be revitalized at a nuclear power station while a rental cell was used.

Electricity from the atom, he said, could be made economicall competitive with conventional fuels in most of the country by the Seventies.

Within 30 years, he went on, the peaceful uses of nuclear explosives, now under study in Project Plowshare, may include such feats as "deepening the Straits of Gibraltar or opening up the Sierra Nevada passes."

Then he said:

"I feel that even such predictions as I have outline may be too conservative, in the sense that there may be spectacular developments that we do not now even foresee.

"We're in a scientific age that is moving at such a rate that Idon't think one can adequately predict what may happen within 20 years.

"And I would add this: I certainly feel that people 20 years from now will have to be much more scientifically literate than people now are.

"So much of daily life then will be related to scientific things that there will be a need for greater understanding of them."

KENNEDY BRIEFED: During the 45-minute briefing for President John Kennedy at Sandia Corp. Friday, Sandia's president, S. P. Schwarz, left, discussed emphasis on reliability and safety in nuclear weapons systems. Also shown with the President are Sen. Clinton P. Anderson, second from left, and Atomic Energy Commission chairman Glenn T. Seaborg. This photo was taken by a firm photographer inside a restricted area.

The Post-Register, Idaho Falls, Idaho Thursday, December 27, 1962

NATIONAL AEC LEADERS VISIT IDAHO

HUGO N. ESKILDSON, above left, manager of the Idaho Operations Office of the AEC, chats with Dr. Glenn T. Seaborg, center, chairman of the U. S. Atomic Energy Commission, and Dr. Leland Haworth, an AEC commissioner, as the two visitors prepared to inspect the National Reactor Testing Station Thursday. It was the first visit to the Idaho station for Dr. Seaborg, a distinguished scientist of international renown and the discoverer of plutonium. (Post-Register Staff Photo)

AEC Head Sees Idaho Role In Space Study

The overseer of this nation's atomic energy program said Thursday here that he thought the Idaho AEC station would probably share more in nuclear space research in the future.

Dr. Glenn T. Seaborg, Washington, D.C., chairman of the U.S. Atomic Energy Commission, said, however, he could not foretell the scope of the work at the present time.

Dr. Seaborg, along with AEC Commissioner Dr. Leland Haworth, also of Washington, are inspecting the National Reactor Testing Station Thursday and Friday — the first visit here for the AEC chairman who President Kennedy appointed two years ago.

"The Idaho site, as you know, is already involved in space research. The reactor safety program (The STEP program) and the lithium-cooled experiment (The LCRE reactor) are already scheduled at the Idaho site. We don't know yet until the experiment is made, but it is possible that the LCRE project would also lead to an advanced space test here. This remains to be seen," Dr. Seaborg told The Post-Register as he boarded a bus to tour the Idaho station early Thursday morning.

Asked if he felt the recent Civilian Reactor Report made by the AEC to President Kennedy would have any effect on the Idaho site, he replied:

"The Civilian Reactor Report made a number of recommendations for reactor development. I think the report could have a positive effect on the Idaho station. I cannot specify what reactors would be built here but I think some of the proposed new reactors could be developed in Idaho."

Talks Here Tonight

Dr. Glenn T. Seaborg, Washington, D.C., chairman of the U.S. Atomic Energy Commission, will give a public address tonight at 8:30 p.m. at the Idaho Falls Civic Auditorium.

Officers of the Idaho Falls Technical Council, sponsors of the address, Thursday urged public attendance for the free address.

Dr. Seaborg will discuss "Nuclear Energy in Space."

The 'New Look'

The Civilian Reactor Report was made by the AEC at request of President Kennedy last spring. It was completed this fall. President Kennedy had asked the AEC "to take a new and hard look at the role of nuclear power in our economy . . ." The president asked the AEC to "identify the scope and content of a nuclear power development program . . . and recommend appropriate steps to assure the proper timing of development and construction of nuclear power projects . . ." In its report, the AEC emphasized the future role of breeder reactors in the atomic power future.

Asked if he felt the new Experimental Breeder Reactor No. 2 at the Idaho site would be able to answer all the breeder reactor research needs suggested by the AEC's recent reactor report, Dr. Seaborg said:

"No. Decidedly not. That's an easy one to answer."

The EBR No. 2 is a large breeder reactor, the first power reactor at the Idaho site to have its own fuel processing and fabrication facility. It has been undergoing "shakedown" operation and has not yet begun its "hot" test program with full atomic fuel complement.

Dr. Seaborg was also asked if he felt any part of the big Rover nuclear-jet test facility in Nevada could be tested in Idaho.

"There is no plan to move any of the Rover project to Idaho. It is best suited for Nevada and the program calls for testing it there . . ."

The Nevada program calls for construction of a new highway and a new government town some 40 miles from the testing site.

Accompanying Dr. Seaborg to Idaho are Dr. Leland Haworth, an AEC commissioner, Dr. Allen J. VanderWeyden, Washington, D.C., deputy director of the AEC's reactor development division, and Dr. Arnold Fritch, technical assistant for the commission.

The group left at 8 a.m. for the Idaho site where they are scheduled to visit the EBR No. 2 reactor, the Mobile Low Power Reactor, SPERT reactor area, the Experimental Breeder Reactor No. 1, the test reactor complex, the Chemical Processing Plant, and the Experimental Organic Reactor Experiment which the AEC recently abandoned and scheduled a study for a new experimental use.

Friday, the visitors will inspect the Naval Reactor Facility and the Test Area North at the Idaho station, before departing Friday afternoon.

A distinguished scientist of international reputation, Dr. Seaborg headed the plutonium work of the Manhattan Project which spawned this nation's atomic energy program during the early war years. Plutonium was discovered by Dr. Seaborg and co-workers in 1940. At time of his appointment as chairman two years ago, he was serving as chancellor of the University of California at Berkeley.

Post Register
Idaho Falls, Idaho
January 4, 1963

Idaho's Atom Galaxy

Observers who have been mulling over statements by Dr. Glenn T. Seaborg during the AEC chairman's Idaho Falls visit, have been left with both reassurances and wonderment about the future of the atom in Idaho.

Dr. Seaborg was mostly reassuring in his statements about the future of the Idaho AEC station. He saw the Idaho site in the path of advanced fuels and materials research and new breeder reactor development. The breeder reactors, incidentally, will undoubtedly occupy a sizeable share of the research and development dollars in the future in the wake of the emphasis given this reactor in the recent AEC report to the President on the civilian reactor power program.

While he would not commit himself on specific growth of the Idaho station, by indirection it could be surmised he felt it would remain the AEC's major instrument for reactor development. He noted that the station has grown vigorously in the past. Dr. Leland Haworth, an AEC commissioner, broke in at the press conference to point out that "the Idaho site is, after all, the National Reactor Testing Station."

It was also reassuring to hear Dr. Seaborg blueprint the exciting and indispensable role that nuclear energy should play in space research. In his talk at the Idaho Falls Civic Auditorium, he, in fact, emphasized that pursuing this research is really a mandate on the American people.

He noted as well that the Idaho site is now developing two space-oriented projects at northern end of the station. But he refrained from measuring the scope of future space research at the Idaho site. He noted, however, that if the one project proves successful in its initial experiment, the LCRE reactor of Pratt and Whitney, the power conversion "followup program" could also be assigned the Idaho site. This latter would probe the propulsion mysteries of deep space missions with the long range development of the ion engine, a totally new concept of propulsion.

But the fact that Dr. Seaborg places such importance on the long range contribution of nucleonics in space and the fact that the Idaho site is suitable for some of this research, did add up to an optimistic equation to some observers.

Reporters wondered, however, about Dr. Seaborg's statement that atomic research is not suffering from Space fund competition. Members of the Joint Congressional Committee on Atomic Energy have at times beer outspoken about what they feel has been the space attrition on peaceful atomic research. It is likely a matter of how much the AEC can fruitfully spend . . . and whether the reactor technology has enough prototype ideas to trot out of the laboratory for testing.

The interpretation may also be at variance over the 1964 fiscal year budget now in process of preparation. Dr. Seaborg thinks it is a "reasonable budget" for nuclear research. Whether AEC will be assigned more funds in the "reasonable budget," remains to be seen.

For 1963, the Idaho site basks in record authorizations for both construction and operations. But Idaho will especially be interested in that 1964 budget because the current 1963 expenditure authorizations largely reflect the cresting of two huge new reactors which will be mostly finished in 1964. Idaho will get an important sizing of its future atomic role in the 1963 fiscal year budget. Will it include a new tangent in reactor experiments, like more advanced breeder reactors? Will it have a little more writing on the wall on the site's space role?

* * *

NEWSWEEK 1-7-63

The New Alchemists

Where medieval alchemists failed with their steaming crucibles, modern scientists have succeeded brilliantly with elegant atom smashers. In the past 22 years, they have created eleven new chemical elements, the last one being lawrencium (element 103), which was created in April 1961 at the University of California's Radiation Laboratory at Berkeley. Though lawrencium, named after the Rad Lab's late director Ernest O. Lawrence, plugged up the last vacant box of the famous Mendeleev Periodic Table (below), nuclear chemists believe they will soon go on to concoct 104 and 105.

The difficulty is that beyond lawrencium the elements are neither long-lived nor plentiful. Lawrencium itself is so fragile and fleeting that it was recognized only from its alpha particles as it decayed by half every eight seconds. Now, however, scientists have harnessed two additional nuclear tools to make new chemical elements.

The Atomic Energy Commission has started a program to whip up elements heavier than uranium (therefore called transuranic), using a new high-flux isotope reactor. It is being built at the AEC's Oak Ridge National Laboratory to produce specks of such "old" new elements as californium (98), berkelium (97), einsteinium (99), and fermium (100). These will be turned over to the element-makers at California who created nine of the eleven new elements in the hope that they can summon still others into existence.

Prank and Pride: One of the most exciting searches at the Rad Lab led to mendelevium (101), named after the bearded Russian chemist Dmitri Mendeleev who, in 1869, without knowing about electrons, neutrons, or isotopes, arranged known and unknown elements by their chemical properties. In 1952 at Berkeley, all of the available einsteinium in the U.S.—about 1 billion atoms weighing less than a trillionth of an ounce—was bombarded with helium ions. Whenever an atom of mendelevium was created, a huge fire bell connected to the counting circuit clanged furiously. Berkeley's fire department ended the scientists' prank, but did not dampen the jubilation in the Rad Lab that day.

In the past year, Albert Ghiorso and the team that found mendelevium have been trying to make element 104 by bombarding californium with carbon-12 ions in the Rad Lab's heavy-ion accelerator. "It's terribly hard to achieve," says Ghiorso. "Element 104 decays with a half-life of microseconds."

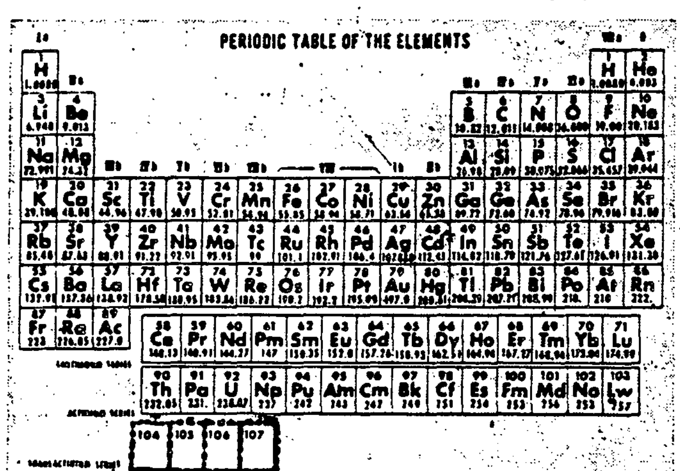
A shortcut to synthesizing new elements—and a way which may yield different isotopes of these elements with longer half-lives—is to use nuclear explosions which recreate our own sun's way of building elements. As a surprising dividend, in 1952, the first thermonuclear test in the Pacific shocked two elements into existence—einsteinium and fermium. Last fall, scientists from the University of California's Livermore Laboratory tried to duplicate this accidental achievement in two underground tests at the Nevada Proving Ground. These shots were secret preliminaries to Project Coach, a bold underground explosion set for next May at Carlsbad, N.M.

"The key to this experiment," says Glenn T. Seaborg, a Nobel Prize winner (for discovering new elements) and chairman of the AEC, "is to produce a lot of neutrons." When this happens, Seaborg explains, the uranium in the test picks up extra neutrons in a "fattening" process. Beta particles in the uranium atoms then decay and change the element—hopefully to No. 104.

Ghiorso and many others believe that the lifespan of element 104 is so brief scientists will be able to find new elements up to 107 only. But Seaborg and others have hopes that another, more recent theory, will prevail: There may be "islands of nuclear stability" beyond 103—perhaps with closed neutron or proton shells. If these "islands" remain stable, chemists should be able to build new elements well beyond 107.

The activities by Rad Lab and Livermore scientists are "a friendly game, but in no way a race," said Ghiorso. "If the guys at Livermore can make 104 and 105, I hope I can get some of the stuff for our accelerator. These elements may be different from anything now on the Periodic Table. Why are we trying to find them? Because it's extremely fascinating."

Ghiorso



Seaborg

Is the new series (dotted lines) a beginning or an end?

Los Angeles Herald-Examiner H★ Friday, Jan. 11, 1963

Radioisotope

Seaborg's Mother Saved

Atomic Energy Commission Chairman Dr. Glenn T. Seaborg had a special reason for words of praise he directed at the nuclear medicine staff of Cedars of Lebanon during dedication of a new wing at that hospital today.

His own mother's life had been saved by radioscope treatment there.

Dr. Seaborg delivered an address on "New Frontiers in Nuclear Medicine" at ceremonies which officially opened Cedars' recently-completed radiation therapy and nuclear medicine wing, 4833 Fountain Ave., Hollywood.

In discussing the usefulness of iodine-131 in diagnosis and treatment of disease, Dr. Seaborg said the isotope is now served some 500,000 times a year in the famous "atomic cocktail" for tracing and controlling thyroid functions.

Then he disgressed for a moment to add:

"You can imagine the extent of my gratification when I tell you that my own mother benefited from radioactive treatment here.

"I should like to note that Dr. Henry L. Jaffe, who is director of the Division of Radiation Teletherapy and Nuclear Medicine here at Cedars and Dr. Eliot Corday, his colleague, have made significant contributions to the diagnostic and therapeutic uses of radio-iodine."

In further enumerating advances made possible by the specialized field of nuclear medicine, Dr. Seaborg said:

"Biological scientists have used a great ingenuity in adapting tools and techniques of the physical sciences to their complex problems. Radioisotopes which have given biologists eyes to see what was formerly invisible are a foremost example.

REVOLUTIONARY TREND

"Biology and medicine are now in the midst of a revolution. This revolution is characterized by increasing capacity to define order in the material of life.

"We are entering a period when biological phenomena can be defined in chemical terms—in terms of chemical structure and dynamics. Significant definitions can already be made at the molecular level.

"The bewildering series of radioisotope applications also includes cancer research and cancer diagnosis and therapy."

Atom Fuel Held Boon to Man

Will Help to Solve World Problems

BY RONALD KOTULAK

An atomic fuel created by man will help solve such problems as population overcrowding, the plight of underdeveloped nations, dwindling sources of natural fuel, and space exploration, the chairman of the Atomic Energy commission said yesterday.

Glenn T. Seaborg, co-discoverer of plutonium, said the element provides the key to unlocking atomic energy. He called it the second most important step in this field since the discovery of uranium.

More than 150 scientists attended the 20th anniversary observance of the first weighing of a man-made element—plutonium—at the University of Chicago.

Created in 1940

Seaborg and Edwin M. McMillan, director of the Lawrence Radiation laboratory of the University of California at Berkley, created plutonium on the California campus late in 1940. They are both Nobel prize winning scientists.

Seaborg said the AEC will concentrate much of its future efforts in developing plutonium powered reactors in coöperation with private industry.

Great Source of Power

He asserted that the element, first used to produce the atomic bomb, now promises to be the greatest source of peaceful power.

"Plutonium reactors will become commercial by 1980 and by the end of this century half of all electrical energy produced in this country will be generated by these reactors," he said.

After that, electrical power plants thruout the world will have plutonium reactors as their source of energy, Seaborg predicted.

Replaces Fuels

"This will be a big boon to the have-not nations because they won't have to rely on fossil fuels which they do not have in abundance," he said.

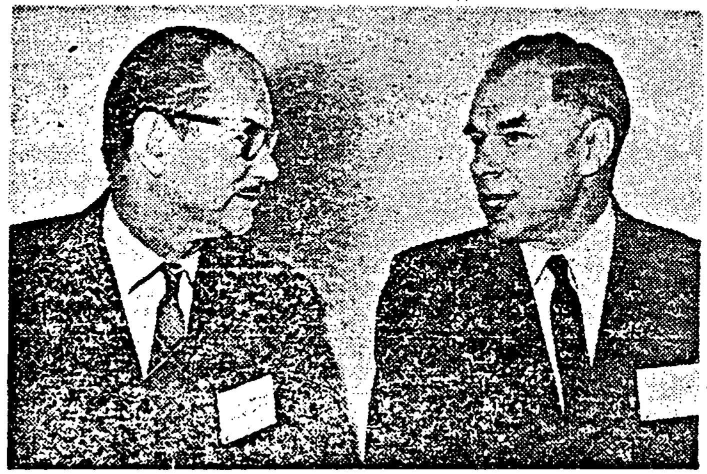
One pound of plutonium in a reactor produces energy equal to the combustion of 1,500 tons of coal. Our present sources of fossil fuels, such as coal, oil, wood, and gas will be depleted in the next few hundred years, Seaborg said.

But plutonium has the ability to produce more fuel than it consumes, he pointed out.

15 Years Away

Alvin M. Weinberg, director of the Oak Ridge national laboratory, said that in the next 15 years energy produced from plutonium powered reactors will be cheaper than that produced from conventional sources.

Such large scale nuclear generating plants, three times larger than any existing electric power plants, will be feasible by 1980, he predicted. Weinberg who addressed the symposium at a dinner, declared that vast amounts of steam available from such gigantic reactors could be used efficiently in desalting seawater for irrigation and drinking purposes.



Edwin M. McMillan (left) of University of California and Glenn T. Seaborg, Atomic Energy commission chairman, at symposium on plutonium chemistry on University of Chicago campus. [TRIBUNE Staff Photo]

Saturday, March 2, 1963 THE WASHINGTON POST
R

By Ellsworth Davis, Staff Photographer

Smithsonian Gets Uranium

Glenn T. Seaborg, chairman of the Atomic Energy Commission, gives a one-inch cube of uranium that was part of the fuel of the world's first nuclear reactor to Leonard Carmichael, secretary of the Smithsonian Institution. The uranium, enclosed in a plastic model of the reactor in which the first sustained nuclear chain reaction was achieved, will be part of a future display.

CHICAGO DAILY NEWS
MONDAY, MARCH 4, 1963
SECTION TWO PAGE 13

Milk, Meat from Plants? Science Sees it Coming

AEC Chief Also Predicts Longer Life, End of Diseases

The chairman of the Atomic Energy Commission said here that may create new plant species capable of producing milk and meat, thus bypasing the cow and steer.

This and many other marvels of tomorrow's world were forecast by Dr. Glenn T. Seaborg, chairman of the Atomic En- at the 18th national conference on higher education in the Morrison Hotel.

Seaborg said, "Man's power to mold the world to his liking is almost unlimited."

In response to an invitation to "visualize the future of scientific developments," Seaborg said Sunday that "although my predictions may seem dramtic or sensational," they probably "will turn out to be too conservative."

* * *

SEABORG said biologists are learning the mechanics of heredity. They may discover how to create new plant and animal species "tailormade to our specifications."

Today, he said, "we grow alfalfa and corn and feed it to the cow to turn it into milk and beef." This is hardly efficient.

Perhaps, Seaborg said, "the agro-genetic engineers of the future may be able to develop a new kind of intermediate life—a form of plant life that turns sunlight and carbon dioxide more directly into milk and meat."

Some day, he continued, "we may have achieved the ability to determine the genetic characteristics of a human infant."

* * *

IT IS NOT too soon, Seaborg said, to start thinking about the tremendous social problem this power would create.

Seaborg said "total eradication of many diseases may not be far off." He also forecast development of "psychochemical" drugs capable of changing human personality.

These super tranquilizers of the future, he said, may reduce the tensions that lead to crime and war. But "they might be used," Seaborg warned, "to keep a captive nation subservient to a totalitarian regime."

* * *

SEABORG said the future may see human beings communicating along a beam of light with civilizations in other solar systems.

Light capable of carrying vastly more information than can be transmitted by radio already is being produced by new devices called lasers.

Seaborg said "it will be possible to make a laser beam more intense than the entire output of energy of our sun at that particular wave length."

* * *

SEABORG also predicted:

Portable transistor television sets, powered by kerosene and getting their programs from satellites in space.

Sun-operated ice-making machines for use in isolated parts of the world to keep foods fresh.

Freeze-dried and irradiated foods which can be stored without refrigeration.

GLENN SEABORG

Longer lifetimes, cheaper travel, greater automation, and a shorter work week.

"Perhaps by 1993," Seaborg said, "the average office or factory worker will be putting in only a 24-hour work week."

* * *

ALL OF these developments will bring about new living patterns and generate new social problems.

So it is up to education, Seaborg said, to produce the kind of citizen who understands "that the value of creative evolution lies not in mere acquisition of material wealth and leisure but in the capacity of these things to help him achieve meaningful fulfillment."

"The hope of the future," Seaborg said, "lies in the halls of learning."

HOME OWNED HOME OPERATED INDEPENDENT

Tri-City Herald

VERITAS

VOL. 58, NO. 234 Thursday, March 14, 1963 Pasco, Kennewick, Richland, Washington Copy

Nuclear Experts Due Tonight For Survey Of Hanford Plant

A group of nuclear experts, including a Nobel Prize winner, will arrive tonight for a visit to the Hanford plant tomorrow.

Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission and winner of the Nobel Prize for chemistry, will head the group.

Sen. Henry M. Jackson, D-Wash., a member of the Joint Congressional Committee on Atomic Energy, made arrangements for the visit and will accompany Dr. Seaborg and the others.

In the party will be James T. Ramey, AEC member; Gen. A. R. Luedecke, AEC general manager; E. J. Bloch, AEC assistant general manager for operations; Dr. Arnold R. Fritsch, technical assistant to Seaborg; and John T. Conway, executive director of the joint committee.

DR. LYMAN FINK, GENERAL Electric Co. vice president and general manager of the Atomic Products Division, will fly to Richland to take part in Seaborg's plant tour.

On few other occasions have so many AEC officials and nuclear experts visited the Hanford plant.

All have made individual visits to Hanford.

One of the primary reasons for Seaborg's visit is to talk with the new Tri-City Nuclear Industrial Council. This meeting is scheduled early Friday morning.

After that, Dr. Seaborg and the others will tour the Hanford plant, stopping at the new production reactor, the biology area, the 200-Area and the 300-Area.

SEN. JACKSON HAS BEEN A member of the joint committee for more than 10 years and is well known for his work in support of converting the new reactor to produce electrical power.

Dr. Fink, whose vice presidential responsibility includes Hanford operations, has visited Richland frequently.

E. J. BLOCH has been assistant AEC general manager for operations since Aug. 14, 1961. Before that he was assistant general manager for manufacturing. He first became associated with the nation's atomic-energy program in 1943 when he was assigned to the Manhattan Engineer District as an army officer. He joined the AEC in November 1946 as executive assistant to the research division. He has had a number of positions with the AEC since then.

Gen. Luedecke, USAF Ret., became general manager of the AEC on Dec. 1, 1958. He has been closely associated with the atomic-energy program since 1949 when he was executive secretary of the Military Liaison Committee.

JOHN T. CONWAY WAS APpointed executive director to the joint committee staff last September. He had been assistant staff director before that and was a special agent for the BFI before 1956.

James T. Ramey, member of the AEC since last August, joined the AEC first as a consulting attorney in 1947. He assisted on legal problems in connection with the early organization of the AEC and its field legal offices.

Later he became assistant general counsel in charge of legal work at the Chicago Operations Office and served there until 1952 when he became assistant to the manager in the Chicago office.

In 1956 he became executive director of the joint committee and remained in that office until he became a commissioner.

Greater Gustavus Quarterly MARCH 1963

Thirty Laureates Coming . . .

Seaborg, Bunche Head Nobel Dedication Program

Thirty Nobel Laureates have now accepted invitations to participate in the dedication of the Alfred Nobel Hall of Science on the Gustavus campus on Saturday, May 4.

Included in the list are 29 prize winners who are now living in the United States and Dr. Arne Tiselius of Sweden who won the prize in chemistry in 1948. Dr. Tiselius is chairman of the board of directors of the Nobel Foundation.

Other high Swedish officials participating in the event are Dr. Gunnar Jarring, Sweden's ambassador to the United States, and Dr. Nils Stahle, executive director of the Nobel Foundation.

The gathering of Nobel Laureates at Gustavus on May 4 could be the third largest in history. According to our research there are only two occasions at which more than 30 Nobel prize winners were present.

The first such occasion occurred on December 10, 1950, in Stockholm. The setting was the fiftieth anniversary jubilee of the Nobel awards and 25 former Nobel prize winners were gathered in the Concert Hall in Stockholm as eight new laureates received their prizes from King Gustaf.

That total of 33 was exceeded on April 29, 1962, when 49 laureates attended a dinner in their honor at the White House upon invitation of President and Mrs. John F. Kennedy.

Dr. Glenn T. Seaborg

Dr. Ralph J. Bunche

Dr. Glenn T. Seaborg, who will deliver the dedication address, was a co-winner with Dr. Edwin McMillan of the University of California of the Nobel prize in chemistry in 1951. The prize was awarded "for their discoveries in the chemistry of the transuranium elements." Dr. Seaborg holds an honorary degree in science from Gustavus, awarded in 1954 when he delivered the commencement address here.

Dr. Ralph J. Bunche, winner of the Nobel Peace prize in 1950, will deliver the banquet address. He was honored for his work as a United Nations mediator. Following the assassination of Count Folke Bernadotte in 1948, Dr. Bunche became acting mediator and settled the Palestine dispute. In 1950 he delivered the principal address at the establishment of the Bernadotte Memorial Foundation at Gustavus. At that time he was awarded an honorary doctor of laws degree from Gustavus.

The dedication address will be delivered by Dr. Glenn T. Seaborg (Chemistry, 1951), chairman of the United States Atomic Energy Commission. The banquet address will be delivered by Dr. Ralph J. Bunche (Peace, 1950), United Nations Under-Secretary for Special Political Affairs.

The majority of the laureates are expected to arrive on the campus on Friday when several informal campus events have been arranged.

The public program will open at 10:30 a.m. on Saturday with a convocation in Myrum Memorial fieldhouse. A special invitation is being issued to college and high school science students of the area for this program when special emphasis will be given to the "Nobel Ideal." A Nobel Laureate representing each of the three science divisions of the awards, chemistry, physics and physiology or medicine, will deliver the same acceptance speech he gave at the Nobel awards ceremony in Stockholm.

The Nobel Laureates will be guests of the Mayo Clinic at a special reunion luncheon at the Holiday House at noon. At the same time the Gustavus science faculty will be host at a luncheon on campus, for official science representatives of colleges and high schools, at which Nobel representatives will speak.

The dedication program will be held in the fieldhouse at 4 p.m. with Dr. Seaborg speaking. At the conclusion of the program in the fieldhouse, a formal academic procession will lead to a platform in front of the Alfred Nobel Hall of Science where the dedication rite will be held.

The concluding event on the day's program will be a formal banquet at 7 p.m. in the Student Union. In order to increase the capacity for this event to 1,200 persons, two banquet halls will be used. Six hundred persons will be seated in the gymnasium-auditorium hall of the Student Union and another 600 in the main dining room and its over-flow room. There will be two head tables with half the laureates seated in one hall presided over by President Edgar M. Carlson and the other half in the other hall presided over by Mrs. Carlson.

Following personal introductions of all the laureates and distinguished visitors in each of the banquet halls, the entire group will move to Christ Chapel for Dr. Bunche's address. This portion of the program will also highlight special music by the Gustavus choral department. Attendance at Christ Chapel will be restricted only to those holding banquet tickets.

Free tickets will be issued for the two programs to be held in the fieldhouse, the morning convocation and the afternoon dedication program. A limited number of banquet tickets will be available at $5.00 per ticket. An order blank for tickets is outlined on page six. This blank should be mailed to Mr. Robert Peterson. Ticket reservations will be honored in order of their receipt.

The Alfred Nobel Hall of Science will be open to visitors during the entire day. Classes have been held in the building since the first of the year. The huge bas relief has not been placed on the front facade of the building as yet, nor has the Nobel Gallery been completed. The work in these two areas will have been completed by May 4.

AUGUSTA HERALD APRIL 9, 1963

COLLEGE FACULTY TO WORK IN LAB

Seaborg Sees SRP as Research Center

AIKEN, S. C. — The nation's chief atomic energy official suggested Monday that the Savannah River Plant near Aiken become a research center for South Atlantic area colleges.

Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission, made the suggestion in an interview while visiting the commission's Savannah River plant.

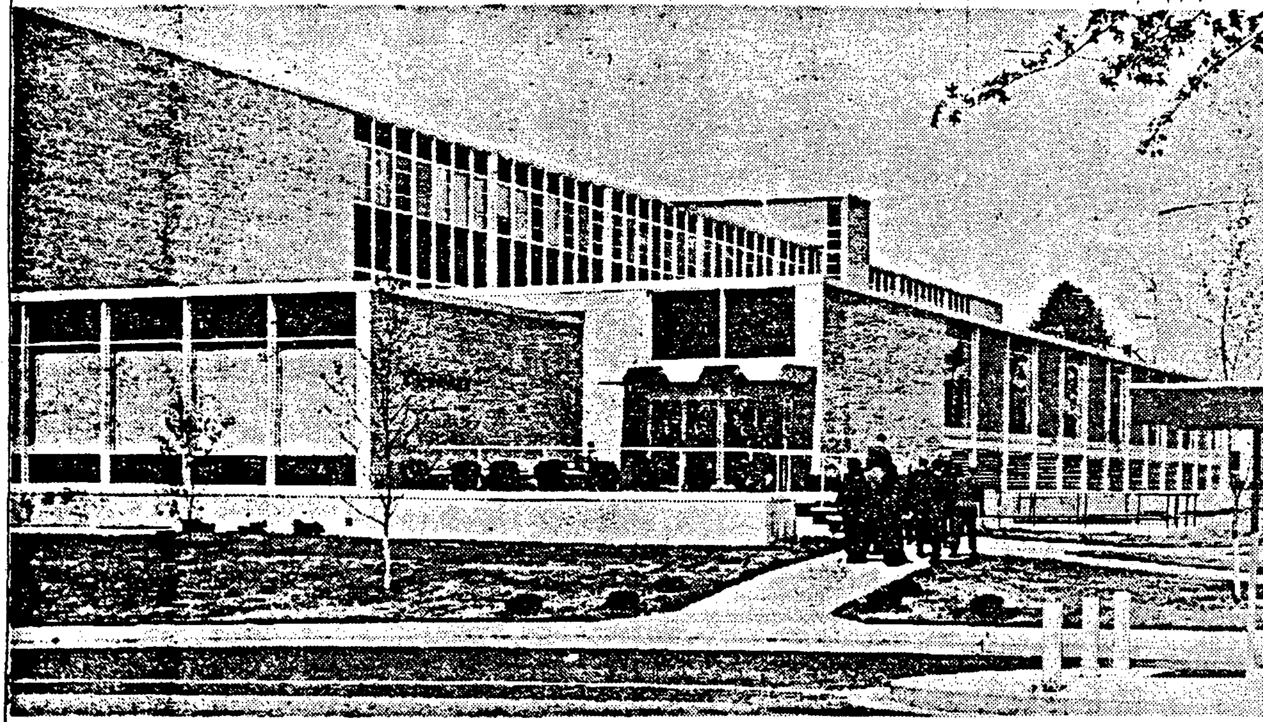
He said arrangements have been made for college faculty members to work in the plant laboratory. He said advanced students also will be able to use plant facilities, and fellowships for such work will be supported by the commission.

This would be similar to arrangements that have prevailed for the AEC's Oak Ridge, Tenn., plant.

On the increasing use of the plant as a research center for Southeastern universities, he was definite and spoke with enthusiasm.

Herald-Breault's Newsfoto, Petersen

DR. SEABORG, (SECOND FROM LEFT), TELLS FUTURE OF NUCLEAR ENERGY AND SRP
Sen. Strom Thurmond, (R), and Other Officials Attend AEC Press Conference



Staff Photos by George Bailey

DEDICATED . . . The University of Kentucky's $6,500,000 Chemistry-Physics Building was dedicated Friday at the sixth annual Research Conference of the Kentucky Research Foundation.

A.E.C. Chief Prods State

Education In Science Urged

By WILLIAM MILLER
Courier-Journal Writer

Lexington, Ky., April 26.—Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission, Friday advised Kentucky not to "float along" in the advancing tide of science and technology but "race ahead with the other strong swimmers."

Otherwise Government contracts and industry will continue to concentrate in the stronger centers of education on the West Coast and in the Northeast, he warned.

Better Schooling Urged

A new social order is developing in America, he predicted, which will eventually "emerge into a new democratic scientific society."

The Nobel Prize winner, who played a leading role in the World War II Manhattan Project, urged the University and State of Kentucky to concentrate on upgrading education, particularly on the graduate level.

He deplored that approximately half of Kentucky's high-school graduates ranking in the top fourth of their classes have been unable to attend college in the past because of low family incomes.

Seaborg was here for the dedication of the University of Kentucky's new $6,500,000 chemistry-physics building and the sixth annual research conference of the Kentucky Research Foundation.

The building, with 244,000 square feet of classroom and laboratory space, will provide instruction for about 1,000 undergraduate students in chemistry and physics plus about 240 graduate students.

3 Given Awards

"It will make a large and immediate impact," Dr. Seaborg predicted. He spoke during a banquet at Tates Creek County Club.

At this banquet three awards for distinguished research and one for teaching were presented to University of Kentucky faculty members by the Alumni Association.

The research winners are, Dr. Albert D. Kirwan, professor of history and dean of the Graduate School; Dr. Richard Sidney Schweet, professor of biochemistry in the College of Medicine, and Dr. Juan G. Rodriguez, professor of entomology in the College of Agriculture.

A teaching award went to Dr. Albert S. Levy, associate professor of education and coordinator of special education.

Kirwan Cited For Book

Dr. Kirwan was cited for his book, "John J. Crittenden —The Struggle for The Union," published in 1962. He is also the author of "Revolt of The Rednecks," 1951, "Johnny Green of The Orphan Brigade," 1956, and "The Confederacy," 1959.

Dr. Schweet was honored for his work in hemoglobin synthesis, an area that has won worldwide distinction for American biochemists and geneticists in recent years. He is the author of numerous scientific books and papers.

Dr. Rodriguez is the author of more than 40 articles on insecticides and control of plant-feeding mites, 10 of these published between 1961-63.

Levy Helps Handicapped

Dr. Levy was cited for contributions to special programs for the handicapped. Kentucky Training Home, U. K. Medical Center, Kentucky Bureau of Rehabilitation Services, and Kentucky Village.

Another speaker was Dr. Frederick N. Andrews, vice-president for research at Purdue University, who warned, "Educational and research activities are expanding on every front and even the most conservative cannot stem the tide of expansion."

Education Challenge Sounded

UMass

By Robert P. Hey
Staff Writer of The Christian Science Monitor

Amherst, Mass.

In much the same spirit that graduation from college is labeled "Commencement," the University of Massachusetts has celebrated its first 100 years.

Emphasis throughout Monday's Charter Day was on the impelling future needs of the nation for better educated citizens, and on the commonwealth's duty to provide sufficient funds to the state-financed university to enable it to do its part. The point was not lost on the dozen or so legislators who attended the day-long ceremonies.

The challenge to the nation was sounded by Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission and former chancellor of the Berkeley campus of the University of California, who gave the Charter Day address before an overflow crowd of several thousand in the Women's Physical Education Building.

Needs Described

"We need wider and higher levels of education in all fields," he declared, "for effective working of our complex, swiftly moving, technical democracy.

"We cannot have too much cultivated intelligence and special training for a number of problems: for intelligent political decisionmaking, for exploitation of new knowledge, for the solution of social problems, for the management of industry, for the interpretation of human events, for the enrichment of life associated with the advancement of the arts and the humanities, and for the achievement of permanent peace and improvement of human welfare around the globe."

He reiterated what so many educators have been saying: that state-supported colleges and universities must pick up the lion's share of the dramatic enrollment increase expected in colleges within the next three years.

Meany Speaks

The University of Massachusetts now has plans to expand its 7,600-student body to 20,000 by 1975. But, as a number of speakers pointed out, that will take money—a great deal of it.

It was on this score that George Meany, president of the AFL-CIO, tore into the Bay State for its low per-capita support of higher education.

"The reputation of Massachusetts" for excellence in education, he said, "rests not upon any public effort, but rather upon the presence here of private institutions which are expensive and selective as well as famous.

"In terms of public support for higher education, Massachusetts spent in 1961 only $5.88 per capita for its public colleges and universities compared to a national average of more than three times that amount."

More Aid Needed

More state and federal aid to education is necessary, he said, as the "only practical way to get more college facilities." And more college facilities, he added, are the "only remedy for increasingly restrictive college-entrance requirements."

"Quite simply," he said, "we as a nation have not made a high enough commitment to public education. We have tried too long to find bargain-basement solutions to our school problems."

Mr. Meany was one of four men awarded honorary degrees by the University of Massachusetts at its morning convocation. The others were Dr. Seaborg; Charles F. Avila, president of Boston Edison Company, and Dr. James Kerr Pollock, Murfin Professor of Political Science at the University of Michigan.

Peabody Quizzed

During the afternoon class, at which Gov. Endicott Peabody was guest lecturer, a student asked what he was going to do about raising the Bay State's level of per-capita aid to higher public education.

The Governor said this certainly was a problem, but said increased aid was dependent upon more sources of state revenue.

Mr. Meany said because "wealthy eastern states" in general "have lagged surprisingly in supporting public higher education," many eastern students have had to attend midwestern universities to obtain a higher public education.

Dr. Glenn T. Seaborg
Keynote speaker

3000 Hear AEC Chief At Official Fair Opening

Seaborg Opens Scientist's Role In Key Address

Student Project Judging Planned At Coliseum Today

By GIL HINSHAW

More than 3000 scientists, teachers and students Tuesday night gathered in Civic Auditorium for the official opening of the 14th National Science Fair-International and heard Dr. Glenn T. Seaborg, Atomic Energy Commission chairman, deliver the principal address.

Keying his talk to the occasion, Seaborg said, "It is fitting therefore, that considerable attention be paid to the early identification of intellectual talent. Tonight we are gathered to participate in one attempt at the identification of boys and girls who have exceptional aptitude for a creative and productive career in science.

His address was entitled "The Creative Scientist —His Training and His Role."

Dignitaries on Hand

Drawing the homage of national and state scientific and political figures, the ceremony was the final event of the fair's second day. Most of today will be given over to judging the science projects of the fair's 411 student exhibitors.

On state with Seaborg were Sen. Clinton P. Anderson, D-N. M., Gov. Jack M. Campbell, and a score of other notables.

Campbell, speaking briefly, told the assembly that New Mexico is no longer the land of manana, but the land of the tomorrow in science. He said it was appropriate for the fair to be held here in the "birthplace of a new age."

Introduced by Anderson

Introducing Seaborg, Anderson confined his remarks to praise of the AEC chairman.

Seaborg, who heads an organization of 132,000 people, said it was unfortunate that "our high school courses have not changed much over the years and such changes as have been made are mostly in the way of accreditation of new material without significant deletion of the old.

The Nobel Prize - winning scientist said, "Another problem in science education is the need for more able and dedicated teachers. Poor salaries, the inadequate community status accorded to teachers, and misguided accreditation requirements have repelled many qualified professional scientists from a career in high school teaching."

Race Against Clock

Many young science students late Tuesday were racing against the clock to have their science projects in place for the judging today.

They had until 6 p.m. Tuesday. Some were adding a last coat of paint to an exposed strip of wood; others tinkered with balky tube connections.

Up and down the aisles of Tingley Coliseum minor crises took on disasterous proportions for the youngsters who will stage the worlds' largest display of youthful scientific genius Thursday and Friday.

The fair itself will be open to the public without charge on those two days.

All But 18 on Hand

At 5 p.m. Tuesday, all but 18 of the 411 student exhibitors had registered. The 18, all from the Dakotas, were still enroute by bus and were to have arrived here by midnight. No ruling had been made about their failure to meet the 6 p.m. deadline. Several other exhibitors would also fail to make the deadline. They were on hand, but their projects were still traveling toward Albuquerque in misrouted luggage.

Some 300 judges will scrutinize the projects today, interview the students and decide where recognition will be paid for originality and scientific thought. Their decisions will be announced in two different sessions.

Health awards will be made at a banquet Thursday night in the University of New Mexico Student Union and the science fair and special awards will be presented at a banquet Friday night, also in the UNM union.

Awards Not Everything

But the awards are not the thing for most competitors. Robert Brook, a sophomore from Arlington Heights High School, Ft. Worth, Tex., summed it up this way: "It isn't to win. It's the experience of meeting other scientists and seeing their work that is the most important."

He sat by his project, ready for judging, writing a letter home. He hastened to add that his school had sent a first place biology winner from the Ft. Worth Regional Science Fair to the national competition every year for 12 years.

About 1000 people had registered for the science fair Tuesday. They are sponsors, teachers and members of the official party.

Seminars Start

More than 1000 students and science teachers also had registered for the 309 science seminars which started Tuesday at Highland High School. Sponsored by the New Mexico Academy of Science, they will continue through Thursday.

So far, Albuquerque appears to be the best host the national science fair has ever had.

Mrs. Dorothy Schriver, assistant director of Science Service, the fair's national sponsor, said Tuesday her organization's officials have had nothing but praise for the way the fair has been handled by Albuquerque. She termed it the best fair to date.

Dr. John D. Hopperton, fair chairman, said the event was highly successful and praised Albuquerqueans for the "tremendous" job they have done promoting the fair. "Everybody has pitched in," he said.

Participants Pleased

Participants in the fair also are pleased with the way the show has been put on. Dr. Lyle J. Michael of Westerville, Ohio's, Otterbein College, here with two delegates from the Ohio Central Regional Science Fair, said he had never seen such thorough preparation for a fair. "We received advance information three different times and knew what to expect."

Students late in getting their projects assembled did receive one compensation Tuesday. Dr. Glenn Seaborg, U. S. Atomic Energy Commission chairman, toured the projects and chatted with young scientists while they worked.

The fair is sponsored by the New Mexico Institute of Mining and Technology and the Albuquerque Journal.

Albuquerque Journal, May 8, 1963
(Continued)

The Albuquerque Tribune May 8, 1963

AT SCIENCE FAIR: Two top figures in America's research program are shown as they chatted at the National Science Fair, International last night. At left is U.S. Sen. Clinton P. Anderson, D-N.M., chairman of the Senate Space and Science Committee, with Dr. Glenn T. Seaborg, chairman of the Atomic Energy Committee. (FarWest photo)

WASHINGTON POST MAY 20, 1963

Wash-Post 5-20-63

Another Soviet Myth Shattered

President's Jet Sets 15 Records Flying to Moscow

By David Miller

Herald Tribune News Service

MOSCOW, May 19—President Kennedy's Air Force jet set a nonstop speed record between Washington and Moscow today, shattered 14 other air records and buried still another Soviet myth.

The 8-million-dollar Boeing 707, carrying a 10-man U. S. delegation headed by Atomic Energy Commission Chairman Glenn T. Seaborg, touched down 8 hours, 38 minutes and 42 seconds after takeoff—the fastest flight ever made in either direction between the United States and the Soviet Union.

Interred quietly was a Soviet myth that the United States was foot-dragging on a proposed commercial air-link between the two countries because the United States lacked a plane that could make a 5002-mile run nonstop.

The black-nosed, blue-and-white jet, piloted by Col. James B. Swindal, 46, of Falls Church, Va., made it with more than two hours of fuel remaining, proving that any delays in reaching a commercial agreement are political, not technical.

The jet left Washington at 9:30 p. m. (EDT) Saturday, followed the Great Circle route over the North Atlantic, Oslo and Stockholm at 580 miles an hour and into Soviet territory via the Latvian capital of Riga, landing at 1:08 p. m. Moscow time (6:08 a. m. EDT).

On board were a Soviet navigator and a Soviet radio operator, the usual requirements for all international flights over Soviet territory. The two men, both speaking English, flew to Washington to make the flight.

Taking advantage of what Col. Swindal described as a fairly good tail wind at 35,000 to 38,000 feet, the jet set speed records from Washington, Baltimore, Philadelphia, New York and Boston to Olso, Stockholm and Moscow—15 records in all.

Because the possibility of a speed record was considered when plans for the flight were made, also on board was R. B. Dillaway, of Woodland Hills, Calif., a member of the contest board of the United States National Aeronautics Association.

Dillaway immediately sent a cable to the Federation Aeronautique Internationale in Paris, asking for certification of the new record. The previously best time between the Soviet Union and the United States was "about ten hours" by a Soviet TU-114, Dillaway said.

Moscow's Sheremetyevo Airport was almost deserted when the jet touched down, but welcoming Seaborg was a Soviet delegation led by his host, Andronik Petrosyants, chairman of the State Committee on the Utilization of Atomic Energy, and American Ambassador Foy D. Kohler.

Seaborg, who will visit a number of atomic research institutions during his 12-day visit, will sign a new three-year memorandum with Petrosyants on cooperation between the two countries on the peaceful use of atomic energy.

The first memorandum, signed in Washington Dec. 24, 1959, after John A. McCone, then AEC chairman, visited the Soviet Union, and Prof. V. S. Emelyanov, then head of the State Committee, went to the United States, provided for unclassified exchanges between the two countries.

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NEW YORK HERALD TRIBUNE MAY 22, 1963

Atoms for Peace

Trib 5-22

Associated Press cablephoto

Dr. Glenn T. Seaborg, A. E. C. chairman, and his Soviet counterpart, Andronik Petrosyants, right, signing scientific exchange memorandum in Moscow yesterday.

The United States and the Soviet Union signed an agreement yesterday to exchange men and ideas to harness the atom for peaceful purposes. The two-year agreement signed by U. S. Atomic Energy Commission Chairman Glenn T. Seaborg and his Soviet counterpart, Andronik Petrosyants, provides for exchange of scientists, scientific books, reports and scientific instruments and the holding of joint conferences. Mr. Petrosyants, in the only reference to politics during the ceremony, said he would be happy "if we could conclude a nuclear test ban agreement." He added, "We have a Russian saying: Let the atom be a worker, not a soldier." Mr. Seaborg responded, "I agree with the sentiments you expressed."

Soviet A-Progress Surprises Seaborg

Soviet Russia's efforts to employ atomic energy for peaceful uses are generally on a par with similar efforts in the United States.

This was the impression given to newsmen yesterday by Glenn T. Seaborg, chairman of the Atomic Energy Commission. The Nobel Prize-winner and nine other American atomic experts returned this weekend from an 11-day tour of the Soviet Union's civilian atomic energy centers.

The main purpose of the Seaborg visit—which is expected to be returned by Soviet atomic experts this fall—was to sign an agreement that will continue U. S.-Soviet cooperation in atomic energy activities for peaceful purposes.

The agreement calls for the exchange of scientists, information, instruments and the holding of joint conferences.

Efforts Compared

Seaborg gave this comparison between the efforts of both nations:

- In the attempt to tame the power of the hydrogen bomb for peaceful purposes, Soviet research compares "very favorably" with similar American efforts but is perhaps more extensive and better funded than the U. S. program.
- In developing a civilian nuclear power program, Soviet reactors appear to be as well built as those in the United States, although the United States has had such reactors in full operation for a far longer time. Moreover, the Soviets do not have as many different types of atomic power reactors as does the United States.
- In high energy nuclear physics research, the United States efforts to date have been far more fruitful.

Surprised by Speed

Seaborg said he was surprised by a few things he saw and learned during his tour. The surprises included a heavy ion accelerator which "was more powerful and more versatile" than Seaborg had imagined it would be, and the speed with which the Soviets had built a particular reactor, getting it into full operation just three years after construction began.

But the biggest surprise of the Seaborg visit was that he and his associates were permitted to visit Soviet laboratories and atomic installations hitherto closed to Western observers.

This aspect of the visit became all the more significant as Seaborg was in Soviet Russia during the climax of the Penkovsky spy trials at which time the Soviets were cautioning their citizens against fraternizing with Westerners.

One explanation for Seaborg's success apparently was the regard the Soviets have for him as a scientist and the fact that eight years ago he honored the Russian chemist Dimitri Mendeleev by naming a newly discovered chemical element medelevium.

Joint Effort Discussed

As regards reports that Seaborg had discussed the possible construction of a joint U. S.-U. S. S. R. atom smasher with his Soviet hosts, Seaborg yesterday said only that he had discussed it during an automobile trip. The gist of the discussion was that scientists of both nations still had an interest in the idea which was advanced several years ago.

Among the various sites visited by Seaborg and his associates were those for the world's highest energy particle accelerator scheduled to be completed in 1966; the highest thermal neutron flux reactor in the world; and when completed, the world's most extensive "hot" laboratories for the study of metallurgy and chemistry.

Seaborg said yesterday he confined his discussions with Soviet atomic experts to the peaceful uses of the atom and neither in formal nor informal conversations did Seaborg discuss such atomic activities as the nuclear test ban treaty, nuclear rockets, or nuclear submarines.

CHICAGO SUN-TIMES, Thurs., June 6, 1963

Do Very Best, AEC Chief Tells Mundelein Graduates

Mundelein College graduates Wednesday were told that "a woman's place is not necessarily in the home.

DR. GLENN T. SEABORG

Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission, was the commencement speaker at the college, 6363 N. Sheridan.

He told the 218 women graduates, "One of the major problems of the woman, particularly the educated woman in our life today, is that of finding her true identity among all the external forces telling her to do this or be that, or to fit into this prefabricated pattern."

Seaborg warned the graduates to beware of people, "magazine editors, advertisers and the like, trying to keep all women in the home rather than finding out what it is that they can really do best as individuals.

"If you use your education and exercise your capabilities, you will continue to learn, and to grow in understanding and wisdom," Seaborg said.

"You owe it to yourself and to your future husbands and children to do the very best you can with what you have."

Seaborg, former chancellor of the University of Southern California, was presented with an honorary degree from Mundelein College.

In the absence of Albert Cardinal Meyer, chancellor of Mundelein College, the Most Rev. Aloysius J. Wycislo, auxiliary Roman Catholic bishop of Chicago, presided over the commencement exercises.

The Big Race

Of all the scientific contacts between the U.S. and the U.S.S.R. since 1956, the latest seemed the most remarkable. For eleven days late last month, Glenn Seaborg, chairman of the U.S. Atomic Energy Commission, and nine other American nuclear experts toured the Soviet Union and saw almost everything worth seeing of its non-military atomic program. When Seaborg returned to Washington, he brought with him a formal agreement for the exchange of scientists and information on the peaceful development of the atom, as well as informal praise for Russian hospitality. In his first post-tour news conference last week, the AEC chairman marveled at the ease of access to atomic centers previously classified "out of bounds."

Such Soviet openness was a tribute to Seaborg's own achievements (a Nobel Prize winner, he discovered nine chemical elements, including mendelevium, which he named for Russia's Dmitri Mendeleev) and to what Seaborg called "an increased air of confidence in their own atomic progress." The candor and confidence, Seaborg indicated, were justified: Soviet nuclear activities "compare favorably" with U.S. efforts. The most impressive features:

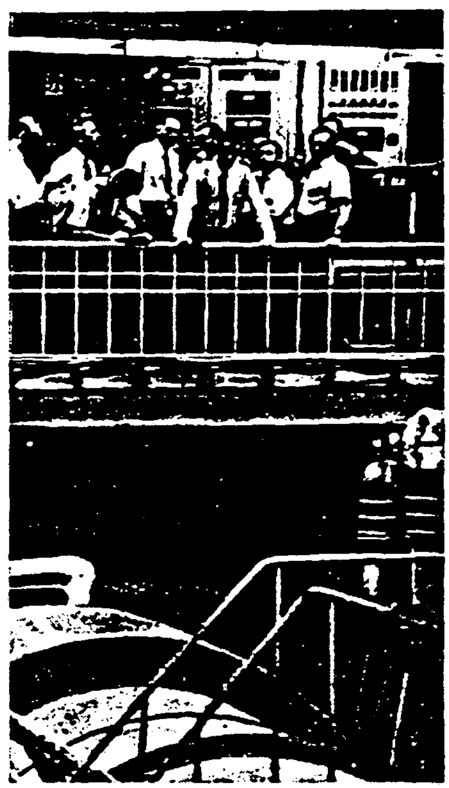
▶Research to control the thermonuclear fusion reaction of the hydrogen bomb is "at least as far advanced" as in the U.S., said Seaborg. With a greater variety of machines and a larger outlay than the U.S.'s $25 million budget, Russian scientists obviously hope to tame the awesome power of the H-bomb before anyone else. The rubles being spent on nuclear hardware reminded one U.S. scientist, who accompanied Seaborg, of the wartime saying at Los Alamos when the A-bomb was being made: "Why use lead when gold will do?"

▶Nuclear reactors for generating electricity appear to be as well built as those in the U.S., but the U.S. has more types operating over longer periods and turning out more power. "It may not be a lead so much as a matter of emphasis," said Seaborg. With plenty of coal and water resources, Russians haven't much interest in atomic-power programs.

▶A 70 BEV (billion electron volt) proton accelerator is being built at Serpukhov, 65 miles south of Moscow. When completed in 1966, it will be the world's most powerful atom-smashing machine, more than twice as big as the 33 BEV synchrotron at Brookhaven, near New York. U.S. scientists, fearful that the 70 BEV accelerator will give Russians an edge in learning about the elusive elementary particles that make up the universe, are pleading for two mammoth machines—a 200 BEV device for the University of California's Lawrence Radiation Laboratory by 1974 and an 800 BEV machine for Brookhaven by 1981.

▶An unorthodox "merry-go-round" research reactor is working at Dubna, the huge center 70 miles north of Moscow that Russians call Atomgrad. The reactor consists of a ball of plutonium, the basic stuff of A-bombs, flanked by two spinning disks charged with plutonium. Every tenth of a second, when the whirling plutonium is alongside the core, a huge burst of neutrons is emitted, for the plutonium has reached the "critical" mass of an atomic explosion. But the buildup is so short-lived (four-hundredths of a second) that an atomic blast cannot take place.

▶The SM-2 high-flux reactor at New Melekess, near Ulyanovsk (Lenin's birthplace), irradiates plutonium to produce milligram bits of californium, one of the new elements Seaborg discovered at California's Rad Lab. Operating at the highest power of any such reactor in the world, the SM-2 may lead to even newer elements. "It's obvious," says Manson Benedict of the Massachusetts Institute of Technology, who was on the tour, "that the Russians are putting on a real drive to find new elements."



Soviet fusion: Americans up close

Soviet scientists, says Benedict, the head of the AEC's prestigious General Advisory Committee, are delighted to be considered competitors. "They are out to show the world they're every bit as good—if not better—than the Americans in physics research," he explains. "This is the kind of race that can only lead to peace and understanding."

The race may become even hotter this fall when Andronik M. Petrosyants, the Soviet Union's atomic-energy chief, leads a ten-man scientific team to U.S. research centers and finds out how far along American atomics is now. Then, next year, Petrosyants will be followed by other Soviet scientists who will work in U.S. labs while a similar group of Americans experiment in the U.S.S.R.

Seaborg Gave Address At "Svenskarna's Dag"

Dr. Glenn T. Seaborg, chairman of tht U. S. Atomic Energy Commission was the speaker at the Svenskarnas Dag celebration at Minnehaha Park in Minneapolis on Sunday.

Thousands of people of Swedish extraction heard Dr. Seaborg open his address by stating that both of his parents were born in Sweden and also heard his tribute to the Swedish immigrants who came to the U. S. and contributed to its culture and progress.

Discussing the subject of nuclear energy Dr. Seaborg stressed the peaceful uses of this new energy but also pointed out its use in defense of our country. He informed that Sweden is also developing nuclear plants, has several of them in process as that country is running short of sites for adding more hydroelectric plants which today supply nine tenths of Sweden's electric power needs. All these he observed on a recent visit to Sweden.

Dr. Seaborg declared that the U. S. and Sweden are cooperating in the nuclear field and declared that Sweden has been a leader in fostering world wide cooperation in the same field.

Turning back to the U. S. Dr. Seaborg stated that there are now some 23 nuclear power plants in process, one of which is located at Elk River, Minn. He stated that the public might be surprised to learn that the total energy locked in the world's uranium ores is a thousand fold that of known reserves of other conventional fuels. He predicted that by the year 2000 probably 50 per cent of all electric power will be from nuclear sources.

The speaker also discussed the space programs of the U. S.—the nuclear rocket itself and also the benefits of nuclear power in space itself, the latter being nuclear powered batteries which may be used in explorations of the surface of the moon. He also stressed the development of communication satellites in 24 hour orbits and much more effective and efficient than Telstar.

Dr. Seaborg also emphasized nuclear power for peaceful uses in excavating, mining, earth moving, forming channels and harbors. A further use would be that of radio-isotopes in the medical field, has coming uses in agriculture, livestock, pesticides and the oil industry.

DR. GLENN T. SEABORG

In closing Dr. Seaborg made this statement—

"Let me close by drawing a lesson from the future promise of the peaceful atom. I think it is clear to each of you that tomorrow's world will be a world of even further scientific and technological discoveries and applications. I feel sure that Americans of Swedish descent, in the tradition of such men as Alfred Nobel, the great Swedish scientist and humanitarian, and John Ericsson, the great Swedish American inventor, will appreciate that tomorrow's citizens — in order to participate in a meaningful way in their scientific society — must have a basic understanding of the principles of science and engineering upon which their world will be built. In other words, tomorrow's citizens must be on speaking terms with science. Now is the time to start this vast educational program for all the people, if we are successfully to meet the challenge of tomorrow"

TIME
THE WEEKLY NEWSMAGAZINE
August 9, 1963 Vol. 82 No. 6

THE NATION

U.S. DELEGATION TO MOSCOW*
Go, wait, see, debate. But then it must be yes or no.

FOREIGN RELATIONS

Bumps on the Ratification Road

When he returned to his Washington apartment one night last week, Vermont's Republican Senator George Aiken learned that the President of the U.S., the Secretary of State, and several lesser New Frontiersmen had been trying for hours to reach him. Aiken hurriedly put through a call to Secretary of State Dean Rusk. The President, said Rusk, wanted Aiken to join the U.S. delegation going to Moscow for this week's formal signing of the nuclear test ban treaty (*see* THE WORLD). The Senator hesitated. "Will I be committed to anything?" he asked. "Will I have to sign anything?" Only after he was assured that he could remain uncommitted did Aiken consent to go along.

Delighted to Offend. Across the nation, many citizens in and out of government shared Aiken's wariness toward the test ban treaty. Before boarding the *Queen Elizabeth* for a "nostalgic" trip to England and the Normandy beaches, former President Eisenhower counseled caution, pointed out that after atmospheric tests were halted in the 1958 moratorium, it was the Russians who first resumed testing. Iowa's Republican Senator Bourke Hickenlooper wanted to know why, after the Russians had rejected a test ban treaty for five years, "suddenly there is a clear sky, the treaty is wrapped up in a week in a sudden and complete reversal."

At the National Press Club, a reporter echoed such misgivings by asking Under Secretary of State W. Averell Harriman whether Russia's record of broken promises did not make the pact worthless. "That is a typical question of a semi-informed person," snapped Harriman. Then, as nervous laughter swept the room, he added: "If I offended anybody, I'm delighted." Chances are he offended a lot of people.

Mail to the White House was running 12 to 1 in favor of the test ban pact, but only 2,000 citizens had written to the President about it in a week, compared to 40,000 during the four weeks of the Cuba crisis. And several Senators reported that in their mail they had heard from as many doubters as rejoicers.

Solid New England. The most urgent question for President Kennedy was not what the Russians would do but what the U.S. Senate would do. Before it can go into effect, the treaty must be ratified in the Senate—by a two-thirds majority. Southern Democrats may be tempted to try to trade off ratification votes for a drastic softening of the President's civil rights bill. And many Senators in both parties remain deeply mistrustful of Russian intentions.

Bent on clearing a road for the treaty in the Senate, Kennedy tried to get two influential Midwestern Republicans, Iowa's Hickenlooper and Illinois' Minority Leader Everett Dirksen, to join the U.S. delegation to Moscow. But both Dirksen and Hickenlooper decided to stay home. The Republican Senators Kennedy tapped instead were two fellow New Englanders, Aiken and Massachusetts' Leverett Saltonstall, who are high-ranking members of important Senate committees but who wield little influence among Midwestern Republicans. To make Dirksen's absence seem less conspicuous, Kennedy decided to leave behind the Democratic opposite number, Majority Leader Mike Mansfield. The Democratic Senators picked to go to Moscow: Arkansas' William Fulbright, chairman of the Foreign Relations Committee; Rhode Island's John Pastore, chairman of the Joint Atomic Energy Committee; Minnesota's Hubert H. Humphrey and Alabama's John Sparkman, both heads of Foreign Relations subcommittees.

* Seated: Saltonstall, Pastore, Fulbright, Rusk, Aiken, Sparkman, Humphrey. Standing: William C. Foster, director of the U.S. Arms Control and Disarmament Agency; Llewellyn Thompson, former U.S. Ambassador to Russia; Glenn T. Seaborg, chairman of the Atomic Energy Commission.

—UPI Photo

Glenn T. Seaborg, chairman of the Atomic Energy Commission, was (as you clearly see) in high good humor yesterday, testifying on the nuclear test ban treaty. He told senators the U. S. is far ahead of the Soviet Union in nuclear strength and that the ban would actually improve the security of the U. S.

Joint Chiefs Endorse Nuclear Treaty

A Ban Clears B ggest Hurdle

The nuclear test ban treaty appeared today to have cleared the major obstacle between it and Senate ratification by gaining endorsement by the Joint Chiefs of Staff.

The three-committee group holding hearings on the treaty called Gen. Maxwell D. Taylor, chairman of the Joint Chiefs, to repeat in public testimony today what he said privately yesterday — that the pact banning all but underground nuclear testing is "compatible with the security interests of the United States."

Gen. Taylor joined Dr. Glen Seaborg, chairman of the Atomic Energy Commission, and the Secretaries of Defense and State in endorsing the treaty and calling for Senate approval.

MADE PUBLIC

The testimony of Gen. Taylor yesterday, and of Dr. Edward Teller behind closed doors the day before, before closed hearings of the Senate Preparedness Sub-committee was made public late yesterday.

One of the most telling points the Joint Chiefs made in favor of the treaty was their conclusion that development of an anti-missile defense system "does not depend on atmospheric testing" which is barred by the treaty.

The pact would not "significantly influence any imbalance that may exist" between the United States and the Soviet Union, they said.

Gen. Taylor was certain to be questioned closely today by the Foreign Relations-Armed Services-Joint Atomic group on the "safeguards" the chiefs want to see carried out. These relate to continued underground testing, maintenance of laboratory and test sites facilities.

PARTICULARS

The preparedness sub-committee, altho it had no such intent, may have helped the treaty's prospects yesterday when it asked the Joint Chiefs for a "bill of particulars" on how the "safeguards" will be put into effect.

Defense Secretary Robert S. McNamara, informed sources reported today, has told the preparedness sub-committee that there are "inaccuracies" in Dr. Teller's testimony. Mr. McNamara made the comment in a letter which has not been made public, altho according to one informed source, Mr. McNamara requested that it be released with Teller's views.

THE WASHINGTON DAILY NEWS, Thursday, August 15, 1963

'All the Points . . . Have Been Considered'

Seaborg Rebuts Teller

By W. D. FRIEDENBERG
Scripps-Howard Staff Writer

Dr. Edward Teller, so-called "Father of the H-Bomb," is already a controversial figure at the Senate nuclear test ban treaty hearings—even before his own personal public appearance next week.

The Hungarian-born nuclear physicist, noted for his zeal as well as his nuclear knowledge, opposes the treaty, saying it would have "grave consequences" for U. S. security.

While Secretary of State Dean Rusk and Defense Secretary Robert S. McNamara this week were presenting testimony in favor of the treaty, Dr. Teller was denouncing it from a rival platform provided by Sen. John Stennis (D., Miss.), a sharp critic of the pact.

'SANITIZED'

Dr. Teller's secret testimony before Sen. Stennis' Preparedness Sub-committee Monday was "sanitized" (censored for classified information) and released for publication yesterday.

In it Dr. Teller maintained that the treaty, which bans nuclear explosions in the atmosphere, outer space and underwater, dooms the U. S. to remain behind the Soviet Union in two vital fields: Defense against incoming enemy missiles, and in super-bombs.

In one field of particular importance — investigation of the effects of nuclear weapons—Dr. Teller said the Russians have "a decisive lead."

REBUTTAL

Yesterday it fell to the Kennedy Administration's top nuclear scientist, Nobel Prize winner Dr. Glenn Seaborg, chairman of the Atomic Energy Commission, to rebut the charges of Dr. Teller, a long-standing personal friend and colleague.

"All the points he (Teller) makes have been considered carefully, over and over again," Dr. Seaborg told the senators. "The conclusion has been that these points he makes are not important enough to forego the treaty. That is, the results to be obtained from the treaty far transcend the degrees of risk he points out."

Dr. Teller's claim of a decisive Russian lead in weapons effects, Dr. Seaborg said, under questioning by Chairman J. William Fulbright (D., Ark.), chairman of the Senate Foreign Relations Committee, is "not a fact. We don't believe it."

WILL CONTINUE

Dr. Seaborg said weapons effects tests will continue to be conducted underground, and there can be other improvements made without testing elsewhere.

Besides, he said, "where there are limitations on our testing program, there are also limitations on the Soviets and on the other signatories.

In answer to Dr. Teller's warning that the Soviets might hold secret tests in distant space, Dr. Seaborg said the amount of information from such tests would be so insignificant it would not be worth it for them. They could get the same information legally and more efficiently underground.

To Dr. Teller's charge that Russian outer space tests would go undiscovered "in the absence of a system of police satellites," Dr. Seaborg pointed out that the United States intends to expand its means of detecting illegal explosions. (See editorial on Page 30.)

LEADERS EYED FROM SCIENCE

Seaborg Suggests Engineers Should Enter Politics

By GERALD GRIFFIN
[Washington Bureau of The Sun]

Washington, Sept. 11—Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission, suggested today that it is time to bring more scientists and engineers into the nation's politics.

His speech, made in New York at the American Chemical Society's symposium on the professional responsibilities of scientists, was delivered as the United States Senate was debating the nuclear test-ban treaty, a prime example of what Dr. Seaborg was talking about.

Dr. Seaborg's point was that scientific and technological considerations figure with increasing importance in major issues before Congress and other governmental agencies. He mentioned the B-70, the TFX, the Skybolt missile, civilian nuclear power and the test-ban treaty as examples.

Statistics Cited

He said statistics indicate that about 3 per cent of the American congressmen have a scientific or technical background, compared to about 30 per cent in the case of "the Soviet leaders."

Dr. Seaborg said he hesitated to compare these figures because of the great difference between the United States national goals, and governmental organization and those of the Soviet Union.

"Nevertheless," he said, "I believe that 3 per cent is not enough because science and technology occupy so much more than 3 per cent of the attention of Congress.

"Admittedly, the hurdles and misfortunes of political life are not particularly alluring to well-paid and well-satisfied individuals," he continued.

"But public life also involves exciting challenges and opportunities. I hope that more scientists and engineers will seek elective positions in recognition of the increasing importance of science and technology in national life."

Dr. Seaborg is following his own advice, to the extent that he is a scientist in public life. He is a chemist by profession. He was a professor of chemistry at the University of California and had done research in nuclear chemistry before he became chancellor of the university and then was appointed chairman of the AEC by President Kennedy.

Influence On World Cited

While he mentioned the familiar theme that science is international, rather than American or British or Russian, he said that the scientists also is a citizen with an interest in the welfare of his community and his country.

Moreover, Seaborg noted, the scientist can hardly help being aware that he and his fellow scientists are profoundly influencing the world.

Thus he said that "the scientist and engineer, as a citizen, does have an obligation to ponder the impact of scientific advances upon national decisions and to contribute to the making of those decisions.

"I do not claim that the scientist or engineer has any special political wisdom, but he does have the advantage of understanding the technical aspects of the problems before the nation," he said. "Increasingly, these technical aspects dominate the choices that are made by the men who formulate Government policy."

Dr. Seaborg said the United States now is in the midst of its third revolution. The first, as he put it, was the revolution of independence which gave political freedom. The second was the industrial revolution, which "gave us our industrial and economic strength."

Now, he said, the third revolution—the scientific revolution—has superseded the industrial revolution. Its beginning could be set at 1939, the year of the discovery of the nuclear fission reaction in uranium.

In 1939, Dr. Seaborg noted, the Federal Government allotted about \$50,000,000 annually for science. Today it spends more than \$14,000,000,000 a year for research and development.

"The scientist and engineer are now as necessary in active Governmental service as the business man or lawyer," he said. "The knowledge of the scientist or the engineer and his reasoning judgment are indispensable to the formulation of national programs."

The AEC chairman pointed out that a number of distinguished scientists are in Government service, but he stressed his point that more are needed.

Moreover, he added, it is time for the country to discard the image of the absent-minded professor who is always forgetting his umbrella.

"There is no reason why some scientist or engineer cannot be a competent administrator at any Governmental level," he said, "particularly in the administration of programs with strong scientific or technical overtones."

BELGRADE EXHIBIT OPENED BY A. E. C.

Seaborg Urges Continued Scientific Cooperation

Special to The New York Times

BELGRADE, Yugoslavia, Sept. 21—Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission, opened an Atoms at Work exhibit today, with a plea for continuing cooperation between Yugoslav and American scientists.

"The scientist can live in many different types of societies, societies which are politically quite different, but when he is in the laboratory the scientist behaves in much the same way in whatever country that laboratory may be located," Dr. Seaborg said.

"He has to, or nature will not yield up her secrets to him," he said. "There is no difference between a neutron in your country and one in mine, or between a Yugoslav uranium atom and an American uranium atom."

He noted that for the next four weeks Yugoslav and American nuclear scientists would do research at the exhibit with a training reactor and a gamma irradiation facility. He voiced hope for a continuation of the joint efforts. "Long after this exhibit moves on."

Staffed by 20 Scientists

It was the first time Dr. Seaborg attended an A. E. C. exhibit in a foreign country since he became chairman of the commission in 1961. Similar exhibits have been presented in Austria, Lebanon, the United Arab Republic, Greece, Pakistan and Thailand.

The exhibit at the Belgrade fairgrounds is staffed by 20 American scientists who have trained a group of Yugoslav high school teachers to lead three-hour seminars for local pupils. It is expected that about 6,000 young Yugoslavs will attend these seminars.

Besides an extensive lecture program, the scientists have also begun working with Yugoslav colleagues on a series of experiments using the training reactor and the gamma irradiation apparatus, powered by cobalt 60.

Among the radiation research projects to be performed are experiments in mutations, insect control, food preservation, polymerization, or hardening of fibers, and sterilization of medical equipment. The reactor will be employed to study neutron lifetimes, spectral analysis and danger coefficients.

During previous exhibits, Yugoslav scientists, working with the Americans, have developed useful applications as a result of joint research, A. E. C. authorities said.

Associated Press

OPENS EXHIBITION: Dr. Glenn T. Seaborg, chairman of A. E. C., who called for scientific cooperation at a ceremony in Yugoslavia.

PHILADELPHIA INQUIRER OCTOBER 18, 1963

Honor for an Atomic Scientist

Selection of Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission, for the highest honor the Franklin Institute can bestow —the Franklin Medal—is a well advised choice.

While Dr. Seaborg has been honored by The Institute before, his accomplishments have continued to mount over the years so that it is increasingly apparent that he is one of the most outstanding United States scientists of all time. His discovery of plutonium in 1940—the key element in atomic bombs —was of crucial importance to the Nation's defense effort in World War II. But that was only the beginning.

He has shared the Nobel Prize for chemistry and was the 1959 winner of the $50,000 Enrico Fermi award. He received the Franklin Institute's John Scott award in 1953 for manufacturing five transurium elements. Dr. Seaborg is chancellor of the University of California and at the same time director of the Lawrence Radiation Laboratory.

In addition, the Franklin Institute honored 14 other internationally known scientists for their work in a wide variety of fields. These annual awards, recognizing the specialized achievements of scientists and engineers, serve dramatically to underscore the extremely complex nature of every great scientific undertaking.

Seaborg, as we all know, was not alone in devising the atomic bomb. He was one among a number of immensely competent scientists who in turn needed the support of the entire Nation and the skilled assistance of industry and a large force of technicians. The Franklin Institute performs a worthwhile service in encouraging such men and keeping their accomplishments before the public.

Oldest Reactor Is Retired at 20

By GENE WELLS
Special to The Chattanooga Times

OAK RIDGE, Tenn.—Twenty years to the day after it began operating, the world's oldest functioning atomic reactor was retired here Monday—a casualty of advanicng technology in nuclear energy.

With Chairman G. T. Seaborg of the Atomic Energy Commission and other dignitaries looking on, the Graphite Reactor was officially put to rest at 11 minutes and 30 seconds past 2 p.m. The galvanometer went to zero. The "pile on" light went out, and roaring fans which so long had been the sound of activity at the granddaddy of all reactors coasted to a halt.

Pushing the button which set this chain of events in motion was Dr. Richard Doan, the first research director at Oak Ridge National Laboratory and one of the little band of scientists and engineers present at 5 a.m. Nov. 4, 1943, when the reactor "went critical."

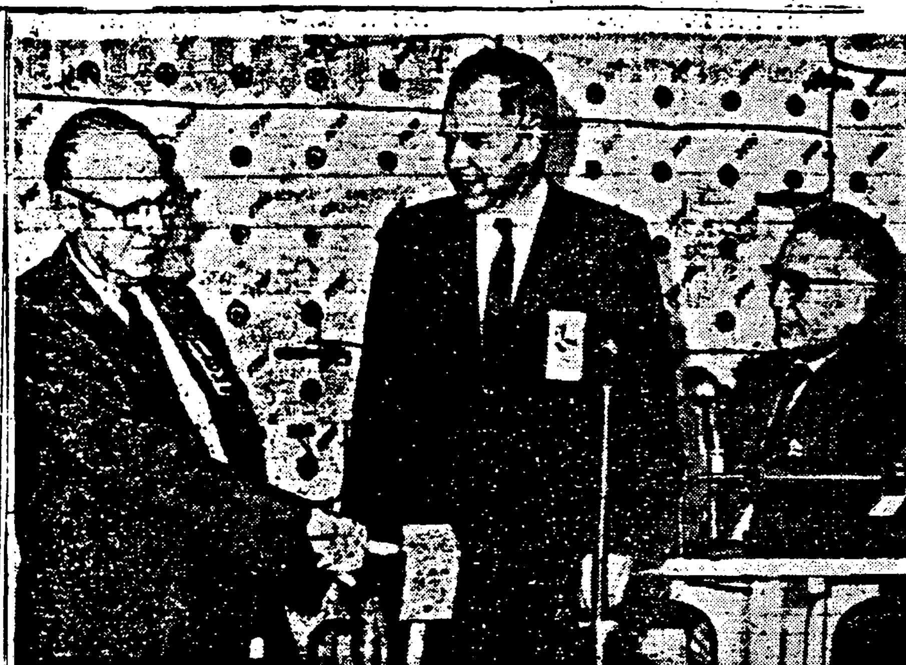
An estimated 200 persons, including many nuclear pioneers who worked on the reactor at the beginning, witnessed the retirement ceremonies.

The Graphite Reactor served as a pilot plant for the production of plutonium during World War II. After fulfilling its original wartime role, the reactor became the first radioisotope producer and for a number of years was the world's only source of reactor-produced isotopes.

The invited guests and other dignitaries were entertained at a reception and dinner at the Oak Ridge Golf and Country Club following the ceremonies. The day's program was climaxed by an address by Seaborg.

Among the dignitaries present were Clark Center, former general chairman and now vice president of Union Carbide Corp., which operates Oak Ridge National Laboratory (ORNL) for the AEC; Kenneth Rush, executive vice president, Union Carbide; Logan Emlet, vice president, Union Carbide, who worked on the plutonium project 20 years ago; John Swartout, deputy director of ORNL; C. E. Larson, vice president of Union Carbide's Nuclear Division.

Joe Sinclair, who was in charge of reactor operations 20 years ago; Dr. Lyle Borst, who was in charge of the original reactor project; Henry Newsome, who was Borst's assistant; Eugene P. Wigner, former director of research and development at ORNL, and A. M. Weinberg, present director of ORNL.



—AP Wirephoto.

GOES INTO RETIREMENT: Dr. Richard L. Doan pushes a button signaling the shutdown of the Atomic Energy Commission's historic graphite reactor in Oak Ridge, Tenn. AEC chairman Glenn Seaborg, center, and A. M. Weinberg, Oak Ridge National Laboratory director, looks on.

In an afternoon address, Doan recalled the difficulties in finding housing for the 100 or so families which migrated to Oak Ridge in the beginning of atomic operations here.

He also remembered that persons visiting Oak Ridge in those days said the professors "had gone off their rocks" by constructing big smokestacks with no facilities underneath for fires.

Weinberg, in his remarks, said the retirement of the Graphite Reactor is the "inevitable fate" of all scientific equipment. He added:

"We must look upon the retirement . . . not with regret, but with a sense of pride at the many technical achievements over the past 20 years that have made this occasion possible."

In reviewing the history of the reactor, Weinberg said its production of radioisotopes may prove to be a more important scientific accomplishment than its original production of plutonium.

Pointing out that atomic reactor power is used today "to light our cities and propel our ships," he remarked:

"Among the newer possibilities under study at ORNL is the use of giant reactors for desalting sea water. One design calls for construction of a complex of four reactors whose heat would be used to produce one billion gallons of desalted water daily. In addition, the same reactors would provide enouugh electricity to light and power a city of about 500,000."

An estimated 1,600 persons jammed the Oak Ridge High School auditorium Monday night for Seaborg's talk on "The New Elements—Plutonium and Beyond."

With the aid of slides, Seaborg talked with simplicity and clarity on the complex technical world of "transuranium elements," which he described as man-made chemical elements with an atomic number greater than natural elements.

He said this "exciting branch of science" which started only 23 years ago "has a clearly discernible future of great progress."

Describing the new High Flux Reactor being built here, Seaborg said, "I am sure this reactor facility will follow in the great tardition begun here at Oak Ridge by the Graphite Reactor."

In remarks at a press conference Monday afternoon, Seaborg said the current strike at two Oak Ridge plants is of concern to the AEC, but said the strike has not really affected the AEC program so far.

FHE★ PAGE 3
Friday, Nov. 22, 1963
San Francisco Chronicle

Dr. Glenn Seaborg and Soviet atomic scientist Andronik Petro on the UC campus

Russian A-Scientists Visit Here

Eleven Soviet atomic scientists arrived here yesterday for a look at Bay Area research centers.

The high-ranking delegation flew into Metropolitan Oakland International Airport and went immediately to the University of California campus in Berkeley where they were welcomed by Dr. Edwin McMillan, director of the Lawrence Radiation Laboratory.

"We asked them here in the interest of international fiendship," said their host, Dr. Glenn T. Seaborg, former UC chancellor and now chairman of the US Atomic Energy Commission.

This morning the group will pay another visit to the Lawrence Radiation Laboratory, and then visit the Vallecitos nuclear power reactor at Pleasanton.

Tomorrow the visitors will be on the Stanford campus for an inspection of Linear Accelerator Center. Later they will attend the Cal-Stanford Big Game.

PHILADELPHIA INQUIRER JANUARY 9, 1964

Background

Uranium Empire

WASHINGTON, Jan. 8 (AP).—

ENRICHED uranium—the weapons explosive and reactor fuel whose production President Johnson says is being cut back 25 percent—is produced at three great plants of the Nation's atom empire.

"Enriched" uranium is uranium that contains a relatively high percentage of fissionable U-235.

The huge plants—rated among the largest industrial facilities of any kind in the world—are at Oak Ridge, Tenn.; Paducah, Ky. and Portsmouth, O.

Together they represent an investment of more than $2.3 billion.

There was no immediate word on whether the announced production cutback would affect all three plants.

The President also declared in his State of the Union message that the United States is shutting down four of its production reactors for producing plutonium, another fissionable material which can be used as a weapons explosive.

Three plutonium reactors being shut down are at Hanford, Wash., and the fourth is at Savannah River near Aiken, S. C. Glenn T. Seaborg, chairman of the Atomic Energy Commission, said the 25 percent cut in enriched uranium will be divided among the three other plants.

Altogether, the reductions will reduce employment totals by about 2900.

AUGUSTA CHRONICLE JANUARY 29, 1964

Augusta Chronicle 1-29-64

SRP's future role discussed by AEC chief, congressmen

Special to The Chronicle

WASHINGTON, D.C. — Georgia and South Carolina Capitol Hill delegation members met here Tuesday with AEC Chairman Glenn Seaborg and discussed the possibility of locating new programs at the Savannah River Plant at Aiken to absorb the pending cutback there.

Meeting with members in the office of Sen. Richard Russell (D-Ga.), the AEC official outlined four possible programs which he believes could be established at the Palmetto State plant.

The agency, he pointed out, is currently exploring the possibility of converting the reactor to be shut down into one which could generate electricity.

Utilities Contacted

The AEC, Seaborg said, has already met with a number of utility companies in the Southeast which he said could participate in any such program that might be undertaken.

Seaborg also said plans are being studied which might result in Georgia and South Carolina colleges using the shutdown reactor.

He said this would go along with a "side program in support of research in colleges in the southeast.

Seaborg said he thought using the "extra" SRP reactor in college research programs was a good idea.

One of the five nuclear reactors in operation at the plant will be shut down July 1, under President Johnson's budget reductions through cutting back nuclear production.

Space Interest

The interstate nuclear board, he noted, has expressed an interest in the reactor for space purposes. The AEC and NASA will be meeting at Georgia Tech, Atlanta, in April to explore space programs involving nuclear power. The government official said.

A fourth possibility, Seaborg said, would be to use the reactor in de-salting ocean water, a program which he pointed out is being given "a lot" of consideration by the AEC.

Sen. Strom Thurmond, who arranged the meeting, noted afterwards that the present AEC budget allocates some $3 million for a new processing facility at SRP.

Additions Cited

"The fact they are making additions at the Savannah plant," he commented, "is indicative of the continuing need of the plant."

However, he expressed the hope that if any additional heavy water research programs are undertaken they will be placed at SRP where similar work has already been done.

OAK RIDGER FEBRUARY 3, 1964

Seaborg On JFK

Glenn T. Seaborg, chairman of the U. S. Atomic Energy Commission, writes his own personal remembrances and feelings about President Kennedy in the current issue of Nucleonics magazine, journal of the nuclear industry.

He writes:

"The President several times demonstrated his interest in having a first hand look at our work when a trip could be fitted into his heavy schedule. Even before his election, he and Mrs. Kennedy had visited the Oak Ridge National Laboratory. Afterwards he visited the Los Alamos Scientific Laboratory and the Nevada Test Site primarily to observe progress on nuclear space projects. He stopped at Sandia for a briefing on the weapons program. He visited the Lawrence Radiation Laboratory at Berkeley and during his trip through the West last fall visited and spoke at the dedication of the NPR conversion facilities at Hanford.

"He was curious about the way things worked and even tried his hand at manipulaitng radioactive materials in a hot cell through use of the remote control equipment during one of his visits. On the visit to the Nevada Test Site, I recall flying over the Sedan crater with him and remember still his fascination at the size of the hole (1400 feet in diameter and 400 feet deep). He wanted his helicopter pilot to land on the crater's edge for a close look. When the pilot after some difficulty persuaded the President that the dust might be deep and cause a problem in taking off, he asked that a low level flight be made around the lip of the crater and this was done. ...

"My memory of the President in these early meetings, an image strengthened and reinforced as time went on, is of a man remarkable for his immediate grasp of ideas, his ability to arrive quickly at the gist of a discussion, and his eloquence in summarizing the main points at issue. ...

"I am encouraged to think that President Kennedy recognized nuclear power as the standard against which other sources of energy would in the future come to be measured."

Chairman Seaborg also tells of the first call he got from President Kennedy asking him to be chairman of the U. S. AEC. It came as a complete surprise on Jan. 9, 1961, two weeks before the inauguration.

He was visiting at the Lawrence Radiation Laboratory in Livermore, Cal. at the time — in the Heavy Ion Linear Accelerator Building. He was called aside and told there was a call from Washington.

On Nov. 22 last, Seaborg was accompanying a group of visiting Russian scientists on their tour of the United States — the tour that had brought them to Oak Ridge four days earlier on Monday, Nov. 18. The tour had then progressed to the Lawrence Lab at Livermore. And again, Seaborg was with the Russians in the Heavy Ion Linear Accelerator Building when he was called aside and told that the President had been shot.

U.S. TO PROMOTE SCIENCE CENTERS

Plan Aims at Correcting Regional Concentration

By JOHN W. FINNEY
Special to The New York Times

WASHINGTON, March 14—The National Science Foundation will embark soon on a far-reaching program to promote the growth of new educational centers of science and technology throughout the nation.

It is a program with broad political and economic implications, for one of its main objectives is to help correct the regional concentration that has developed in scientific research, both in universities and industry.

With multimillion - dollar grants to potentially promising universities, the foundation plans to foster new "centers of excellence" in science and technology, comparable to the leading universities and institutes now concentrated on the East and West Coasts.

Indirectly, it is hoped the new centers will stimulate economic growth, particularly in regions that are now lagging in research.

The Science Development Program, as it is called by the foundation, had its origins in a report issued more than three years ago by the President's Science Advisory Committee on the relationship between the Federal Government and universities.

More Centers Urged

One of the principal recommendations of the report was that more "first rate centers of science" were urgently needed, and therefore the Government should "encourage" the growth of such centers from the present 15 to 20 to twice that number by 1970.

Translating the recommendation into a program has proved to be a long and difficult task. To a certain extent it meant departing from the guiding principle of awarding Federal support for science on the basis of quality—a policy that has tended to reinforce the present concentration in a limited number of universities.

The Administration, and in particular the foundation, spent two years trying to figure out an approach that could assist promising universities and still avoid the danger of the program's evolving into a political pork barrel.

Then last year the program finally formulated by the Administration ran into trouble on Capitol Hill, partly because the foundation failed to present an effective case to a Congress that was just becoming aroused over the regional concentration of the Government's support of research and development.

In slashing the foundation's budget last year, Congress cut the funds for the science improvement program from a request of $33 million to $3 million.

Will Start This Spring

With this token sum, plus $25 million it has requested for the coming fiscal year, the foundation plans to make a start on the program this spring.

Within the next few weeks, the foundation will request proposals from universities and colleges that want to take part in the program. The institutions will be asked to outline a five-year plan of what they would do to improve their science and engineering programs.

As explained in an interview by Dr. Leland J. Haworth, the foundation director, the basic concept of the new program is to find "situations where an institution could be given a shot in the arm that would have appreciable results and get them started toward becoming a center of excellence."

"We are looking for places that have a potential and honestly want to do something about it," he said.

The foundation is considering grants of up to $5 million or $6 million for a single institution over a three-year period, with the understanding that the funding could be continued for two more years. By the end of 1965, it hopes to have made grants to 10 or 15 institutions.

Discretion on Funds

The universities would have wide discretion in deciding how the funds could be most profitably used. They might be used for faculty, laboratories, equipment, building up a science department or undertaking a new interdepartmental program of research and education.

While the emphasis will be upon universities with graduate schools of science and engineering, the foundation will consider grants to four-year colleges. For example, the grants might be used by colleges to build up research programs that would serve to attract and retain a scientific faculty.

In awarding the grants, the foundation will attempt to achieve a broad geographical distribution of institutions. To a certain extent, the distribution will be automatic since the foundation will deliberately exclude the present leading institutions from the program. But as foundation officials acknowledge, the geographical selection can raise some delicate political problems.

The problems were summed up in a speech this week by Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission, who served as chairman of the panel that drafted the 1960 report of the President's Science Advisory Committee.

Discussing the need for new "centers of excellence" and broader geographical distribution of Federal support of research and development, Dr. Seaborg said:

"How do we prevent the competition for establishing such new centers in the various regions of our country from degenerating into squabbles reminiscent of our saltier pioneer political eras? How can we prevent a science pork barrel?

"We must not let our national support of science and technology degenerate to the point where no state, no Congressional district, is complete without a post office, a reclamation project and a new science laboratory.

"This does not imply a lack of merit in the considered geographical distribution of our scientific expenditures.

"Any such program, however, should be both soundly conceived and wisely administered if we are to build new centers of excellence in new geographical areas without tearing down or undermining other centers that have already achieved and sustained excellence.

"We must manage somehow to provide for the support of new centers and allocate the development of major facilities among them in such a way that we do not turn our best scientists into migratory workers.

"We cannot afford to have these men gravitating from one scientific mecca to another, dependent upon the fluctuating whims of Federal support."

NEW YORK TIMES MARCH 25, 1964

Seaborg Is Upheld In Seeking to Patent Artificial Elements

The New York Times

Dr. Glenn T. Seaborg

3-25-64

By JOHN W. FINNEY

Special to The New York Times.

WASHINGTON, March 24—Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission, may become the first man to hold a patent on two chemical elements.

They are americium and Curium, short-lived manmade elements produced in a nuclear reactor or in bombardments by an atom smasher.

For his World War II work in developing techniques for producing and isolating the elements, Dr. Seaborg has been supported in his patent claims by the United States Court of Customs and Patent Appeals. The elements have no known practical uses although they are of great scientific interest in understanding the nature of matter.

While Dr. Seaborg would have his name on the patents, all the rights would be assigned to the Government.

As Dr. Seaborg explained, he was "just a name" that the Atomic Energy Commission was using on the patents.

In effect, he said, they are Government patents, taken out to protect the public against the possibility that some individual would lay a patent claim to the elements and their production methods and then attempt to force payment of royalties.

Curium and americium are trans-uranium elements, having an atomic number—the number of protons in their nuclei—greater than uranium, the heaviest naturally occurring element. Uranium has an atomic number of 92, americium 95 and curium 96.

Since the first trans-uranium element, neptunium, was produced by a University of California research group in 1940, eleven of the synthetic elements have been identified, ranging up to atomic number 103.

Curium was first produced in the summer of 1944 by bombarding plutonium — another manmade element used in making bombs — with alpha particles, the nuclei of helium atoms, shot out by the cyclotron accelerator at Berkley.

Americium was created in the winter of 1944 by bombarding plutonium with neutrons produced in the first atomic reactors at Oak Ridge, Tenn., and Hanford, Wash.

In a decision handed down last Thursday, the Court overruled the Patent Office in its refusal to grant Dr. Seaborg patents on the elements and on the methods of producing and purifying them.

The patent office argued that the methods for producing the two elements had already been covered in a patent granted to the late Dr. Enrico Fermi for developing the first atom pile, or reactor, and in the description of reactors contained in the Smyth Report, the official account of the development of the atomic bomb in World War II.

In opinions written by Judge Arthur M. Smith, the appeals court held that the amount of the two elements that would be produced in the reactors described in the Fermi patent or the Smyth Report would be so minute as to defy detection.

For example, a Fermi reactor, after operating for 100 days at a 500-kilowatt power level, would have produced no more than a thousand-billionth of a gram of curium and a billionth of a gram of americium.

These amounts of the elements would have to be distributed throughout 40 tons of intensely radioactive uranium fuel.

Office Is Overruled

The court held, therefore, that Dr. Seaborg had developed a different and patentable method for producing the two elements.

The Patent Office can ask the court for a rehearing, but the expectation was that it would accept the ruling and grant the patents to Dr. Seaborg.

Dr. Seaborg holds about three dozen patents and has several more applications pending.

Most of these grew out of his World War II work as a Government employe in helping to develop the atomic bomb.

His principal contribution was in producing and isolating plutonium, a scientific feat for which he subsequently was awarded the Nobel prize.

Among some of Dr. Seaborg's colleagues in the atomic field a question has been raised about the propriety of scientists getting patents for inventions they made while working the for Government.

Dr. Seaborg points out, however, that there was no personal monetary benefits in the patents and that all the rights have been assigned to the Government.

Dr. Seaborg and three of his University of California colleagues received a patent for the method of producing plutonium in late 1940, before their research was supported by the Government.

The patent rights to plutonium were turned over to the Government, and in compensation each of the scientists received $100,000 from the Atomic Energy Commission.

POWER LINE ISSUE STIRS COAST CITY

Seaborg Brought Into Fight on Stanford Accelerator

Special to The New York Times

SAN FRANCISCO, April 4—Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission, said Thursday that his most time-consuming problem now concerned whether a buried line or a set of towers would carry high-voltage power lines to the new linear accelerator being built at Stanford University.

The residents and city government of Woodside, an expensive suburb, resist bitterly the idea of overhead lines. They want the line buried. That would cost up to $2.6 million.

Dr. Seaborg said that the commission would consider any proposal for sharing the cost with local interests and the Pacific Gas & Electric Company, the utility that will serve the line.

The linear accelerator will cost $114 million and will be two miles long. Dr. Seaborg said that he feared that unless some resolution were reached the device would be completed before electricity was available to power it.

Stanford trustees have refused to spend the school's money on the power line. A statement issued more than a month ago noted that they agreed to have the accelerator placed on university property "upon the clear understanding and agreement that the university would not realize financial gain or loss from the installation or operation of the project."

Agitation by Woodside residents has given the power-line dispute status as a political issue. It was understood that Pierre Salinger, the former Presidential press secretary now campaigning for the Democratic nomination for the Senate, had arranged to have Dr. Seaborg meet with parties to the dispute.

The physicist was asked if he favored a solution to the problem. He said he would like to see eight tubular overhead poles in the area outside Woodside, and five in the incorporated area. They would be painted green and would be installed with a minimum of tree cutting. Dr. Seaborg, formerly of the University of California, still maintains his home at Lafayette, an East Bay counterpart of Woodside. He said there were overhead lines in Lafayette.

The commission chairman discussed the controversy with Fred Terman, the Stanford provost; David Packard, chairman of the Stanford board of trustees; Dr. Wolfgang K. H. Panofsky, who will operate the accelerator, and R. W. Joyce. He urged that some sort of compromise proposal be made.

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Tri-City Herald

An Independent Newspaper

GLENN C. LEE, Publisher R. F. PHILIP, President

Page 4 Tuesday, April 7, 1964

Take A New Look Now

Sen. Warren G. Magnuson, senior senator from our state, is a man who knows how to get things done, and from where he sits in the Senate he has the power and prestige to get things done with no fuss or muss.

He isn't running for office, so he can't be accused of being out trying to get votes. He made the statement last week in the presence of Dr. Glenn Seaborg, chairman of the Atomic Energy Commission, that we ought to take a new look at releasing land in the primary control zone of the Wahluke Slope.

Seaborg agreed to do so.

The land has been locked up for more than 20 years by the Atomic Energy Commission because the Hanford plants are directly across the Columbia River from it. The AEC has maintained that the possibilities of radiation exposure made agricultural development of the land too risky.

Many of the reasons for holding the land have changed. Shutting down some reactors will reduce the radiaton hazards. And in 20 years of operation, as Hanford experts have said many times, the amount of radiation detected on the Slope and in other neighboring areas has been negligible.

We are learning to live safely with the nuclear plants.

Land on each side of the 42,000 acres still held by the AEC has been released and development is underway. Sen. Magnuson played an important part in gaining release of this land.

Sen. Magnuson is one of the most influential men in Congress. He outranks all but 11 other members of the Senate, where seniority alone brings power. He is chairman of the Commerce Committee and is the ranking member of the Space and Appropriations committees. And he is chairman of the Democratic Campaign Committee.

In addition, as one Washington, D.C., writer noted recently, "he controls so many subcommittees that his offices occupy all but one suite of an entire first-floor Senate Office Building wing — a tidy little empire dubbed 'Maggie's Alley' by the rest of the Senate."

He seldom makes a speech in the Senate, because he seldom needs to speak. The explanation of this fact is best expressed in his own words:

"If you need a speech, you don't have the votes; if you have the votes, you don't need a speech."

Sen. Magnuson is no grandstander. He works quietly behind the scenes, preferring accomplishments to headlines. His legislative success has earned him the admiration and respect of his peers, who call him a "magician extraordinary."

Sen. Magnuson's promise to do everything he can to convince the AEC it should release the remainder of the Wahluke Slope assures that the proposal will be given the most careful consideration.

This land is the most fertile in the Basin Project. Its development willl be a great addition to the economy of this area, and of the state.

The people appreciate Sen. Magnuson's interest in this effort to get AEC to release this rich land for farming.

Isotopes Meeting Address — OAK RIDGER 4/21/64

Editor Says Science Is Losing Its Allure With Congressmen

By DICK SMYSER

The honeymoon is over between science and Congress.

There have been times — like the days just after World War II when the public stood in awe of nuclear energy, or the earlier years of the space age — when scientists had little trouble getting public money for their projects.

But now it is back to austerity again — or if not austerity at least back to a significantly more conservative and sometimes suspicious look at science by senators and representatives.

And while a lot of the reason for this turn of events is just the turn of events in the world itself, a significant part of the blame for the change can be laid at the door of science itself.

So implied Phillip H. Abelson, editor of "Science" magazine, in a talk in Gatlinburg Monday night. He addressed an evening banquet session at the Second Annual Radioisotopes Conference being held there through Wednesday under the sponsorship of Oak Ridge Institute of Nuclear Studies and Oak Ridge National Laboratory.

"In the past year or two we have entered a new and more difficult era in the federal support of science. There has been a lessening of the annual percentage increase of funds; more serious is an increased tendency for Congress to intervene in the control of research goals and in the detailed procedures of the administration of granted funds," said Abelson.

("Science" magazine, which he edits, is the official publication of the American Association for the Advancement of Science.)

The editor - scientist spoke of numerous instances in which respected scientific viewpoints have been severely questioned by members of Congress in hearings. He referred also to instances of not only questioning, but of actual verbal abuse of scientific opinions and personalities. He deplored these in themselves and also as they are manifestations of the new sort of "anti science" trend that he fears in Congress.

And one of the reasons why these abuses go on, and are not the subject of reaction by a public he thinks is still significantly sympathetic to science, is because so many of the hearings are held behind closed doors with the proceedings then carefully edited to eliminate the nastiness before publication.

Generally, Abelson expressed the opinion that while, a decade ago, congressmen stood in awe of what science had done — specifically in the development of the nuclear project — it (Congress) now feels that it has acquired enough scientific knowledge to itself make judgements which really should be scientific judgements.

However he does not blame Congress completely. Rather, he thinks science itself has contributed to this new and unhappy state of affairs. Science has exploited and abused, in some instances, its earlier periods of great popularity. And, more broadly, science is still failing to make itself understood with the public.

Abelson made a study of the scientific names that have appeared most often in recent public print. He took the New York Times index as an indicator. Leading all others was Glenn T. Seaborg, chairman of the U.S. Atomic Energy Commission, with 88 mentions. (The period studied was 1961 to 1963.)

Of course, he agreed Seaborg was listed quite often because he was just taking over the post as head of the AEC during this period.

However, even in the three years preceding his appointment to the USAEC, Seaborg had 22 index mentions. This contrasts to Jerome Wiesner, until recently the special scientific assistant to the late President Kennedy. Wiesner had six mentions prior to taking office and then 77 later.

So what?

So Abelson thinks that the number of mentions is interesting as it may indicate the people who are shaping the current public image of science. And he indicates pleasure that it is Seaborg who is crrently most in the news. For he feels that, of those most frequently mentioned, "Seaborg is perhaps most acceptable to scientists. He has achieved scientific distinction, and he displays good judgement while maintaining a moderate course."

"The others do not meet these standards. I will not go into detail," he said. The others of the "top six" are Adm. Hyman Rickover, Edward Teller, Linus Pauling and Harold Urey.

Abelson cited the Joint Committee on Atomic Energy as a congressional group that has, through the years, taken upon itself more and more decisions that previously were reserved for scientists. He said:

"After the Democratic party returned to power in the Senate in 1954, the Joint Committee began to exert greater influence on the (Atomic Energy) Commission's programs, and since 1957 it has been able to wield as much authority as it pleases. Even with the advent of the Kennedy administration, and with scientists comprising a majority of the membership of the Commission, the Joint Committee preserved a relatively unassailable position. It's members enjoy a large measure of power arising out of their control of legislation. Moreover, they consider that they have established what amounts to a moral claim on authority in this field.

"They believe—and with some justice — that their long experience gives them the background to make technical decisions. In addition they think they have a superior understanding of the legal and political issue involved. The scientists, in contrast, are not much more expert in technical matters and are usually not competent in the nonscientific aspects."

Abelson feels that the only area of science that is not now threatened by this growing disenchantment in Congress is medicine. He feels there is still great public and congressional support for research against disease.

However, he cites the National Institute of Health as one of the agencies in which Congress found abuses that have added to the negative trend. While granting that in the administration 15,000 grants, which the NIH makes each year, it is difficult to be sure each and ever one is worthy, nevertheless he cites "a particularly indefensible grant to one small profit-making firm that was thoroughly exploited."

Another sad aspect of the negative trend is what Abelson says is a tendency now for scientists to make their requests for funds to Congress not so much on the basis of which projects they think might have most appeal to congressmen.

"The heads of agencies are practically helpless before the onslaughts of congressional committees, and they are deeply aware of the fact. Their plans and their budgets are often prepared with a view to the preferences and prejudices of the men who will judge them, particularly those of the chairman of the relevant committes or subcommittees," he said.

And, ironically, the success of science has contributed to the inclination of Congress to be less excited about public money for science. Abelson cites the atomic energy field in this respect:

"In the atomic energy field we can again see the result of success. There have been very effective raw-materials, production, and weapons programs. Just recently the civilian reactor program has come to a crisis in the brilliant prospect of nuclear power in New Jersey at the rate of .38 cents per kilowatt hour. — Total appropriations for the Atomic Energy Commission are lower, and very likely research and development funds for the agency will hold even or contract in the future."

Other interesting quotes:

"Congress has never been able to grasp fully the value of pure research."

"Congress and the public have not been educated on the desirability of promoting science for its intellectual values or long term scientific values. Highly practical visible goals are needed to arouse enthusiasm."

"Today, science in this country is relatively disorganized and its moral position is not unassailable."

"Easy money from Washington has in some places been administered carelessly. A recipient of federal funds ought to regard a grant as a sacred trust."

"For the most part scientific organizations are not effective in political matters."

"We need to be more effective politically at the grass roots."

PITTSBURGH POST-GAZETTE, SATURDAY, APRIL 25, 1964

AEC Brass Visit Bettis Atomic Lab

McNamara Heads Group Believed Studying Carrier

Secretary of Defense Robert S. McNamara and top Atomic Energy Commission officials yesterday paid an unannounced visit to the Westinghouse Atomic Energy Laboratory at Bettis Field in West Mifflin.

Officially it was announced the visit was to "review the naval nuclear propulsion work being done there."

However, it was believed the visit stemmed from the current dispute over whether the nation's next aircraft carrier, already authorized, will be nuclear—or conventionally-powered.

Last October, Secretary McNamara authorized the carrier to be built as a conventional carrier on the ground the advantages of a nuclear-powered craft was not worth the extra cost.

It has been estimated a nuclear carrier would cost $403 million, or $126 million more than the conventional carrier. However, $32 million of the cost would include the nuclear power that would last for seven years.

Despite last October's decision by McNamara, the question was reopened April 3 when Vice Admiral Hyman G. Rickover, head of the AEC's Naval Reactor Division, recommended the Navy make another attempt to obtain nuclear power for the new ship "while there is still time to do it."

If such a decision is made it was believed it would be a big boost for the Bettis plant which is operated by Westinghouse for the AEC. The plant, which once had about 5,000 production workers, now has approximately 2,800.

In yesterday's tour of the plant, Secretary McNamara was accompanied by Dr. Glenn T. Seabody, chairman of the AEC; Admiral Rickover, Dr. Harold Brown, director of defense research and engineering, and AEC Commissioners James T. Ramey and Gerald F. Tape.

The afternoon trip through the big laboratory was conducted by Charles H. Weaver, Westinghouse vice president for the Atomic Defense and Space Group, and Philip N. Ross, vice president and general manager of the Bettis plant.

In urging that the question of nuclear power be reconsidered, Admiral Rickover said the Navy's Bureau of Ships had reported the shift to nuclear power still could be made without delaying completion of the big carrier—now set for the end of 1968.

Yesterday's trip here by McNamara had no connection with the visit of President Johnson and his advisors to Pittsburgh and other cities in connection with his "War on Poverty" program.

Defense Secretary Reviews Work at Bettis Atomic Plant

Left to right, Secretary Robert S. McNamara, Vice Admiral Hyman Rickover, Dr. Glenn T. Seaborg, AEC chairman, and J. J. Taylor, of Bettis staff.

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Town Topics

Cherry Blossoms Mist for Emperor

By Marie McNair

HIS MAJESTY, the Emperor of Japan, had a birthday yesterday and in Washington hundreds of guests began arriving early at the Japanese Embassy to offer congratulations to the Ambassador and Mme. Takeuchi.

In addition to being among Embassy Row's most popular hosts, Ambassador and Mme. Takeuchi have one of the most beautiful embassies in town, filled with rare Japanese paintings and objets d' art.

The terrace, strung with Japanese lanterns, was unfortunately only to be viewed, not occupied, yesterday because of the late afternoon breezes and the mist. But there were some hardy souls who made a pilgrimage through paths of cherry blossom petals to the Japanese tea house in the garden.

Beautiful Japanese kimonos worn by wives of the embassy staff dotted the drawing room scene. Mme. Takeuchi wore an amethyst brocade kimono patterned with tiny Japanese fans in delicate pastel tones. The dean of the diplomatic corps, Nicaraguan Ambassador Guillermo Sevilla-Sacasa, headed the guests from Embassy Row. The Finnish Ambassador and Mme. Seppala were there and also the Danish Ambassador and Countess Knuth-Winterfeldt, the Moroccan Ambassador and Mme. Bengelloun, and the Ethiopian Ambassador, Beranou Dinke, who will give an Ethiopian Easter Eve party on Saturday.

A GUEST at the party will be Vickie Jean Morgan, 17-year-old daughter of a U.S. Army Major stationed in Addis Ababa who has returned to this country to celebrate winning "Seventeen" magazine's grand prize in its new party of the year contest. A jungle party last fall at her home in Addis Ababa was attended by 50 teen-agers from 11 different countries.

The new Panama Ambassador, Miguel Moreno, was in a conversational group that included Dale and "Scooter" Miller, and Mrs. Edward Mead, a vistor from San Marino, Calif., a member of the Duque family which was prominent in Panama a couple of generations ago. Dale Miller was patting himself on the back and rightfully, for having gone out and bought the yellow material, and a pattern to go with it and taken them both to a dressmaker to make the dress and jacket that Scooter wore yesterday.

Mrs. George Ball, wife of the Under Secretary of State, and Mrs. Alexis Johnson, wife of the Deputy Under Secretary of State, were there

By Dick Darcey, Staff Photographer

BIRTHDAY PARTY: The Ambassador of Japan, Ryuji Takeuchi, and Mme. Takeuchi welcome the Chairman of the Atomic Energy Commission and Mrs. Glenn Seaborg to their party at the Embassy yesterday marking the birthday of the Emperor of Japan.

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Lincoln Evening Journal 5/25/64

Seaborg (left) examines a probe similar to those used to control reaction in the atomic pile at Hallam with plant superintendent, J. Denny Cochran.

U.S. Atomic Energy Chairman Terms Hallam Plant a Success

By HOWARD ROSE

Hallam — Dr. Glenn T. Seaborg, chairman of the U.S. Atomic Energy Commission, visiting the atomic power plant at Hallam, said the facility has successfully attained its objective.

Although he noted that small plants like that at Hallam's Sheldon Station are not economically competitive, experience gained at the Hallam unit shows that larger reactors will be economical.

Dr. Seaborg said that Atomics International is ready to build larger plants and utility companies are actively considering construction plans.

"There has been a marked increase in civil uses of atomic energy," said Dr. Seaborg.

He described the use of large, water-cooled atomic power plants and said they are economically feasible although not as efficient in the use of nuclear fuel as the Hallam reactor.

No new installations are presently planned for Nebraska, Dr. Seaborg said, but a water-cooled facility being built for the Northern States Power Company is nearing completion at Sioux Falls, South Dakota.

Dr. Seaborg was a guest of Gov. and Mrs. Frank Morrison at a breakfast Monday morning. In the afternoon he was Wesleyan commencement speaker.

Dr. Seaborg said development of an atomic-powered aircraft is a dead issue. But he pointed out that satellites, radio equipment, lighthouses and other devices requiring power for extended periods, are using radio isotype energy (heat) which produces electricity directly through the use of thermocouples.

He said also that atomic power has a promising future in maritime applications, especially the merchant marine.

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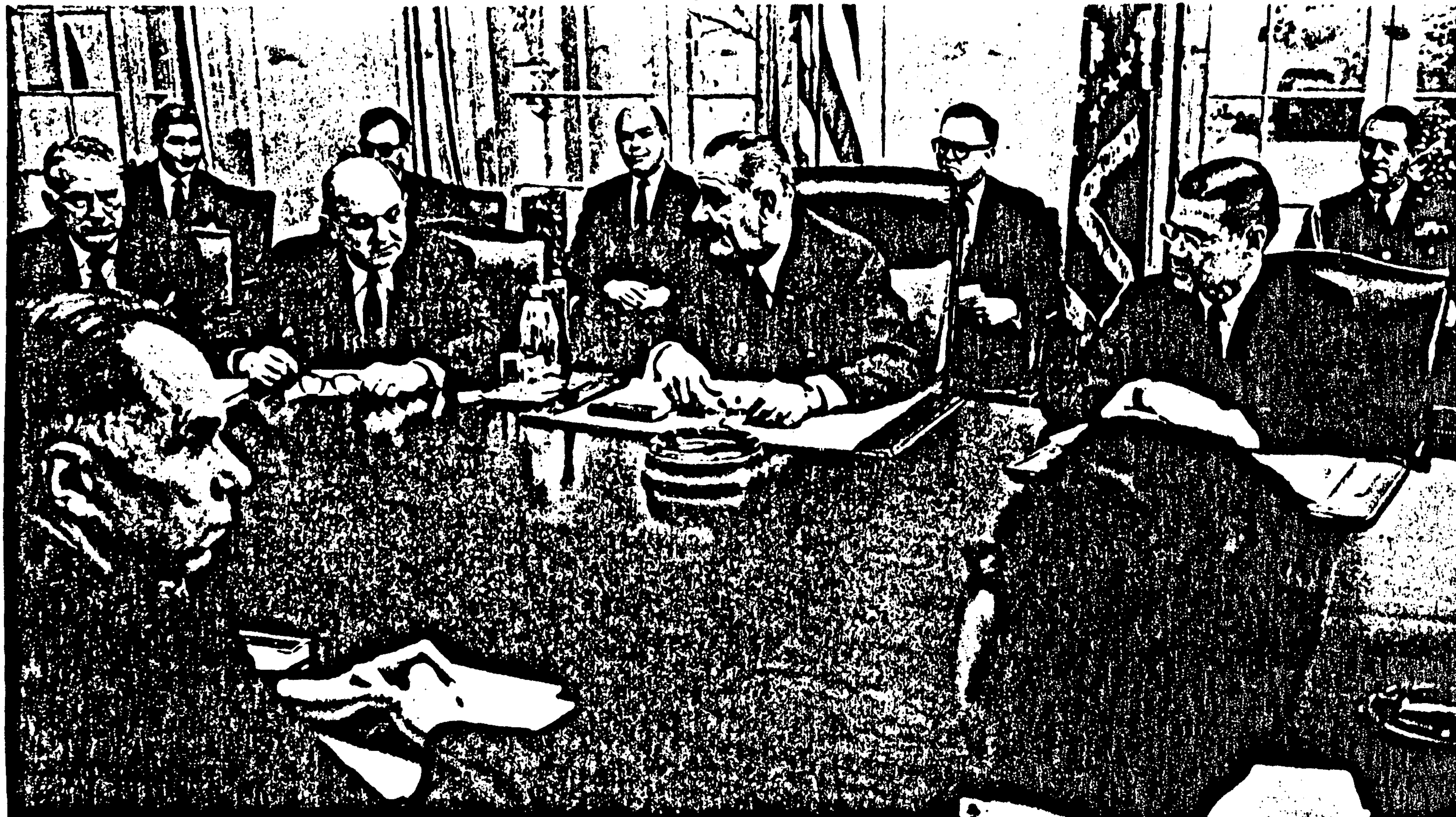
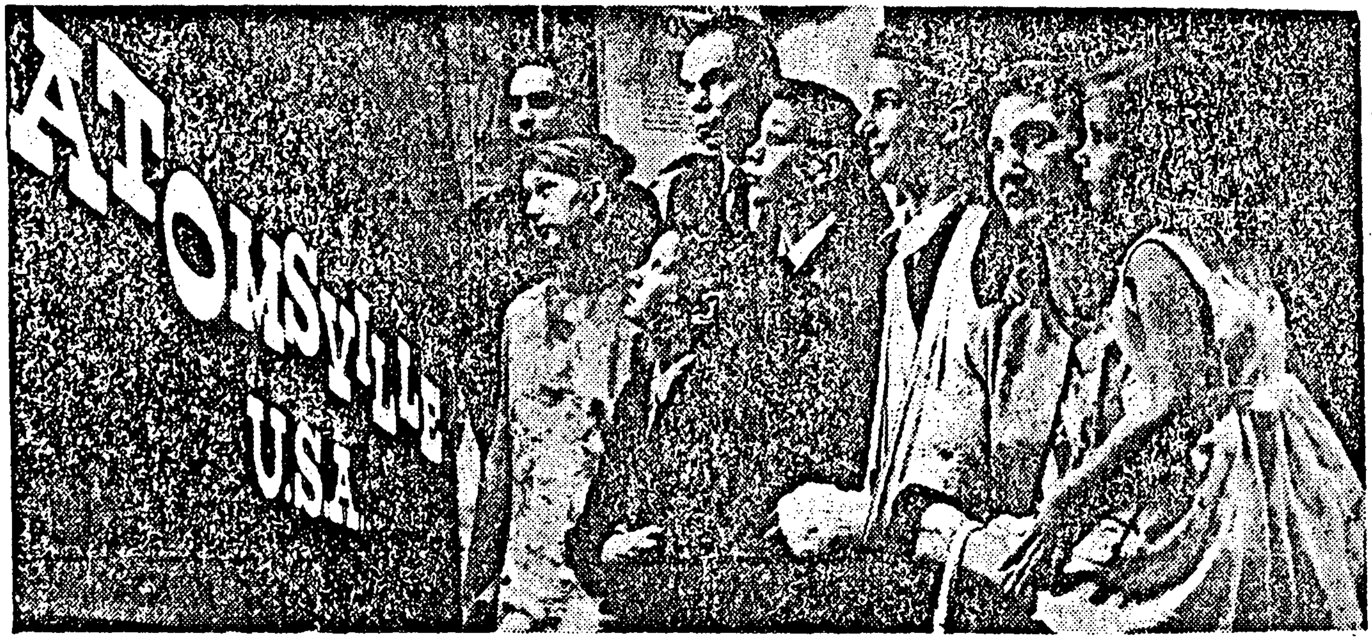
NEW YORK TIMES June 14, 1964



NATIONAL SECURITY COUNCIL—President Johnson presides at a meeting of the country's highest policy-making group. Flanking him are, from left, Under Secretary of State George W. Ball, Secretary of State Rusk and Secretary of Defense McNamara. In the foreground are Glenn T. Seaborg, chairman of the Atomic Energy Commission, and a National Security Council staff member.

New York Herald Tribune Tuesday, June 16, 1964



Herald Tribune photo by MORRIS WARMAN

SCIENTIFIC VIEW—Nobel Prize winner and AEC chai rman Glenn T. Seaborg brought his family to the Fair's Hall of Science opening. From left: Peter, Lynne, Eric, M r. Seaborg, Stephen, David, Dianne, held by Mrs. Seaborg.

New York Herald Tribune Tuesday, June 16, 1964

Nuclear Wonderland At Fair for Children

By Joseph R. Hixson
Herald Tribune Science Writer

WORLD'S FAIR.

The children were playing nuclear fission pinball in Atomsville, U. S. A., while Dr. Glenn T. Seaberg, Atomic Energy Commission chairman, was helping to dedicate the Hall of Science here yesterday.

And above the heads of Fair director Robert Moses and his 200 preview guests, workmen were furiously pouring concrete to complete the Hall by Stepember. Only the first floor of the two-story structure opened yesterday.

The seven major exhibits, ranging from the imaginative Atomsville (for children only) to the instructure chemical man and electronic brain shows of two pharmaceutical firms, are well worth a visit, but not really worth standing in line for.

Atomsville, put up by Dr. Seaberg's commission, lets moppets prospect for uranium over a colorful push-button map of the world set into the floor and encourages them to operate an atomic pile, raising the control rods to get more and more simulated neutron emission until the red light flashes "Scram" for simulated danger.

CHAIN REACTION

In the pinball device, which by mid-morning had broken down under enthusiastic play, you shoot stainless steel neutron balls aiming for holes marked Uranium-235, Uranium 239 and Plutonium. If your neutron goes in, everything lights up for the chain atomic reaction.

The hearing aid people are in the hall with a nice diagram of the human ear and plenty of commercial blandishments.

HALL OF SCIENCE IS DEDICATED

The American Chemical Society, trying to tell the story of chemistry in the oceans, manages to be dark and green and dull.

Aside from Atomsville, in fact, this is a hall for bright tennagers and smart adults. The Upjohn Co. simulated brain is a good show, originally designed for doctors and thus a mite hard to follow. It shows graphically how the brain handles signals from the eyes and ears, fusing them in the cerebrum into the image we know and remember.

14-MINUTE FILM

In a bright blue upside-down acorn, Abbott Laboratories seats one in a small amphitheater to look down on, a 14-minute film about the giant molecules of inheritance, deoxyribonucleic acid. Three dimensional models spring out over the colored screen, on which the presentation is brilliant but hardly for the uninitiate.

Bright children over ten will have fun with the color riddles and games propounded by Interchemical Corp. After learning how we see color in a big and sprightly exhibit, the technologists may wander over to the catalogue of dyes and dye chemistry presented by General Aniline and Film.

While the children are in Atomsville, their mothers might well ponder the American Cancer Society's presentation on the Papanicolaou smear test for cancer.

As for the hall itself, a hexagonal, free-form, concrete structure 200 feet on a side, it is below ground level, light gray, very noisy and continually exciting to the eye. Upstairs, when the building is finished, will be the Martin-Marietta Corp.'s tribute to the space age.

Addressing the dedication crowd, Dr. Seaberg said that in expanding our science education of children, we must not lose sight of the necessity for educating adults, too, in the principles of the scientific method.

Mr. Moses spoke of the hall's successor, the Museum of Science, which will remain here when the rest of the World's Fair is torn down. He said it would be the greatest such museum in the United States, if not in the entire world. Considering what is in the hall now, that will take some doing.

Denver Post
Denver, Colorado
July 1, 1964

Radcliffe Head Joins AEC And Hears Praises of LBJ

WASHINGTON — Dr. Mary Ingraham Bunting, president of Radcliffe College, was sworn in at the White House Monday as the first woman member of the Atomic Energy Commission.

Mrs. Lyndon Johnson attended the ceremony in the Cabinet Room adjoining the President's office. She heard him address the Brooklyn-born educator and scientist as commissioner and praise her for her example of good citizenship in taking the office.

CITES RESPONSIBILITY

"I believe we can say objectively that no woman has shared in a responsibility to all humankind so great or so grave as Mrs. Bunting is assuming today," President Johnson said before the oath was administered.

He appointed the 54-year-old widow and mother of four children last March to the post as one of the more important steps in his efforts to bring more women into high posts in government.

He voiced hope Monday that Dr. Bunting's appointment will express to wives and mothers throughout every land a reaffirmation of American determination that the "power of the atom should be used for human progress and peace."

"In accepting this duty, Mrs. Bunting is doing much more than practicing what she has been preaching to the women of America," he said. "She is helping to set a new standard of public service for all our most useful citizens—men as well as women."

"We have for too long accepted as standard the idea that success in private life precludes service in public life. Such a concept is obsolete and we must discard it. I am hopeful that we can develop a concept that personal success is not complete until our careers are crowned by a tour of public service," he declared.

After Dr. Buting took the oath, the President handed her her engraved commission and welcomed her into his official family.

AP Wirephoto

NEW ROLE FOR A WOMAN

President Johnson congratulates Dr. Mary Bunting after she became first woman member of Atomic Energy Commission. With them is Dr. Glenn Seaborg, AEC chairman.

ELEMENT NO. 104 FOUND, TASS SAYS

Sketchy Report by Agency Tells of Atomic Discovery

By ROBERT K. PLUMB

Press reports from Moscow yesterday said that Soviet scientists had synthesized element No. 104, the 12th radioactive element heavier than uranium that has been created by man since 1940.

If the report is correct, Soviet scientists have accomplished a feat that has eluded the efforts of, among others, the Lawrence Radiation Laboratory of the University of California at Berkeley. The Radiation Laboratory is world leader in studies of elements heavier than uranium.

The 11 other transuranium elements made since 1940 have been identified either in whole or in part by workers associated with the Radiation Laboratory. That laboratory has been hard at work in efforts to identify 104, but the report from California yesterday was that it had not yet been successful.

In 1940, Dr. Glenn T. Seaborg of the Berkeley campus of the University of California identified man-made element number 93, which was subsequently named neptunium.

Work by Seaborg

Dr. Seaborg and co-workers then synthesized other elements beyond uranium (element 92), which was the heaviest element in textbooks of two decades ago. They synthesized plutonium (94), americium (95), curium (96), berkelium (97) and californium (98).

Californium was made in 1950 and by then the periodic table of the elements was beginning to have a distinctly California flavor.

Dr. Seaborg and Dr. McMillan shared the Nobel Prize in chemistry for this work in 1951. Since then, five more transuranium elements have been synthesized at Berkeley. They are einsteinium (99), fermium (100), mendelevium (101) and lawrencium (103), named for the late Ernest O. Lawrence of California, inventor of the cyclotron, and element 102.

Element 102 has a story its own. It almost got away from the California group. In 1957, a team from the Argonne National Laboratory near Chicago, the tomic Energy Research Establishment in England and the Nobel Institute for Physics in Stockholm announced the discovery of 102 and later proposed the name "nobelium."

But the Swedish work could not be verified and a year later 102 was found at Berkeley.The name nobelium has been dropped and 102 has not yet been renamed.

Full Data Are Awaited

Dr. Seaborg, who has guided the Berkeley work for years, is now chairman of the United States Atomic Energy Commission. His technical assistant, Dr. Arnold R. Fritsch, said in Washington yesterday that Dr. Seaborg had seen a brief press report from Moscow but that he would withhold a judgment of the situation until all the facts were in.

New elements are often "identified" by measuring the radioactivity they give off. This makes it difficult, it was said from Washington, to be certain that a new element has in fact been achieved.

According to Tass, Professor Dmitri Blokhintsev, director of the Joint Nuclear Research Institute in Dubna, said that 104 had been discovered.

A team headed by Georgi Flerov, a corresponding member of the Soviet Academy of Sciences, made the discovery.

For three years, it was reported, the team has been working on the synthesis of new elements. In this work, in the United States and elsewhere, accelerators are used to fire charged fragments of atoms called ions into targets of samples of heavy elements such as uranium and the new transuranium elements heavier than it is.

Target of Plutonium

The Moscow report was that element 104 had been made in Dubna by hitting a plutonium target with accelerated ions of neon 22. Plutonium has atomic number 94, neon has atomic number 10. The two together would give the new element with atomic No. 104.

The new element is unstable, like others in the series of man-made elements. It has a half-life of about three-tenths of a second, it was reported. That is, half of any given sample will have disintegrated in this time span.

The short life of the element makes it extremely difficult to identify. Also, Tass said that only about 150 atoms of the new element have been obtained, a sample so small that positive identification is hard.

Soviet scientists presented a preliminary report on their work in July at the Internation Congress on Nuclear Physics in Paris, it was reported.

Dr. Frank Asaro, a chemist at the Radiation Laboratory, and Dr. John Rasmussen, Professor of Chemistry, said that Americans at the Paris meeting, in hearing this report, had to rely on Soviet judgments of their own experimental findings since no graphs or other data were shown.

The periodic table of the elements, named for the Russian Dmitri Mendeleev—for whom element 101 was named by the California group — is an arrangement of the elements in order of their increasing weight. It begins with hydrogen, element No. 1.

The atomic number of an element is the number of protons or positively charged particles in an atomic nucleus. Elements also contain neutral particles in their nuclei. The sum of protons and neutrons equals the mass number of a given element The most common form of uranium, element 92, has a mass number of 238. The transuranium elements have larger atomic numbers and larger mass numbers.

'Shells' Determine Properties

Around the nucleus of an atom of any element are a series of electrons arranged in precise orbits. The number of electrons and their arrangement in a series of "shells" surrounding each nucleus determine the chemical properties of each element.

From knowledge of electron configuration, chemical properties can be predicted.

Dr. Seaborg and Dr. Fritsch reported in the Scientific American for April, 1963, that element 104 should be a most interesting element when discovered.

Since element 103, lawrencium, is the last of the transuranium actinide series of elements (named after actinium, element 89), then 104 would be the beginning of a new series and the first transactinide element.

Element 104 should be chemically similar to hafnium, element 72, according to the predictions of the periodic table. The properties of the new element 104 are not, of course, yet known.

No Theoretical Limit

At this time, it appears that there is no real limit to the number of new elements that can by made by man. But practical limitations appear. Each heavier element is more difficult to make because when with more energy heavier ions are crashed into targets smaller yields of new elements are achieved.

Also, as heavier elements are created, the half-lives appear to decrease. Thus the half-life of the known transuranium elements decreased from 20 days in the case of einsteinium, element 99, to 8 seconds for lawrencium, element 103. The new report has it that 104 has a half life of three-tenths of one second. Shorter half lives make it more and more difficult to prove chemically that a new element has in fact been produced, despite the success of accelerator experiments.

Tass reported yesterday that new "supersensitive rapid" methods of studying atoms had been developed, presumably to investigate the chemical properties of the new element. Similar techniques have been worked out here, but as far as is now known, neither element 102 or element 103 have been identified chemically—by their properties. And chemical identification of 104 may be some time in the future.

Philadelphia Inquirer SEP 1 1964

Russians Challenge U. S. Cost Estimates For A-Plant in N. J.

By ROBERT C. TOTH

Special to The Inquirer And Los Angeles Times

GENEVA, Aug. 31—A Russian engineer on Monday challenged the accuracy of cost estimates of a major new atomic power plant in the United States— Estimates which led President Johnson to hail it as a major economic breakthrough in getting cheap electricity from the atom.

The figures also have been questioned privately by British experts at this international atoms-for-peace meeting.

High U. S. science officials here, however, defended the estimates as being "very good ones."

ESTIMATE COSTS

General Electric is building the plant in question at Oyster Creek, N. J. It will turn out between 515,000 and 640,000 kilowatts of electricity. Construction costs were estimated at between $118 and $136 per kilowatt, and output of electricity at .38 to .48 cents per kilowatt hour.

Three Russian engineers presented a conference report which showed that the Soviet nuclear power program is strikingly parallel in direction and emphasis to U. S. efforts, except for cost figures of the plants.

FIGURES 'COMPARABLE'

These showed that the estimated construction costs for a comparable plant was about $165 per kilowatt, or 40 percent higher. The delivery cost of electricity was put at .44 cents per kilowatt hour, or about 15 percent higher.

N. M. Sinev, one of the Russians said his cost estimates and those for the Oyster Creek plant were "really very comparable" if all the costs of the American station were taken into account.

COMPETE WITH U. S.

If the cost of auxiliary facilities are added, and the expected error of such estimates recognized, "there is no difference" between the figures, he said.

British nuclear experts have questioned the Oyster Creek estimates since they were published late last year. The British are competitors in the world market for atomic plants, and this may influence their view of U. S. achievements.

AP Wirephoto by Cable From Geneva

Members of the U. S. delegation attend opening session of Third International Conference on the Peaceful Uses of Atomic Energy. At the session, in Geneva, are (from left) Edward R. Gardner (standing), of the Atomic Energy Commission; Glenn T. Seaborg, AEC chairman; Donald F. Hornig, special assistant to President Johnson for science and technology, and Henry D. Smyth, U. S. representative to International Atomic Energy Agency in Vienna.

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SEABORG PREDICTS ATOM POWER GAIN

But Warns Geneva Parley of Fusion Problems

By WALTER SULLIVAN
Special to The New York Times

GENEVA, Sept. 8 — Dr. Glenn T. Seaborg, chairman of the United States Atomic Energy Commission, predicted today that by the end of this century more than half the world's electric power would be generated by nuclear plants.

At the same time he warned that the dream of harnessing the power of the hydrogen bomb might never be fulfilled. It must be pursued, he said, "but we cannot be absolutely sure" that success is possible.

Dr. Seaborg gave the summing up lecture to the scientists of almost 70 nations, assembled here for the third United Nations International Conference on the Peaceful Uses of Atomic Energy.

The conference, which began here Aug. 31, ends tomorrow.

His sober warning with regard to research on fusion, the reaction that powers a hydrogen bomb, echoed similar remarks made earlier in the conference by his British counterpart, Sir William Penney.

Sir William, the chairman of the United Kingdon Atomic Energy Authority, expressed his faith in the ultimate achievement of controlled fusion, but said work in that direction had not yet progressed to where such an outcome was demonstrable.

Huge Benefit Seen

Dr. Seaborg emphaized, however, that the benefit to be gained by the achievement of fusion—"essentially unlimited power for the earths population for all time"—was one that could not be ignored. The fusion reaction would be fueled by deuterium, a variety of hydrogen found in seawter.

It has been felt by a number of participants that this will be the last conference of this sort. The first, in 1955, marked the first dramatic lowering of the barriers to international exchange of data on nuclear energy research. The second, in 1958, saw the emergence of fusion research from its shrouds of secrecy.

Dr. Seaborg described the current meeting as "the conference of fulfillment." Detailed discussions of reactor technology are the order of the day. Governments and industrial concerns have been busy in the corridors trying to win new customers or admirers.

Dr. Seaborg described the period of the last Atoms for Peace conference as "an age of innocence" so far as fusion research was concerned. Not enough was known to foresee the formidable problems that stand in the way of controlling this reaction.

Prospects 'Not Bright'

"Plasma physicists now know well," he said, "the hard scientific and engineering realities of suspending, squeezing and holding in space gases with temperatures or the order of those found in stars. They have learned that the prospects for an easy engineering short cut to controlled fusion are not bright."

The sought-after fusion reaction is related to, though not identical with, the one that causes many stars, including our sun, to "burn."

Current research, Dr. Seaborg said, has shown the achievement of sufficient heat and pressure in the laboratory to be "one of the most difficult scientific and engineering problems ever encountered."

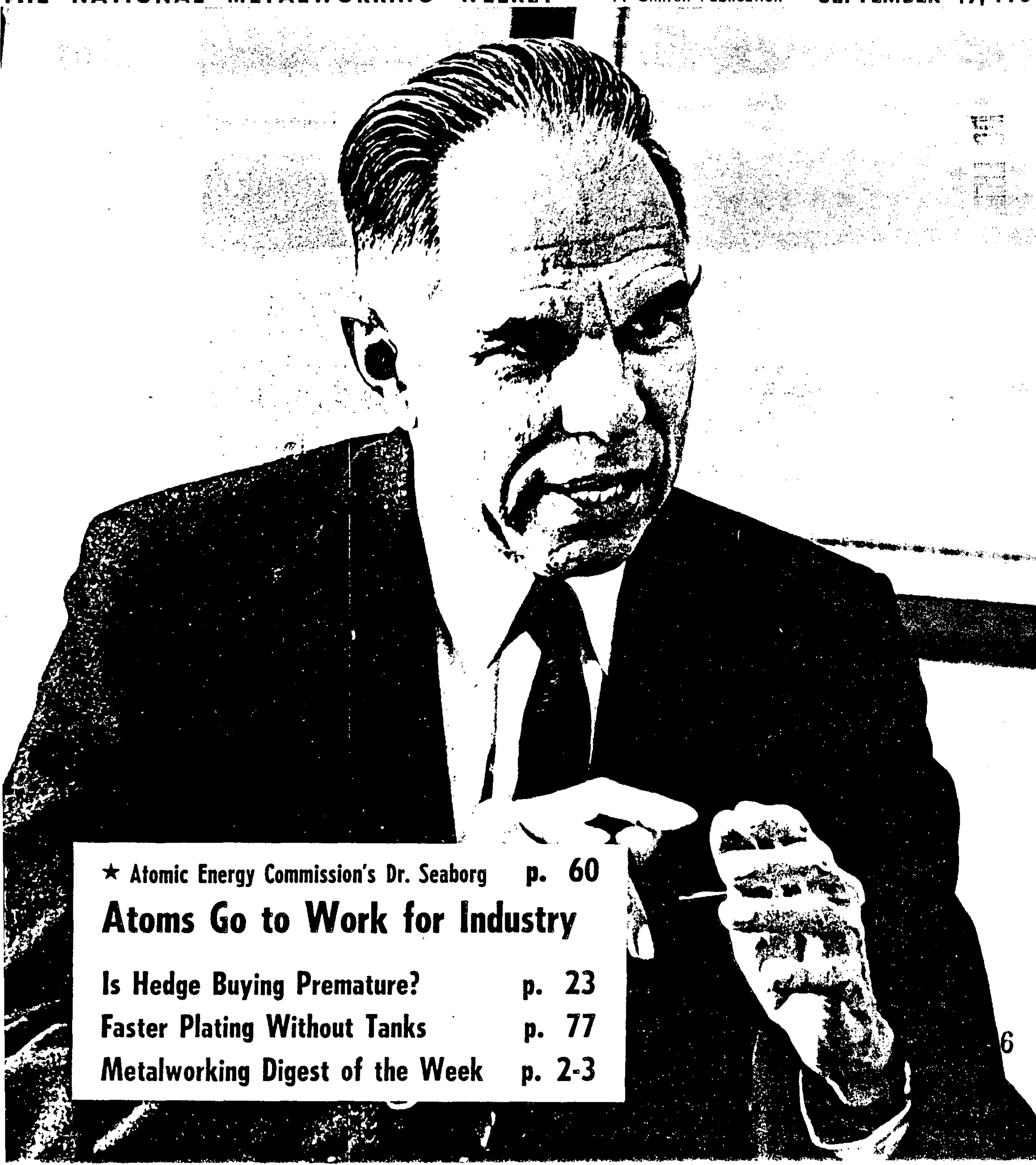
Nevertheless, he said, much progress has been made. The science of plasma physics, which is at the heart of the problem, has come of age.

Dr. Seaborg commented that nuclear energy might provide the means whereby developing nations can "circumvent the long years of the Industrial Revolution."

He said that controlled fusion might be achieved before the end of the century in spite of the seeming difficulties, but that present planning should not count on it. The plans, he said, can always be altered when the breakthrough occurs.

IRON AGE

THE NATIONAL METALWORKING WEEKLY A Chilton Publication SEPTEMBER 17, 1964



IRON AGE interviews AEC chairman Seaborg

Industry Fallout From the Atom

In an exclusive Iron Age interview, Atomic Energy Commission chairman Glenn T. Seaborg tells what the atom and atomic power mean to the metalworking industry now and in the future.

By R. W. Crosby

■ **Q. Dr. Seaborg, just what is the economic breakthrough in commercial nuclear development recently referred to by President Johnson?**

A. Recent decisions by utility executives to select nuclear rather than conventionally fueled central station power plants are in large measure responsible for President Johnson's statement on commercial nuclear power development.

Such decisions were made by Jersey Central Power and Light Co. and Niagara Mohawk Power Corp. and were based entirely on economic considerations.

These decisions to go nuclear, in addition to satisfactory operating experience with existing prototype plants and recent offers by reactor manufacturers to build complete plants on a fixed-price, turnkey basis, have led to widespread agreement that economic commercial nuclear power is coming of age in high cost fuel areas.

Q. How will this "breakthrough" affect the metalworking industry?

A. As nuclear power becomes more competitive over greater sections of the nation—as well as the world—the metalworking industry will undoubtedly see significant demands for new or improved products.

Efforts must continue on developing materials such as very high-strength steels for large pressure vessels which will have improved resistance to radiation effects from a nuclear environment.

Changes will also occur in the type of material being used, such as zirconium instead of stainless steel for fuel element cladding in water reactors and increasing use of other high-temperature materials such as nickel alloys, columbium, etc.

Nuclear power will also be more demanding on this segment of industry because of rigid specifications, quality control and unusually stringent fabrication techniques required.

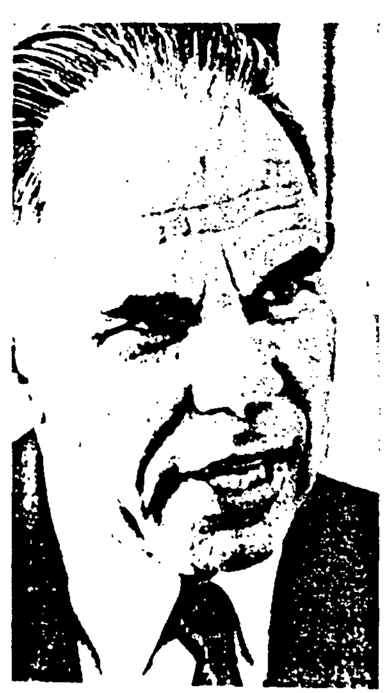
There will be a need for the metalworking industry to accelerate and expand its R&D efforts on higher strength materials. In some cases the metalworking industry may find itself expending more and more effort on ceramic materials.

Q. Since power needs are increasing, power plants would be built even if they did not use nuclear fires for their energy source. What advantages will nuclear power have not now available through conventional power systems?

A. It is true that power plants would be built in any event to meet the nation's increasing needs for power. The advantages of nuclear power, when fully developed and demonstrated, include a reduction in power costs in what are now high power cost areas in the country.

In the next few years nuclear power is expected to become competitive in more and more areas, thus eliminating regional differences in the cost of power which influence the location of industries.

Q. What sections of the country will be most involved in the buildup of commercial nuclear power



"We have only begun to explore .. potentials of the atom."

Mushrooms

plants? What specific areas are slated for new nuclear power plants?

A. Large commercial nuclear power plants are presently planned for construction primarily in such high fossil fuel cost areas as the New England states and in New York, New Jersey, and California.

A utility decision to locate a plant at a specific point on its system is governed by many factors. These include the demand for a large block of power and the price of alternate fuels for that particular site.

We expect that as the economics of nuclear plants are demonstrated and the efficiency of these plants is improved, decisions will be made to build nuclear facilities in many areas of the nation.

Q. Let's turn to materials, Dr. Seaborg. New plant construction would involve the metalworking industry no matter if it were nuclear or conventionally powered. The difference in materials has to be in the power source. What materials are involved in nuclear reactors to be used that are not involved in conventional power systems?

A. In the nuclear reactor field, we have considerable interest in zirconium and its alloys. Zircaloy-2 and Zircaloy-4 are used extensively for process tubing, fuel cladding, and other stress-bearing components in power reactors.

Austenitic stainless steels and intermediate to high nickel alloys have been used in a variety of nuclear reactor applications as well as in conventional power systems. The nickel alloys and stainless steels will continue to play an important part in both power systems.

Nuclear reactor fuel materials also can be classified as not involved in conventional power systems. These may be fissile or non-fissile and either metallic or ceramic fuels. Examples would be uranium, thorium, plutonium or their oxides, carbides, and nitrides.

Q. What are the special requirements involved in materials for nuclear reactors?

A. Because of radiation effects peculiar to nuclear environment, maintenance of any nature is a major task. Material quality must meet the highest standards of integrity. This means control not only of the concentration of residual elements to meet nuclear specifications, but rigid control of fabrication, annealing, and cleaning processes.

". . . more and more attention will be given to exotic materials . . ."

I'll give you some examples. Irradiation studies suggest that boron in stainless steels and nickel alloys should be held below 1 to 2 parts per million in fuel cladding or structural materials to be used in nuclear reactors. Under irradiation with thermal neutrons, boron transmutes to helium and lithium, and it is postulated that helium migrates to the grain boundary causing a loss of ductility in stainless steel and nickel alloys. The result is a premature failure.

Strong arguments can be made for holding cobalt below 0.005% because of the formation of radioactive cobalt. The half-life of radioactive cobalt is about 5.3 years. In the zirconium alloys, fluorides specifications call for a maximum of 35 parts per million. This is because some cracking failures of zircaloy in a nuclear environment are attributed to fluorides.

Q. Is the metals industry at this point ready to face the requirements placed on it by the breakthrough?

A. By and large, I think that the answer to this question is "yes," with possibly some exception on the level of effort in research and development on new and improved high-strength materials.

The metalworking industry is, at present, adequately meeting the requirements for material and components for nuclear power plants. In my opinion, it has done a good job of meeting new demands such as developing techniques to fabricate very large pressure vessels.

The continuing problem, of course, is one of quality control, adherence to rigid specifications and adapting to the use of new materials and applications.

The industry has learned that errors can be extremely hazardous and costly and must be eliminated to a much higher degree than in normal industrial experience and practice to date.

Q. Will the growth of nuclear power draw in parts of the metals industry which have not been involved so far in reactor development? If so, what industries?

A. To some extent, I suppose. But I do not think any significant change can be anticipated. Basically, both the government and industry are working on new or improved alloys of metals to meet the requirements of higher temperatures, higher stresses and difficult corrosion environments.

Examples of several possible metals that may be used in larger quantities than today might be vanadium and columbium. Alloys of these metals are presently under study as potential candidates for fast breeder reactor systems or for use in our space program.

Tantalum and tungsten are considered very interesting metals as we work toward higher temperature

"... metalworking ... may have to diversify to handle other materials."

and will continue to receive a great deal of attention.

The need for materials with favorable nuclear properties that will withstand higher temperatures in radioactive environments also probably means that we will be looking more and more to ceramic materials as we exceed the upper limits for metals.

We anticipate that, as new materials are developed or required, they will be produced by further expansion of existing industries for the most part.

As I stated before, it is quite possible that the metalworking industries may have to diversify to handle other materials, such as ceramics.

Q. Since the Atomic Energy Commission has a great interest in those special materials, are you doing any special metallurgical studies on them? What are the major studies and what do you hope they will produce?

A. We have sponsored and continue to sponsor research and development programs to develop new alloys or make present alloys perform better—usually with ever increasing demands at higher temperatures, higher stresses and corrosive environments.

The research covers zirconium alloys, austenitic stainless steels and nickel alloys for water reactor systems and vanadium alloys. These, as I mentioned, have potential for fast breeder reactor systems.

Q. To go back to the "breakthrough" for just a moment: How fast will the shift to nuclear power be and how widespread?

A. In our report to the President on civilian nuclear power, we estimated that the installed capacity by 1980 would be approximately 40 million kw and in the year 2000 that half of all electrical power produced in the United States would come from the atom.

Developments within the past year have indicated that nuclear power is coming of economic age sooner than anticipated in its ability to compete with conventional fuels in medium and high cost fuel areas.

To reflect this development, our estimate for 1980 has been revised upward to 60 to 70 million kw of installed capacity.

Q. How is the use of nuclear power in space developing?

A. As you know, several isotope generators are in orbit providing 2.7 and 25 electrical watts of electricity for Department of Defense satellites. We also have several other generators under development which will increase power level capability and make use of cheaper, more readily available isotopes.

We expect very soon to make a large increase in power level capability with the introduction of the reactor-powered units. The first test of a reactor unit will be with SNAP-10A (Systems for Nuclear Auxiliary Power), scheduled for launch during the spring of 1965.

SNAP-10A will be tested at 500 electrical watts, but the SNAP-10A concept—the zirconium hydride reactor with thermoelectric power conversion, using hardware now under development—is expected to produce from 15 to 20 kw.

The mercury turboelectric conversion system, also being tested, will increase this capability by a factor of about two due to its higher efficiency. For higher, even more compact systems, we are proceeding with a development program known as SNAP-50°SPUR. This should produce power levels of 1000 kw and higher.

Q. What do these developments mean to the metalworking industry?

A. As in the nuclear power field, the search is continually for high-strength, high-temperature materials but even more so in the space program.

Of course, there is a difference in that the materials required for many of the space programs will be required to stand up for shorter periods of time as compared to the life of nuclear power plants.

However, because of the unusually high-temperature and strength requirements, more and more attention will be given to exotic materials such as René alloys and other super alloys.

In the SNAP-50 program considerable work is being carried out on developing metals such as columbium. In our ROVER nuclear rocket program the materials to date have been primarily ceramic in nature. However, we are looking at metals such as tungsten.

Q. Quite a bit has been said about commercial shipbuilding being revolutionized by nuclear power. What do you believe is the future of nuclear merchant shipping?

A. I personally believe that the future for nuclear powered merchant ships is bright. Recent operating experience with the N. S. Savannah has been highly satisfactory and her reception in foreign and domestic ports has been most enthusiastic.

Recently, reactor manufacturers submitted to the government interesting proposals for the development of advanced, compact, maritime propulsion systems. These may indeed revolutionize commercial ship building, especially when coupled with new hull designs.

The proposals from reactor manufacturers are currently being evaluated by the Commission and the Maritime Administration.

Q. What is the status of the AEC program for the use of nuclear power for earthmoving and mining. What can the industry expect in the near future?

A. Significant progress has been made in developing both the technology and nuclear explosives needed for use in mining and earthmoving.

In mining, and some related industrial fields involving detonations which are completely contained underground, we believe we have the basic technology to conduct in cooperation with industry a joint project to demonstrate the economic practicality and technical feasibility of such applications.

In excavations, or earthmoving, truly remarkable strides have been made in reducing the amount of radioactivity released by the detonations in the process of forming the crater. Generally the larger the excavation project, the more nuclear explosives will be able to save economically.

In order to carry out such projects, with the results predicted precisely enough for most engineering purposes, we believe more experiments are necessary. We hope to accomplish this research in about five years.

In the meantime, we would be glad to examine projects jointly with industry to see whether such projects could make a contribution to our experimental program and also result in an excavation having a practical industrial use. Possibly, projects with simple specifications could be accomplished even earlier.

Dr. Glenn T. Seaborg has become synonymous with nuclear energy. In 1940 he co-discovered plutonium, element 94, the first of a number of transuranium elements which he helped to discover. During World War II he headed the plutonium work of the Manhattan Project. Until his appointment as Chairman of the Atomic Energy Commission in 1961, Dr. Seaborg was Chancellor of the Univ. of California at Berkeley. Among innumerable honors, Dr. Seaborg numbers the Nobel Prize in Chemistry which he won with an associate in 1951, and the AEC's Enrico Fermi award, received in 1959.

It should be understood, of course, that any project must conform to strict public safety criteria and must be conducted within the framework of the limited nuclear test ban treaty.

Q. With the cutbacks in fissionable materials production and future weapons cutbacks a possibility, where does the future of the Atomic Energy Commission lie?

A. The AEC has a broad range of programs in addition to the production of fissionable materials and weapons.

Many segments of the AEC's work are actually growing and will probably continue to do so for some time. The whole area of nuclear power development —civilian nuclear power for generating electricity, naval reactors, maritime propulsion and space systems —is expanding.

In fact, I expect that future nuclear developments may well be more significant than those that have occurred in the past two decades. We have only begun to explore the potentials of the atom.

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TRI-CITY HERALD OCTOBER 2, 1964

Jet Speeds Fair Photos To The Herald

Tri-City Herald 10/2/64

By R. F. NOWAKOWSKI
Herald Staff Writer

You don't think of New York as 3,000 miles away when you take pictures there one afternoon and have them printed in The Tri-City Herald the next.

The pictures in The Herald today were taken yesterday afternoon at the New York World's Fair. I brought back the undeveloped film in my coat pocket on a night flight so that Herald readers could see today what Hanford Day was like in New York. (Pictures on page 13).

You tend to think of distance in terms of time. It was only seven hours to New York Wednesday on a nonstop, jetprop flight in a General Electric Co. executive airplane.

THERE WERE 12 OF US ON the flight out. Some going to tell the story of Hanford to the nation; others going to report the story in newspapers of the Pacific Northwest, or radio and tv stations.

We left Pasco at 8 a.m. and it was 6 p.m., New York time (only 3 p.m. Tri-Cities time) when we touched down at La Guardia Airport in New York.

There probably were people at the World's Fair yesterday who missed the Hanford "Miracle in the Desert" exhibit, but not very many.

BY 3 P.M., GE HAD COUNTED more than 40,000 people through the company exhibit and past the carousel.

It certainly attracted attention. Hundreds of persons stopped and gathered around when newspaper and tv photographers arrived with Dr. Glenn T. Seaborg and a crowd of representatives from the Tri-Cities and Washington, D.C.

Dr. Seaborg, chairman of the Atomic Energy Commission, came from Washington especially to tell the nation about diversification at Hanford — a project he called a "model" for other cities with similar problems.

I doubt that few people have spent a whole day at the New York fair and have seen so little of the 1,200-acre attraction.

WITHIN A FEW HOURS AFTER the press conference by Dr. Seaborg ended, I was on a commercial jet which left John F. Kennedy Airport at 11:55 p.m. and headed back to the Tri-Cities.

It was only an hour later than the usual time to start work when the pictures arrived in the Tri-City Herald photo lab to begin the processing for today's paper.

Tri-City Herald 10/2/64

Wait To See Miracle

R. F. Philip, left, president of the Tri-City Nuclear Industrial Council, stood with Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission, in front of the General Electric Co., exhibit at the New York World's Fair as viewers waited in line to see the Hanford and other GE displays. Philip was one of the participants in a press conference at which the diversification effort was discussed.

CHICAGO TRIBUNE 10/22/64

10/22/64

Midwest Schools to Help Run Argonne

AEC Announces Agreement with U. of C.

The Atomic Energy commission announced yesterday the approval of a reorganization of Argonne National laboratory, giving other midwestern universities an equal voice with the University of Chicago in its management.

Chicago, which has operated the laboratory under an exclusive contract with the AEC since Argonne was started in 1946, will continue to operate the physical plant, but "responsive to the policies of the corporation within the terms of the contract," the announcement said.

Committee Makes Decision

The AEC called it a "tripartite agreement," in which the commission is one party, the University of Chicago another, and two groups of universities, Midwestern Universities Research association [MURA] and Associated Midwest universities [AMU] the third party.

The decision was made by a committee of seven scientists and administrators representing Chicago and the two groupings of universities. The situation is somewhat complicated by the fact that Chicago is a member both of the 15-university MURA organization, and the 33-institution AMU.

However, it is widely known that there have been rivalries and jealousies over university use of Argonne's facilities, especially the new 50-million-dollar zero gradient synchrotron, one of the world's greatest high energy accelerators, about a year and a half old.

Northwestern university and the University of Wisconsin particularly have forged to the front in research in particle or high-energy physics, the most esoteric form of nuclear physics and a field in which the Fermi institute at the University of Chicago has shown little activity.

Other Universities Active

Northwestern and the University of Wisconsin recently have commanded more time on the Argonne ZGS than has Chicago, scientists say.

The 15 members of MURA, which includes Northwestern, Wisconsin, Indiana, Purdue, Michigan State and others who are heavily engaged in nuclear research, recently asked the AEC to build a separate 150-million-dollar accelerator for them at Stoughton, Wis., MURA headquarters, but the request was denied.

Scientists here say that the "tri-partite" agreement making MURA and AMU universities equally responsible with Chicago in Argonne policies will probably forestall such a move in the near future.

Chairman Praises Plan

Glenn T. Seaborg, chairman of AEC, said that the new agreement "will enable the many important institutions in the midwest to develop their own programs more efficiently thru direct familiarity with proposals for new programs and facilities at Argonne," and "at the same time, the plan proposes to retain the competent and experienced management provided for so long at Argonne by the University of Chicago."

George W. Beadle, president of the U. of C., said the university welcomed the new plan.

"It is both appropriate and necessary for our sister institutions to join in making the fundamental decisions regarding the new directions that Argonne should take in furthering the best interests of science and the peace time technology of the atom," he said.

The MURA universities are Iowa State, Purdue, Michigan State, Northwestern, Chicago, Illinois, Iowa, Indiana, Kansas, Michigan, Minnesota, Notre Dame, Wisconsin, Ohio State, and Washington [St. Louis].

In Associated Midwest Universities [AMU] are these 15 plus the University of Arizona, Battelle Memorial institute, Carnegie Institute of Technology, Case institute, University of Cincinnati, Illinois Institute of Technology, Kansas State university, Loyola, Marquette, Mayo Foundation, Michigan Technological university, Missouri, Nebraska, Oklahoma, Pennsylvania State, St. Louis university, Wayne State, and Western Reserve.

The New York Times.
SATURDAY, NOVEMBER 14, 1964.

First Patent on Element Given For the Discovery of Americium

Customs Court Ruling Clears Way for the Issuance on Work of Dr. Seaborg

By STACY V. JONES
Special to The New York Times

WASHINGTON, Nov. 13 — The first patent ever awarded for an element was given this week to Dr. Glenn T. Seaborg. It is assigned to the Atomic Energy Commission, of which he is chairman.

The discovery is americium, element 95. A second patent, on curium, element 96, will be granted to Dr. Seaborg for the A.E.C. on Dec. 15. Both are man-made substances.

It is likely that these will be the only patents on the distinct varieties of matter called elements. The law does not authorize the patenting of elements found in nature, such as gold and silver. The synthetic elements could be patented.

However, all those identified so far, except americium and curium, have been described in technical papers and legally are not new.

Ruling Overruled

The Patent Office Board of Appeals held that Americium and curium were legally not new either, on the ground that their discovery had been anticipated by production in an early reactor.

The United States Court of Customs and Patent Appeals reversed the board in twin decisions last March, clearing the way for patent issuance.

The New York Times
Glenn T. Seaborg

This week's patent (13,156,-523) covers element 95, two of its radioactive isotopes, several compounds, and methods of separating them from solutions of irradiated uranium or plutonium.

The discovery of americium and curium has scientific significance as marking the first breakthrough, after plutonium, in the artificial production of elements.

The Nobel Prize, awarded Dr. Seaborg in 1951, recognized his achievements in isolating these and other "transuranium" elements.

The application for the United States patent was filed in 1946. It was held secret for about a decade, and was involved in long patent-office proceedings.

That the two new elements had been discovered was not secret. Dr. Seaborg made the first public announcement Nov. 11, 1945, in answer to a question on the Quiz Kids radio program.

The name americium, after the Americas, was chosen by analogy with europeium, the name of the rare-earth element that is its counterpart. In the year-long efforts to separate the elements, Dr. Seaborg says, a laboratory associate referred to americium and curium as "pandemonium" and "delirium."

PAGE 20 Thursday, Dec. 3, 1964
THE SAN FRANCISCO CHRONICLE

Bay Peace Leaders Find a Friend

A group of local peace movement leaders met privately yesterday with Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission to express their concern over fallout, weapons testing and nuclear development.

They found Seaborg pretty much on their side.

He agreed with them that the nuclear test ban treaty should be extended to cover all weapons test, including those underground.

He agreed that all nations should join the ban on weapons tests—including France and Red China.

SAFEGUARDS

He agreed that maximum safeguards should be applied in the industrial applications of atomic energy.

Seaborg was warm, sympathetic and concerned as he talked with his visitors for 20 minutes in an empty corner of Civic Auditorium. And later he said:

"I feel these people are serving a most useful purpose; as concerned citizens they are discussing problems that should concern usal l."

And the peace leaders were equally sympathetic to Seaborg: "We feel he is as concerned about nuclear safeguards as we are," said one.

VISITORS

The conference was held at the request of the peace leaders yesterday morning while Saborg was here for meetings of the Atomic Industrial Forum and the American Nuclear Society. With Seaborg was AEC Commissioner Mary Bunting.

The visitors were Mrs. Gloria Feldman of Women for Peace, Dr. Leona Bayer of the Women's International League for Peace and Freedom, and Cecil Thomas and Robert Mang of the American Friends Service Committee.

The peace group leaders ing a formal statement calling for: compulsory removal of all strontium-90 from milk supplies; stricter controls over industrial and government nuclear energy projects; revision of radiation exposure safety standards; an invitation to Red China to jexposure safety standards; an invitation to Red China to join atom talks, and a universal testb an treaty.

Scientists Are Human Too, Seaborg Says

A scientist of some renown sought yesterday to establish the fact that he and all other scientists are human beings.

Glenn T. Seaborg, now Chairman of the U.S. Atomic Energy Commission, laid out his case in the course of accepting the Charles Lathrop Parsons Award of the American Chemical Society for his public service activities. The award dinner was at the Madison Hotel here.

His qualifications to be regarded as a scientist are many: co-discoverer of plutonium and eight other transuranium elements, codeveloper of the atom bomb, 1951 Nobel Prize winner in chemistry and so on.

But in the Chemical Society acceptance speech, he made a bid for recognition of scientists as being something else, too.

Following are some excerpts:

Old legends die hard, but none has been more persistent than the belief that the scientist is something more, or perhaps something less, than a human being. The image of the scientist as a misguided or visionary eccentric is almost as old as Western culture. In fact, Aristophanes wrote one of his most successful comedies on this theme and spoke of the scientists of his day, certain philosophers, as dwellers in Cloud-Cuckooland.

But the image of the scientist as a more or less wicked wizard is perhaps even more ancient. You will recall that the demigod Prometheus stole fire from heaven and was rewarded by his superiors for this bit of insolence by being sentenced to an eternal career as a bird-feeding station. Whether or not he was wicked depended upon whether you took sides with the gods or Prometheus's human beneficiaries.

To say the least, people have always felt some uneasiness upon being confronted with new knowledge and have been inclined to distrust the purveyors of such knowledge. The quasi-legendary figure of Dr. Faustus represents one reaction—that of awe-struck fear; the dwellers in Cloud-Cuckooland and their successors in the writings of Jonathan Swift are the products of another, more positive reaction—ridicule.

Here is Gulliver's account of his initial encounter with science: "The first man I saw was of a meagre aspect, with sooty hands and face, his hair and beard long, ragged, and singed in several places. His clothes, shirt, and skin were all of the same color. He had been eight years upon a project for extracting sunbeams out of cucumbers, which were to be put in phials hermetically sealed, and let out to warm the air in raw, inclement summers.

"He told me, he did not doubt, that in eight years or more, he should be able to supply the governor's gardens with sunshine, at a reasonable rate; but he complained that his stock was low, and entreated me to give him something as an encouragement to ingenuity, especially since this had been a very dear season for cucumbers."

Times have changed a great deal. I am confident that our people working on their project of producing miniature suns by means of the controlled fusion process have better prospects than the cucumber expert of the Grand Academy; science requires substantial sums for its support in these days, and we are not alarmed when our controlled thermo-nuclear scientists indicate at budget time that it is going to be a "very dear season for cucumbers" . . .

The scientist as the visionary bungler stubbing his toe over the most obvious facts of life certainly has his counterpart in everyday experience. Indeed the very fact of asking a lot of questions is sure to produce a lot of wrong answers. But it is the virtue of science over the long run to put these wrong answers to the test of reality and relegate them to the junk heap of human experience . . .

What is now emerging, I believe, is an era in which the scientist will achieve increasing stature as a human being because he is willing to look beyond the immediate results of his scientific endeavors to their social consequences.

He recognizes that even though he cannot presume to advise mankind with finality on the values that are most acceptable for our world, at least he may be able to help point out the probable consequences of pursuing alternative courses according to one or another set of values. And he realizes that he, in common with men generally, will be deeply affected by the course that is chosen . . . .

BUSINESS WEEK

December 26, 1964

Fifty cents

A McGraw-Hill publication

Industry scrambles to get plants built

Page 54

Below: At Hanford, Wash., Glenn T. Seaborg is trying out a unique experiment to soften the blow of AEC cutbacks [Research]

As plutonium fades, AEC calls industry in

Dr. Glenn T. Seaborg, left, AEC chief, was co-discoverer of plutonium, chief product of the huge Hanford Works.

Five new private contractors will get to lease the huge Hanford Works. They'll seek commercial products from atomic research

The stark hills are frozen now. The huge silvergray reactors that line the south bank of the Columbia River —stolid sentinels of U. S. nuclear military might—stand silhouetted against the Saddle Mountains and the Rattlesnake Hills.

But what is happening on that cold desert near Richland, Wash., is being watched closely from all corners of the nation. Led by its chairman, Dr. Glenn T. Seaborg (cover and above), the Atomic Energy Commission is pioneering a model of how to deal with vast government facilities that are no longer needed for their original purpose.

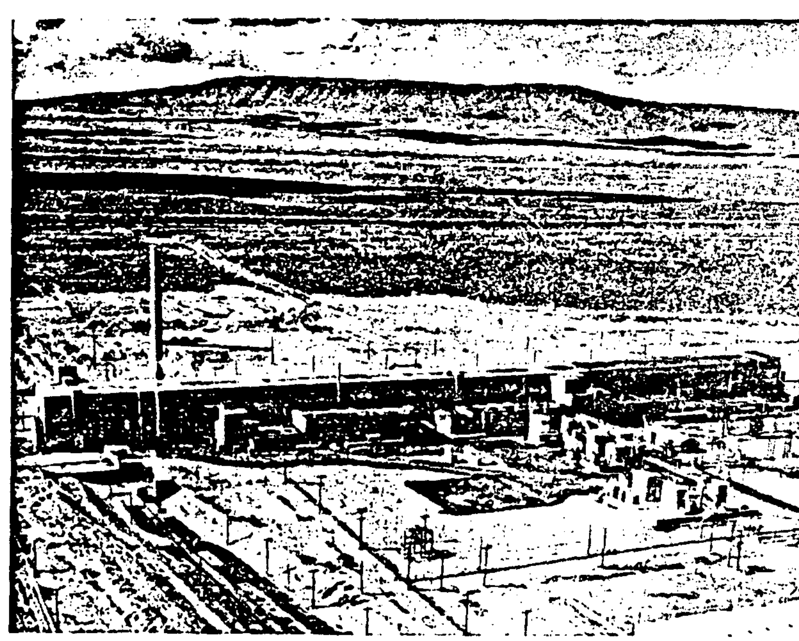
The unique feature of AEC's way of handling its Hanford Works is this: Before cutting back on production at its plutonium plant, AEC has broken the huge complex into five packages, has taken bids from new private concerns to operate these units, and is turning over to them a going business that they can quietly adapt to new uses that may develop.

This way, in contrast to the impact of military base closings, should provide little disruption of work, no ill effect on employment, nor severe impact on the local economy.

No longer needed. It is clear, says AEC Chmn. Seaborg, that the con-

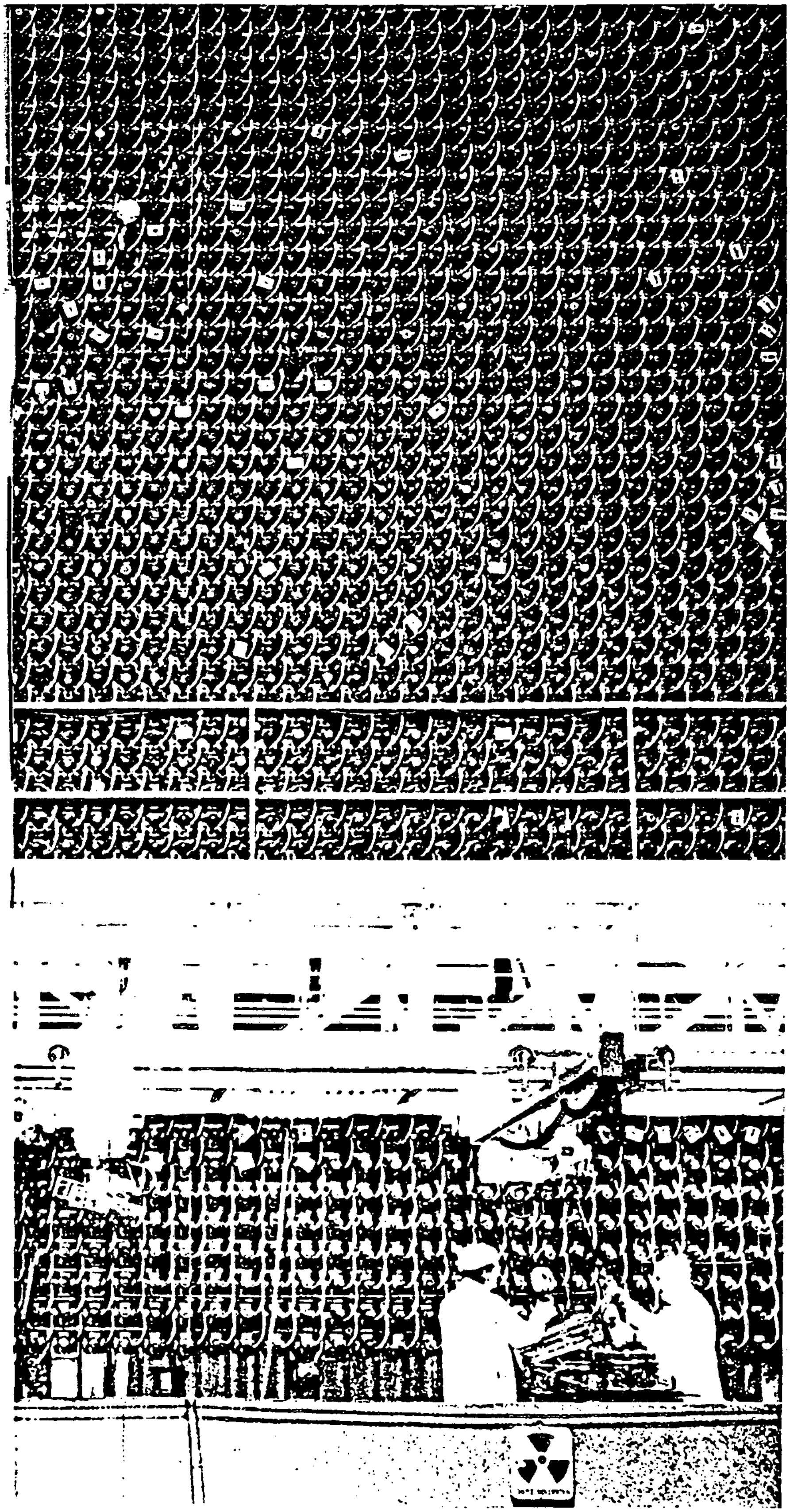
Nuclear power plant

So-called N reactor will provide steam for this 800,000-kw. power plant.



Chemical processing of spent fuel

This plant, called Purex or "the canyon," more than 800 ft. long, recovers usable plutonium and radioactive wastes from fuel used by nuclear reactors.



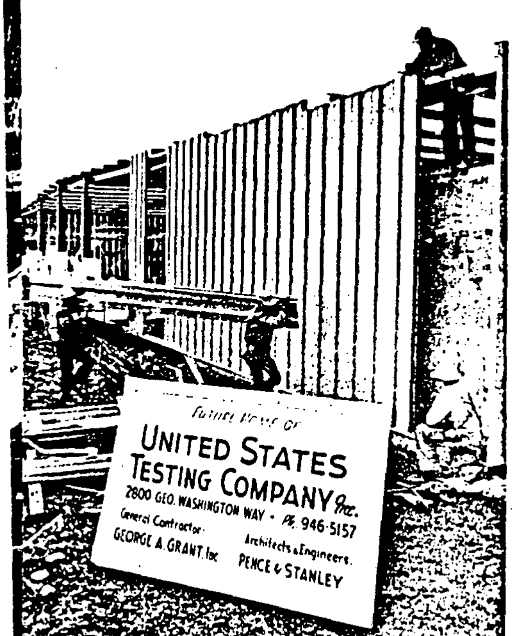
Test reactor

At the research reactor, technicians wrestle with "cask" containing a hot 25-lb. fuel element. Below, scientists work on study of actinide elements.

Reactor producing plutonium

Hanford's reactor K, one of the newer units, is not included in the cutback of plutonium production. This is the front face of the huge reactor.

GE man Harry E. Parker, left, and AEC manager James E. Travis dip into stack of eight industry bids for contract to operate reactor and fuels business.



First new tenant at Hanford is U. S. Testing Co., Inc., which has taken over detection and protection work and will build its own operations headquarters.

ditions which gave birth to the $1.4-billion Hanford Works no longer prevail. Hanford will still have the function of producing the manmade element plutonium and of doing the R&D to support this work. But advances in weapons technology have decreased the need for huge quantities of plutonium for this use.

In the 20 years of Hanford's existence, too, the private nuclear industry has matured to the point where it can now take on some of AEC's original burden.

So three of Hanford's nine reactors, plus a chemical extraction plant, have been marked for shutdown next year. Barring radical shifts in U. S. foreign policy, defense planners say privately, Hanford may have only two or three reactors still running by 1967.

Local impact. Even the first, firmly announced cutbacks could have spelled disaster to the towns of Richland, Kennewick, and Pasco—the Tri-Cities of southeast Washington. The Hanford Works is virtually the sole business support of this part of the Northwest.

"At a minimum," says a local official, "2,000 highly trained technical and scientific people would have been thrown out of work by the first reactor closings."

Year of change. "We don't want the commission to be in the position of walking out on a place that was built by us to meet a national need when that need has been fulfilled or partially fulfilled," says Seaborg. "We therefore accept it as our responsibility to do everything we can to help the people of the communities surrounding Hanford to meet the situation."

Within the next year, Hanford will be divided into three major and two minor segments, still owned by AEC but operated by five new tenant contractors who will include some of the big names in U. S. industry. These contractors will be encouraged to diversify into as many nonmilitary, commercial uses of nuclear technology as they can.

I. First steps

One of the smaller packages of work at Hanford has already changed hands. U. S. Testing Co., Inc., of Hoboken, N. J., has taken over from General Electric Co., AEC's over-all contract operator at Hanford for 18 years, responsibility for radiation detection and protection services.

This business, running to several million dollars a year, will be handled by U. S. Testing with 47 employees, 22 of whom have come from GE's payroll.

Battelle moves in. A bigger change will take place on Jan. 4, under terms of a contract signed this week between AEC and Battelle Memorial Institute of Columbus, Ohio.

Battelle will move in as operator of Hanford's $84-million research laboratories, taking over a $30-million operating budget from GE. A quarter of this budget will continue to support the plutonium production that remains at Hanford, but the future growth of the labs will be in new directions.

Free from conflict-of-interest problems, as GE was not, Battelle—which now becomes the largest not-for-profit research institute in the country—will be able to go out after not only other government research work but also industrial R&D contracts. It aims at $10-million worth of such contracts within the next two or three years. Under GE operation of the labs, industrial contract work was not possible.

Expansion, too. In its contract proposal, Battelle promised also to spend $5-million to expand the newly christened Battelle Pacific Northwest Laboratories. It has bought 300 acres just outside Hanford's gates for lab expansion and 18 acres near the University of Washington in Seattle to coordinate university research in the state.

Smooth transition. Battelle is also keeping an unwritten promise to keep GE's current staff at Hanford intact as far as possible.

"This was perhaps the single most important step of the whole operation," says a local AEC official, "because it involves a priceless commodity: the confidence and cooperation of a pool of close to 1,800 scientists and engineers."

The changeover is going "unbelievably well," the AEC man says. All but 17 of the 1,800 lab workers will merely change employers on Jan. 4. Battelle people are thoroughly familiar with the Hanford Labs as visitors coming and going all through GE's years of tenancy.

"In a way, it's just like a homecoming," says Clyde R. Tipton, Jr., responsible for spearheading commercial diversification at Hanford for Battelle. In addition to Tipton and the head of Battelle Northwest, Sherwood Fawcett, only five Battelle employees have been injected into the labs' management staff, and none farther down the operations ladder.

II. Throwing off shackles

Hanford lab workers are aware that Battelle will make many changes, but they seem to welcome the challenge of the wider vistas that are opening up in commercial fields as well as basic research.

"There's no question," a GE local official admits, "that the technical people working for us under our contract with AEC have been restrained. Until very lately, Hanford has been a quiet place. And, because our work here was almost 100% for the commission, it was bound by all the reimbursement/patent restrictions of any government agency."

Sky's the limit. Under the precedent-setting "use permit" that is being worked out in detail for Battelle, researchers will be free to probe almost limitless possibilities.

In fields such as ceramics and nondestructive testing, Hanford is acknowledged to have research skills and ingenuity unmatched elsewhere in the free world. Under Battelle, much of this technology should find its way out into patentable, and profitable, commercial uses. The new management of Battelle Northwest says it intends to spin off production companies whenever it can.

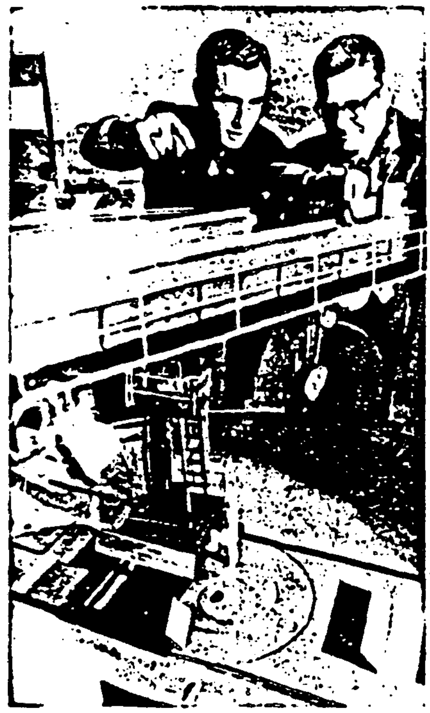
"You see here the most sophisticated gadgeteers in the world," says Tipton. "They have developed hundreds of gadgets for the complicated business of operating and controlling huge plutonium reactors—safely and with a fantastic degree of precision and control. There is, quite literally, no limit to the broad-scale commercial applications of such devices. From a complete reconstruction of the logging industry's operations and plywood production to medical electronics, this kind of R&D capability should be able to proliferate almost endlessly."

That's precisely what AEC wants—a flow of new commercial blood from its Hanford laboratories. In this way, the realignment of military requirements can be made to benefit the economy of the Northwest.

III. Full speed ahead

When AEC and Hanford's caretaker, GE, first started talking about "replacement planning" to make up for plutonium cutbacks at the plant, it was suggested that the research labs should go first, Seaborg recalls. And once this decision had been made, both parties agreed, it was most important to move swiftly with the plan for total segmentation and diversification.

"Nothing could have been worse than to have dragged this thing over a period of years," says Harry E. Parker, GE's manager of contractor replacement at Hanford. "People would have really been upset then, and the whole Hanford operation might have been jeopardized."



Two Battelle administrators who came to run Hanford labs are Clyde R. Tipton, Jr., and Ronald F. Dickerson.

Even before Battelle was selected to run the labs, beating out IIT Research Institute in the final decision, the first moves were made to find a contractor to take over the $196-million worth of chemical separation facilities at Hanford.

Reprocessing fuel. Hanford is a major point for processing the increasing quantities of spent and irradiated fuels that come from nuclear power plants and other users. It employs 1,500 men in recovering plutonium from these fuels in two barnlike, remote-controlled units called Redox and Purex (picture, page 58).

Prospective bidders for operation of Redox and Purex proved to be equally interested in AEC's plan to install a $9-million chemical separation stage to recover sought-after radioisotopes from the "impurities" in spent fuel. These impurities are now discarded as wastes.

In its final invitation to bidders, AEC therefore broadened its tender to include construction and operation of the new fission-product plant as well as operation of the existing processing facilities.

Bids opened. Three bids came in before the Oct. 30 deadline: one from Dow Chemical Co., one from Monsanto Chemical Co. and United Nuclear Corp., and a third from Martin Co. Div. of Martin Marietta Corp. in team with U. S. Rubber Co. AEC has promised to make its choice by New Year's Day, and Seaborg says he hopes to accomplish the transfer from GE to the new contractor by the middle of 1965.

"All bids for this sort of contract contain proprietary information," says a member of AEC's bid appraisal committee, explaining why details cannot be given out. "But, regardless of which company is finally named, our choice will be a good one."

All three bids reportedly are salted with proposals to build and operate an isotope packaging plant in the Tri-Cities area. This is welcomed by AEC. The radioisotope business is beginning to boom [BW Jun.13'64, p68], and a packaging plant, though not so diversified from nuclear business as AEC might like, should give the local economy a real boost.

Eager bidders. In addition, Martin and U. S. Rubber say they sweetened their bid with promise of an $8-million investment in the Hanford area. Monsanto and United Nuclear are known to want this part of the Hanford operation so keenly that they have agreed to withdraw another bid to operate the reactors if they can have the contract for the chemical processing. Civic leaders think that Dow, long bullish about major expansion in the Northwest, has the best chance to win.

"When you consider what the new contractors will be getting—a free ride on knowhow in a growing industry, with no capital investment except the time and salaries of a few management personnel," says James E. Travis, manager of AEC's Richland Operations Office, "it looks pretty good."

AEC has made no outright policy decision to lean toward bidders that haven't had a strong interest in the nuclear business until now, but it's clear that the choice of such contractors would be compatible with the commission's long-range aims of broadening the commercial nuclear industry's base.

IV. The biggest segment

"Where you will probably see this sort of consideration come into strong play," says an AEC oldtimer, "is when the new contractor is named for the operation of Hanford's $714-million worth of reactors." With the legacy of trained personnel from GE's present staff at Hanford, a company won't need to know much about nuclear technology to keep the reactors running.

AEC closed the bidding this month with eight names on the list: Aerojet-General Corp., Allis-Chalmers Mfg. Co., Douglas Aircraft Co., Inc., Kaiser Industries Corp., the team of Monsanto and United Nuclear, Thompson Ramo Wooldridge, Inc., U. S. Steel Corp., and Westinghouse Electric Corp.

Both the payroll of 3,000 men and the operating budget of nearly $30-million at Hanford's reactor and fuels operation will shrink when the three reactors close down early next year. But this known fact apparently didn't bother bidders.

"It must have cost each of the bidders close to $100,000 to prepare a final bid," says Harry Parker of GE. "You might think that would cut the list way down. But it hasn't."

Interest runs high. "I was optimistic from the beginning," says Parker, "that we had something here that the larger companies in the country would be interested in—a tremendous source of trained manpower and a chance to diversify without a costly company investment."

And that's how it has worked out. Roger Blough, chairman of U. S. Steel, says: "We are interested in getting the Hanford reactor operations contract for two reasons—to gain some firsthand knowledge of the construction materials requirements of the nuclear industry and to acquire knowledge about the utilization of nuclear power."

Says Dan A. Kimball, chairman of Aerojet-General: "We welded together our strongest companywide capabilities in proposing on the Hanford operation, because we think it is the greatest industrial opportunity today. Conditions are very favorable there for the conversion of advanced scientific ideas into industries that mean civilian jobs and economic growth. We want diversification, and the AEC has very wisely encouraged industry to come in with its ideas for doing precisely that."

AEC has promised to decide on its new reactor contractor by Mar. 1.

V. Taking graceful leave

If the big reactor contract can be transferred on schedule, GE can be substantially moved out of Hanford by the end of 1965. Wilfred E. Johnson, GE's general manager for Hanford atomic products operations, will stay to see the transition through, and 600 GE people will still be closely involved with starting the so-called N reactor due, before 1967, to start feeding 800,000 kw. into the Northwest power grid.

"GE has closed things down before, but never anything this big," says David W. Day, manager of the company's business planning and transfer office. "From the beginning, it was an extremely delicate job. GE's own management policy of decentralization made the split-up into segments somewhat easier. But this is not just a matter of reactors—it's a matter of 8,000 people."

As Day explains it, GE's position at Hanford became more embarrassing with every expansion of GE's own Atomic Power Equipment Dept. at San Jose, Calif., and the AEC decision to close some of the reactors brought things to a head. GE felt it wasn't in a position to push the diversification of Hanford to take up the slack. "So we decided to help the government make a change," Day says.

Showing the way. The transition isn't entirely free from snags, of course. Battelle has already run into minor difficulties in transferring insurance policies and pension rights of GE's lab personnel; new contracts will have to be threshed out with the Hanford Atomic Metal Trades Council, a council of 18-19 unions. Hanford will also have to lose its reputation for being purely a plutonium producer before diversification will come easily.

Even so, the trail-blazing aspects of the big move outweigh the inconveniences. AEC obviously already looks at its experiment as a model for dealing with other nuclear facilities if the need arises. Congress and the White House also are watching, with Defense Dept. procedures in mind. Industry generally applauds Seaborg's announced purpose of spreading AEC's amassed know-how as far and as fast as security policy will permit.

Even big labor is pointing to the Hanford experiment as a good example in contrast to the announced closing of 95 military installations by the Defense Dept. Spokesmen for the International Assn. of Machinists and the AFL-CIO Metal Trades Dept. complained bitterly of "failure of the Pentagon to follow the lead of the AEC, which has implemented a policy for easing the blow of cutbacks."

Different? Hanford's plant, technology, and importance to a local community may not be duplicated at, say, a naval shipyard or a missile plant. But Seaborg obviously sees some relationship.

"While the commission believes it has a unique responsibility at Hanford to the Richland community," Seaborg says, "the problems which are being faced there are not unlike those faced elsewhere from cutbacks due to defense shifts or technological change. I believe we are on the right track at Hanford in working to solve such problems." **End**

Johnson Goes Over A-Plans With Seaborg and Hornig

By GARNETT D. HORNER
Star Staff Writer

AUSTIN, Tex.—President Johnson concentrated on atomic energy programs for the new year in his consideration of budget problems today.

Glenn T. Seaborg, chairman of the Atomic Energy Commission, and Dr. Donald Hornig, the President's science adviser, flew to the LBJ Ranch to confer with the President.

Press Secretary George E. Reedy said the discussion would involve phases of the AEC prosion's budget for fiscal 1966.

Budget Bureau Director Kermit Gordon, who arrived at the ranch yesterday and remained overnight, joined in the talks.

Envoy to Bonn at Ranch

Johnson also gave particular attention today to West German problems after getting a generally encouraging report from Secretary of State Dean Rusk yesterday on developments around the world.

George McGhee, ambassador to West Germany, flew to the President's ranch home with Seaborg and Hornig for consultation on matters of concern in Bonn.

Johnson also continued work on his State of the Union message in which he will outline his 1965 program Monday night when he speaks to a joint session of the Senate and House and to the country via television at 9 p.m.

In addition, he still has several decisions to make that will determine whether his budget message to Congress later in January will call for spending more or less than $100 billion in the 1966 fiscal year starting next July 1.

Protocol Chief Selected

Out of his conference with Rusk yesterday came just one official announcement—selection of a 35-year-old former Johnson staff assistant, Lloyd Nelson Hand, a Los Angeles insurance executive, as chief of protocol to replace Angier Biddle Duke who is to get an important ambassadorial post abroad.

It was understood that in a year-end review of foreign policy problems Johnson and Rusk were chiefly concerned with Viet Nam and the Congo as the main sources of infection and danger to world peace.

Officials said Rusk reported a feeling that second thoughts are beginning to take hold to produce a possible trend toward moderation among hostile factions in South Viet Nam following the military purge of the high national council in Saigon.

This feeling was coupled with hope that signs of the unity American officials feel is a key to effective prosecution of the anti-Communist war in South Viet Nam may begin appearing within the next few days.

The very manifestations of disunity in Saigon during the last 10 days, these officials hope, may have had a sobering effect on military, Buddhist and other factional South Vietnamese leaders.

Hand Was Johnson Aide

Rusk was described as encouraged by the number of moderate African voices making themselves heard in recent days among the dissident clamor over the Congo.

But he is understood to have warned Johnson that most of the new African countries could go down the drain of Communist revolution — inspired chiefly by Red China — if the moderate voices do not prevail.

In announcing Duke's resignation as chief of protocol, the White House said he "will be assigned to an important ambassadorial' post shortly." But there was no hint as to what post it will be.

Hand, who has worked in Los Angeles as vice president of the Pierce National Life Insurance Co. since mid-1961, was an assistant on Johnson's staff when the President was Senate majority leader and vice president.

A native of Alton, Ill., Hand is a graduate of the University of Texas and of its law school. He was president of the student body in 1950-51. He took his law degree in 1957 after 42 months of service with the Navy in the Korean War.

He is married to the former Ann Donoghue of Houston, Tex. They have five children—Cathy, 12; Lloyd, 10; Susan, 8; Bridget, 7, and Lyndon, 4.

In a statement on the Duke-Hand shift, the President said:

"Ambassador Duke's service as chief of protocol since 1961 has been outstanding. Mrs. Johnson and I—as well as all of official Washington—will very much miss Angier and his charming wife, Robin."

Nuclear Future Beckons to U.S.

Only Change Is Certain

By Neal Stanford
Staff Correspondent of The Christian Science Monitor

Washington

What lies ahead in the field of nuclear energy as a new calendar year opens?

The two men probably best qualified to answer that question are:

Atomic Energy Commission chairman Glenn T. Seaborg and Rep. Chet Holifield (D) of California, a charter member of the joint Congressional Committee on Atomic Energy and its chairman for the coming session of Congress.

Here are some of their thoughts as the new year starts, expressed this past month in talks, interviews, and memoranda.

Uncertainty the Norm

Mr. Seaborg makes the provocative observation that probably the most startling developments in nuclear energy in the decade to come will be along lines and in fields not now predictable. The greatest certainty is the uncertainty of just what will develop.

But having said that, the AEC chairman is not unwilling to anticipate what may happen in the field of nuclear energy in the coming decade or so.

For one thing he predicts that nuclear power for naval and maritime ship propulsion will be "commonplace" by 1980. Mr. Seaborg forecasts that by that date—if not sooner—all ships in the United States Navy larger than destroyers will be nuclear-powered as old ships are replaced.

The reason is that the efficiency of nuclear reactors is being constantly improved. Also they are achieving life-of-the-ship reactor cores under direction of Admiral Hyman G. Rickover's naval reactors development program.

Marine Gains Seen

Nuclear power, combined with automation for ships and cargo handling, the AEC chairman says, will start a renaissance for the American maritime fleet, letting it achieve the prominence it held in world commerce in the '40's.

The demonstration nuclear ship NS Savannah, he is convinced, will have proven to everyone that nuclear-powered freighters and tankers can haul cargo at high sustained speeds over long distances at reduced per-ton operating costs.

Mr. Holifield thinks that one of the most important things that will happen—actually is happening—is that nuclear power will make itself economically competitive. This means that in the future nuclear power plants won't need government help and subsidies.

Costs Coming Down

This past year, he points out, two electric utilities announced plans for large central-station nuclear-power plants which, it was said, would not need direct government assistance. To make nuclear power competitive is, as the congressman puts it, "a tremendous achievement."

Both men see nuclear power plants as being used in the next 5 to 10 years for the desalting of water for domestic and industrial uses, in line with President Johnson's recent call for a more or less crash attack on this problem.

Mr. Seaborg sees, along with the desalting of sea water and brackish water to produce potable water and electricity, "a tremendous industrial and social growth" in areas of the country held back until now because of inadequate water supplies.

Both men see nuclear power

Associated Press

Glenn T. Seaborg
Chairman of AEC

Chet Holifield
Congressional atomic expert

as coming into its own in space exploration in the coming decade. Says Mr. Seaborg: "There is no comparable source of power capable of operating for months on end without regard to darkness, or orientation to the sun, or extreme temperature changes, or high levels of cosmic radiation."

Construction Use Likely

And he adds: "The most dramatic uses for nuclear power in space in the '80's will be in the manned lunar exploration and manned satellite programs." He is convinced that primary propulsion for post-Apollo space vehicles (requiring extended heavy payload) will be by nuclear rocket engines, following the Rover program, which staged its first successful ground firing this year.

Both men see the country's Plowshare program (development of peaceful uses for atomic energy) as making spectacular progress in the coming years. Nuclear explosives will be even cleaner than they are now. They will be used for crushing ore bodies, for developing and conserving water resources.

By 1980, the two men believe nuclear explosives should have been used in large-scale excavation projects, digging of canals and harbors and construction of roadways across mountains.

Both men see a new set of advanced nuclear reactors being developed. Mr. Holifield sees a high-gain breeder reactor (that produces as much fuel as it needs for its own use and also fuel for other reactors) as not far off.

These are far from all of the things in store for nuclear power in the coming years. This is but the beginning of the nuclear age.

Expectations are that there will be nuclear-powered bathyscaphes for ocean bottom exploration and mining the rich undersea mineral deposits. There will be pervasive effects of radioisotopes on medicine, agriculture, and industry in general, changing the complexion of the nation's life. There will be radiation preservation of foods and the radiation manufacture of chemicals and plastics.

A.E.C. Bids U.S. Consider Accord on Peaceful Blasts

By EVERT CLARK

Special to The New York Times

WASHINGTON, Jan. 5—The United States should begin now to consider international cooperation in the peaceful uses of nuclear explosives, Glenn T. Seaborg, chairman of the Atomic Energy Commission, told the Congress today.

This in turn might lead to modification of the nuclear test ban treaty, which would have to precede the use of nuclear devices to dig a sea-level replacement for the Panama Canal, A.E.C. officials said.

The 1963 treaty, signed by 106 nations, prohibits testing in the atmosphere or in space. It also prohibits any underground test that would produce radioactive debris beyond the boundaries of the country exploding the device.

A Severe Limitation

This would place particularly severe limitations on the use of nuclear devices in Panama or the other small Latin-American countries where the canal might be built.

Dr. Seaborg and others appeared before the Joint Congressional committee on Atomic Energy to report "very promising" progress in the nine-year-old program known as Plowshare and aimed at developing peaceful uses of nuclear explosives.

Noting that the Soviet Union appeared to be showing a genuine interest in this field, the officials indicated that the time might be ripe to begin efforts toward international cooperation.

Prior to the third International Conference on Atoms for Peace in Geneva last August, the Russians opposed the Plowshare explosions, calling them a subterfuge for weapons testing. The Russians expressed no opposition at that meeting, however.

Gain From Meeting Discerned

"Our opinion that there is international interest in Plowshare," said Dr. Seaborg, "was strengthened by the discussions on Plowshare and international cooperation in Plowshare which occurred in Geneva during the third International Conference on Atoms for Peace.

"We probably should begin to give serious consideration to some kind of international cooperation in Plowshare. This could either be in connection with the International Atomic Energy Agency or other appropriate international groups."

John S. Kelly and Gerald W. Johnson said delegates from Israel, India, France, Rumania, Australia and the United Arab Republic showed interest in specific nuclear excavation projects for their own countries. Mr. Kelly is director of the commission's division of Peaceful Nuclear Explosives. Mr. Johnson is associate director for Plowshare at the commission's Lawrence Radiation Laboratory in Livermore, Calif.

Seven major Plowshare experiments were conducted last year, Dr. Seaborg said. Although hundredfold progress was made in containing radioactive debris from underground explosions, much more work must be done, he said.

Five years of developing the necessary explosives and techniques for producing the explosives are needed before the construction of a sea-level canal can begin, he said. Even then, he added, the economics of the nuclear approach must be weighed against the cost of conventional construction.

Committee members expressed disappointment at this forecast and at what they considered to be slow progress in developing techniques for freeing oil and gas deposits through nuclear explosions.

Doubts Are Expressed

"The public has the idea that this canal is going to be built tomorrow with nuclear explosives," Senator Clinton P. Anderson, Democrat of New Mexico, said. "It's not, is it?"

He asked if Plowshare might be moving backward rather than forward.

The committee chairman, Senator John O. Pastore, Democrat of Rhode Island, said the potential for oil recovery and canal building had been "the whole spirit, impetus and initiative" of Plowshare.

If these projected uses should prove unfeasible, Mr. Pastore said, "I'm afraid your attendance will drop." "I would be one of those who would want to take a closer look at your budget," he added.

"I do not feel the future of nuclear explosives for excavation should depend that strongly on the canal," Dr. Seaborg replied. "In the whole history of the world that faces us, this is just one place of many places where, in the future, this technology could be used—if we solve the problems and if it is truly as much more economical as indicated."

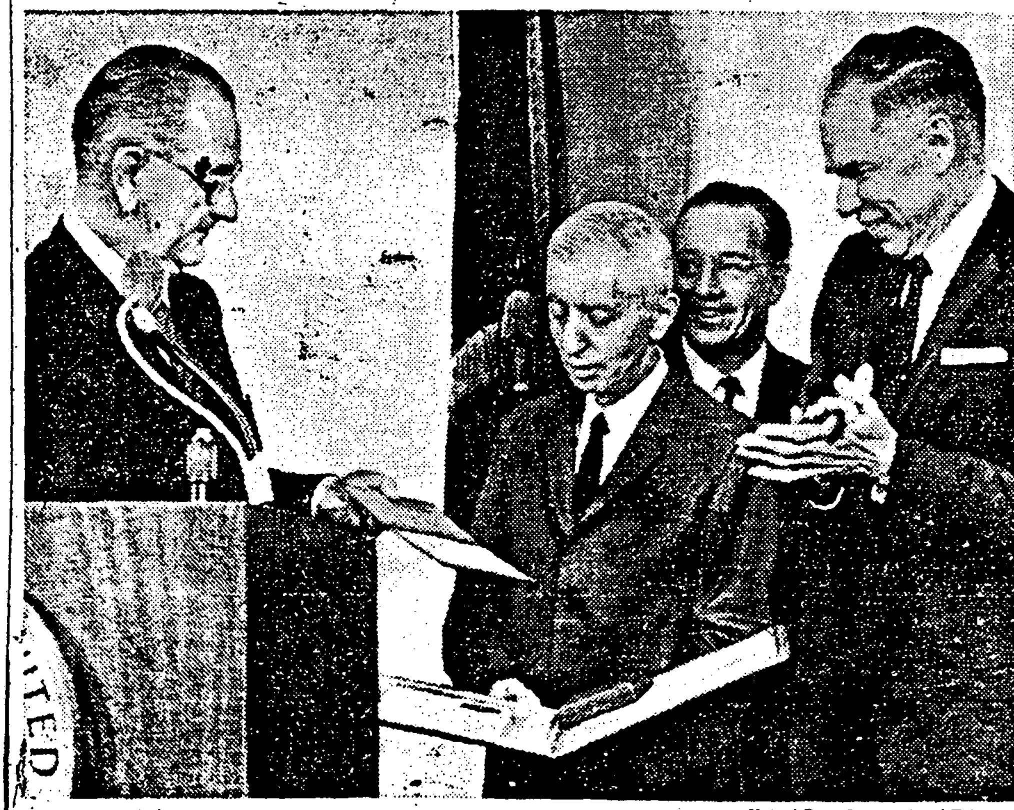
Mr. Johnson said the canal project was considered of vital importance. "As time has passed," he said, the project "has looked more favorable rather than less favorable."

Aside from excavation and oil recovery, the main peaceful use of underground explosions is the production of isotopes for research use. Dr. Seaborg reported "very exciting" results in this area.

"It is clear now that nuclear explosives can be used to produce new isotopes and even new elements," he said.

At least eight more Plowshare explosions are planned. Dr. Seaborg said the commission was ready to undertake with oil and gas companies a demonstration project to explore oil and gas recovery.

THE NEW YORK TIMES, FRIDAY, JANUARY 15, 1965.



United Press International Telephoto

HONORED AT WHITE HOUSE: Vice Adm. Hyman G. Rickover receiving the Enrico Fermi Award yesterday from President Johnson. Others are Dr. Glenn T. Seaborg, right, chairman of Atomic Energy Commission, and James T. Ramey, member of commission.

Rickover Receives the Fermi Atomic Award

Admiral Gets $25,000 Check And President's Praise for Work on Submarines

WASHINGTON, Jan. 14 — (UPI)—Vice Adm. Hyman G. Rickover, whose work led to development of the nuclear submarine, received the Government's highest atomic science award today.

President Johnson conferred the gold Enrico Fermi Medal on the admiral and presented him with a check for $25,000. He is the first nonscientist to win the award established 10 years ago in honor of the late Italian-born physicist.

Admiral Rickover, who will be 65 this month, is technically retired, but by common consent of the White House, Congress, the Navy and the Atomic Energy Commission he can continue for so long as he wants as the Navy's assistant chief for nuclear propulsion and the A.E.C.'s manager for naval reactors.

He was cited for "engineering and administrative leadership in the development of safe and reliable nuclear power and its successful application to our national security and economic needs." He is credited with convincing Congress and the Defense Department almost singlehandedly to start the nuclear submarine program.

President Johnson noted that the first atom-powered submarine, the Nautilus, made her maiden voyage just 10 years ago. Now the nuclear fleet includes 29 Polaris-firing submarines, 22 attack submarines and three surface vessels.

Mr. Johnson also praised Admiral Rickover's work in nuclear power plants for civilian purposes.

Seaborg Talks :f Gains In Synthetic Elements

By Howard Simons
Washington Post Staff Writer

The familiar periodic chart of chemical elements is about to be extended again.

Twenty years ago there were 95 known elements. Today there are 103, perhaps 104. Now, chemists are predicting the discovery of at least a half dozen new elements in the near future.

Indeed, the promise of discovery is so great that Atomic Energy Commission Chairman Glenn T. Seaborg says it has created "a renaissance in thinking" among chemists.

Seaborg shared the 1951 Nobel Prize in chemistry for his part in discovering the important man-made element, plutonium.

Disclosed by A-Test

Reason for the excitement and optimism was an underground nuclear blast set off in October by the AEC in its attempt to develop nuclear explosives for peaceful purposes.

Preliminary analysis of debris from the October experiment already has yielded isotopes of mass 257. There is evidence, too, that isotopes of mass 259 may be locked in the debris.

"Isotopes of mass 259," Seaborg told a congressional committee recently, "would be the heaviest yet produced by any means."

Creating new chemical elements with an atomic blast is not new. Elements 99 (einsteinium) and 100 (fermium) were first discovered a dozen years ago in the debris of America's first H-bomb test.

But what is new is the promise that nuclear devices can be fashioned especially to create new elements in underground atomic chemical factories.

Numbering Explained

"Only a modest improvement in neutron flux accompanied by use of a heavier target such as plutonium, curium or californium," Seaborg said, "could lead to creation of isotopes with masses greater than 270 and atomic numbers greater than 103."

The atomic number is the proton population in the heart of an element. Thus, hydrogen with one proton bears atomic number 1. All elements, except for hydrogen, also harbor neutrons or neutral particles in their nuclei. Atomic mass is the sum of an element's protons and neutrons.

"The general procedure for creating a new heavy element," explained Seaborg and his colleague Arnold R. Fritsch, "is to add one or more protons or neutrons to an element's existing nucleus." Protons can be added by driving them into the heart of an element with a particle accelerator. Neutrons can be added in a like manner using nuclear reactors or nuclear explosions.

Particle accelerators and atomic reactors have been used to create all except two of the 11 transuranium or man-made elements created since neptunium (element 93) was first manufactured. Now chemists may be reaching the limit whereby these two methods can be used to create new elements.

What is needed is a way to add a lot of neutrons to an element in double quick time. And the best bet for this is a nuclear explosion — a fact recognized here and in the Soviet Union.

Essentially what happens is this:

An atomic device rich in transuranium targets such as plutonium or californium is put together and detonated. Subjected to a flood of neutrons, the transuranium targets transmute to become something else.

Salt Preferable

The new isotopes or elements thus formed are locked into the surrounding geology as a consequence of the nuclear explosion. Preferable geology in this case is salt for the simple reason that it is easier to melt and dissolve salt than rock.

Prompt samplers can be used to fish element-containing debris from the underground test site and immediately subject it to chemical separation techniques. In time, when it is safe to do so, more elaborate recovery takes place with deep drills.

This is the way chemists hope to create and recover the new transuranium elements they have already blocked out on the classical periodic chart of chemical elements. All transuranium elements, in effect, are synthetic. All are radioactive. And most have fleeting lifetimes. Elements 104, for example, which may or may not have been created by the Russians, has a half-life of three-tenths of a second which doesn't allow much time for chemical analysis.

Until very recently, it was generally agreed that the new, still-to-be-discovered elements predicted by Seaborg and others would have lifetimes so short they would hinder their discovery.

There is now the tantalizing possibility that a yet-to-be-made isotope with atomic mass 300 and atomic number 126 will be comparatively stable.

Position Suggested

What will the new elements be like? Seaborg has suggested how they will fit into the periodic chart. The undiscovered element 108, for example, should resemble osmium (element 76) which is the densest or heaviest form of matter on earth. Element 110 should resemble gold and 111 mercury.

To what use might the new elements be put? Though the chemists are reluctant to guess, they do point to the uses made of other laboratory-produced transuranium elements such as plutonium for weapons and atomic power and curium for powering equipment aboard space satellites.

But whether there is a practical use for the new elements, Seaborg notes further that each such element tells chemists more and more about nuclear and atomic structure; more about what matters.

CHICAGO SUN-TIMES, Sat., Feb. 6, 1965

Glenn T. Seaborg, chairman of the Atomic Energy Commission, addresses the Executives Club of Chicago. (Sun-Times Photo)

Atom Know-How Spreading, AEC Chairman Warns

It is no longer possible to restrict the spread of nuclear technology in the world, Glenn T. Seaborg, U.S. Atomic Energy Commission chairman, told the Executives Club Friday.

Man's hope of safety for the future is international control of atomic energy as well as the test ban and nuclear arms control, he said.

The Nobel Prize-winning chemist spoke at a luncheon meeting in the Sherman House.

"There were many who felt in the early days, as some feel today, that we could somehow hold back the hands of time—arrest scientific progress—and not co-operate with other countries in providing this nuclear technology," he said. "But science can not for long be kept under lock and key."

Los Angeles Times
THURS., MAR. 4, 1965—Part I

Fight Over A-Smasher Developing

Californians Quiz Chairman of AEC; Berkeley Wants It

BY ROBERT C. TOTH
Times National Science Correspondent

WASHINGTON — Evidence of tattling scientists was heard Tuesday at a hearing called by a congressional subcommittee to discuss the strange world of nuclear physics.

The Joint Committee on Atomic Energy wanted a justification of the Atomic Energy Commission's proposed new $6 billion, 15-year program for high energy physics research.

Included in that program is a $280 million atom-smasher whose great power (200 billion electron volts) would be six times greater than the largest accelerator working today.

Most physicists want the machine for their areas, and the internecine fight developing over its location surfaced at the hearing as AEC Chairman Glenn T. Seaborg finished his opening statement.

Californians Ask Why

He was immediately asked by two California representatives, committee Chairman Chet Holifield and ranking Republican member Craig Hosmer, to explain why 24 university presidents were called to an unpublicized meeting here last month to discuss the new atom-smasher.

Physicists at the University of California at Berkeley long had expected that the machine would be built near there, and they saw in the meeting danger that they were being cut out, even though their university president, Clark Kerr, attended.

So they told the California congressmen about it, and the congressmen put some seemingly hostile questions to Seaborg on the subject.

"What competence do these university presidents have in this field? Why should they be equipped to consider a site for the machine?" Holifield asked.

Brought for Discussions

Seaborg explained that, with the advice of their physicists, the university heads were brought together through the National Academy of Sciences to discuss schemes for the administration and management of the new atom-smasher.

The AEC is considering the possibility of giving the management contract to a consortium of universities, much as it contracts with Associated Universities, a group of Eastern schools, to run the Brookhaven National Laboratory on Long Island.

The fear of Berkeley scientists that they will not get the machine was heightened by the meeting of the university chiefs, but it probably has its roots in the AEC's program which was announced last week.

The plan for the 200 BEV machine leaves unspecified the machine's location. In contrast, earlier reports to the AEC from expert advisers had recommended Berkeley as the site.

Hard Fight Planned

By initiating an attack on the meeting, the Berkeley physicists indicated they intend to fight hard for the atom-smasher which, under an AEC grant, they are designing.

As if in comic relief to this all-too-real work of science and politics, there later emerged "quarks" from the elusive regions of the nucleus and the curious land of James Joyce's "Finnegan's Wake."

Dr. Murray Gell-Man, the brilliant Caltech physicist who is something of a nuclear Mort Sahl, told the congressmen that the purpose of atom-smashers is to learn more about the fundamental particles and forces of nature.

He has theorized, with supporting evidence, that none of the known particles of today are truly fundamental. All are manifestations of three particles, which he named quarks and which he believes will never be found since they are only mathematical concepts.

Why call them quarks? he was asked.

It seems that in reading "Finnegan's Wake," he was struck by the word. It was part of the cry of the bartender when, as Gell-Man read it, the character emerged periodically from his sleep-like fantasies. He said, "Three quarks for Mr. Mark."

Since bartenders normally deal with pints and quarts of beer, and in waking up, one might normally say "hark," Gell-Man reasoned that the combination of quart and hark came out quark.

Well, anyway, he liked the word enough to name his mathematical particles quarks, he explained.

But before he could go further, the committee escaped to answer a quorum call on the House floor.

THE MACHINIST March 11, 1965

Stockpile atomic skills?

Seaborg

The men who guide the nation's atomic energy program are looking for ways to keep intact the USA's force of skilled nuclear craftsmen, particularly machinists.

Official concern about the dispersal of atomic skills was voiced during a recent public hearing by the Joint Congressional Committee on Atomic Energy.

Chairman Glenn Seaborg of the Atomic Energy Commission was testifying about the planned cutback in production of atomic weapons. He explained that the cutback will make it necessary to lay off 1,000 employees at Oak Ridge, Tenn.

U.S. Sen. Albert Gore of Tennessee, a ranking member of the committee, expressed concern about "the personal tragedies and the economic consequences" of so many layoffs in a brief one-year period. He pleaded that "such a concentration of sophisticated skills as is in existence at Oak Ridge" be kept intact.

"At Oak Ridge," Sen. Gore added, "there is a combination of scientific skills that can hardly be duplicated any other place in the world."

Dr. Seaborg, a Nobel Prize-winning chemist, agreed, but pointed out that very few scientists and engineers would be laid off, he told the committee. The layoff victims, he explained, would be "mainly production workers, machinists."

This exchange followed:

Senator Gore. These are very skilled people.

Dr. Seaborg. That I concede.

Senator Gore. This requires sophisticated engineering capacity and precise technical skills?

Dr. Seaborg. Yes. The bulk are machinists, though exceedingly able and clever machinists.

Senator Gore. Unfortunately, I am not an engineer but I believe an extremely talented machinist can deal in fabrication of weapons with the tolerance of a millionth of an inch.

Dr. Seaborg. I don't disagree with that. My father was a machinist, my grandfather was a machinist, and my great grandfather was a machinist.

Senator Gore. Do you carry a union card?

Dr. Seaborg. No. I am the black sheep of the family. I don't have any abilities along those lines or I might have tried it. . . .

Dr. Seaborg told the committee that the Atomic Energy Commission is making a serious effort to bring work from other government agencies into Oak Ridge and also to help Oak Ridge employees locate other jobs before they are actually laid off.

WASHINGTON POST MARCH 11, 1965

Upgrading Arts and Letters

The Administration has spoken out on the subject of Federal aid to the arts as President Johnson said it would in his State of the Union message. Further, the President has embraced the humanities as well in a bill that would establish a National Foundation on the Arts and the Humanities and endow it with up to $20 million a year.

This is a big jump from the timid beginning in the last Congress, which created a Federal Council on the Arts. But it is not a new idea nor an Executive innovation. Bills to aid the arts have been introduced annually and an impressive number of Representatives became co-sponsors of Rep. William S. Moorhead's bill to create a National Humanities Foundation.

The concept of a combined foundation brought impressive support from the academic community at recently concluded Senate hearings on the spate of arts and humanities bills introduced this session. One reason stressed by witness after witness was that such legislation is needed to right the imbalance that has occurred in this country between the humanities and the sciences. A scientist, Glenn T. Seaborg, chairman of the Atomic Energy Commission, spoke of "an imbalance in our national personality" and said a foundation would "help refocus our attention on those values which serve to guide society—physically, socially and spiritually." This is an overriding consideration. Private funds cannot be solicited at a rate to compete with government programs and a recent Rockefeller panel report shows that culture attracts a very small percentage of corporation and foundation dollars.

Nonetheless, the bugaboo of Federal control remains dangerously alive. Ten per cent of the Federal Theater Project plays produced during depression years were subjected to criticism in Congress. Although this bill contains a specific disclaimer of Federal intervention and although government support of the arts has worked well in England and other European countries, there will be problems: immediately, because Federal control could well lead to encouragement of the medicore and the innocuous; in the long run, because the Foundation will give the government new influence in the world of ideas, where criticism of government must form. Proponents of Federal aid point with pride to the massive Federal science projects, yet they have caused discontent on college campuses, which in some cases has led to an outright refusal to participate in them.

As to the bill itself, it contains the best features of bills introduced by Sen. Claiborne Pell and Rep. John E. Fogarty. The concept of separate branches for the arts and humanities, equally funded and under directors appointed by the President, is sound. The 24-member advisory committees for each branch should provide a forum for debate and dissent, while coordination with other Federal programs has been assured in the parent Federal Council on the Arts and Humanities.

There are several improvements Congress might make, however. The individual states should be encouraged to take a major part in the program and their role should be spelled out more clearly. Continuing funds at no less than the initial level should be guaranteed to prevent yearly harassment of the program in Congress. The bill should indicate that the purpose of the foundation is to encourage higher standards in the arts, not just a wider proliferation of them.

Furthermore, if the Administration really intends to help arts and letters in this country, it should not give with one hand while still taking away with the other. Bills to remove the Federal excise tax on theater tickets and on musical instruments should be passed at once and liberalized revision of copyright law should be given priority.

Eventually our civilization will be judged, as have civilizations before ours, on its cultural creation. Many feel artists should create by themselves and of themselves. Yet this bill, in the words of the Rockefeller Report, sets out to prove there is "no incompatibility between democracy and high artistic standards."

WASHINGTON POST, April 5, 1965

Orbiting A-Reactor Operates Successfully

VANDERBERG AIR FORCE BASE, Calif., April 4 (UPI) America's first nuclear power plant for space vehicles passed its initial test today, generating 580 watts of power on radio command while in orbit around earth.

Dr. Glenn T. Seaborg, Chairman of the Atomic Energy Commission, described the launching of the SNAP 10A space vehicle and the successful operation of its nuclear reactor as a "significant advance in this space and atomic energy program."

SNAP, which stands for Systems for Nuclear Auxiliary Power, was launched from Vanderberg yesterday and placed in an orbit circling earth every 112 minutes.

The atomic power system was designed for future space missions to distant planets. It would supply electrical energy for an Air Force ion engine able to propel future space vehicles to such planets as Jupiter at 100,000 miles an hour.

An Atlas-Agena rocket lifted the SNAP 10A into orbit. About four hours later, a radio signal was transmitted from earth to start up the nuclear reactor in space. At 4:45 a.m. (EST) today the reactor reached full power of 580 watts.

EAST CAROLINIAN, East Carolina College, Greenville, North Carolina
April 14, 1965

Nobel Prize-Winner Seaborg Lecture Tonight At 8:00

Dr. Glenn T. Seaborg, the Nobel Prize-winning Chairman of the Atmoic Energy Commission, visits EC campus today.

The Nobel Prize-Winning Chairman of the Atomic Energy Commission, Dr. Glenn T. Seaborg, is on the East Carolina campus today for a six-hour visit.

Dr. Seaborg will arrive at the Greenville Airport at 3:30 p.m. today. At 4 p.m. he will conduct a news conference in Flanagan 209 for students and faculty members.

A dinner with college officials is scheduled for 6 p.m. at the Greenville Country Club.

A lecture tonight at 8:00 pm in Austin Auditorium will highlight the visit of the first Nobel Prize-winner to the campus.

A limited number of tickets are available for the lecture in the Central Ticket Office at $2 each. Students and facult will be admitted free of charge.

Dr. Seaborg was awarded the Nobel Prze for Chemistry in 1951 along with his colleague at the University of California.

The noted scientist is credited with the co-discovery of plutonium in 1944. He has since aided in the discovery of nine other elements and 100 isotopes.

Instrumental in the formulation of the Nuclear Test Ban Treaty, Dr. Seaborg was a member of the delegation sent to Moscow in 1963 for the formal signing.

In 1961, he was appointed chairman of the AEC and is presently serving a five-year term.

Students are urged to attend the news conference and lecture today.

12 Thursday, April 22, 1965 FH
THE SAN FRANCISCO CHRONICLE

Seaborg Reports on A-Energy in Peace

GLENN SEABORG
Progress on two fronts

By David Perlman
Science Correspondent

The atom in space and the atom underground are spurring two of America's most successful nuclear programs, Dr. Glenn Seaborg reported here yesterday.

For the competitive, who like to Beat The Russians, America's progress in both fields is both impressive and dominant, Seaborg said.

And for those whose standards of achievement are more basic, the progress promises immense returns both in scientific knowledge and practical benefits.

SPEECH

Dr. Seaborg, chairman of the Atomic Energy Commission and Nobel laureate in chemistry, came to San Francisco yesterday to speak before the newly formed Chemical Industry Council of Northern California.

At a press conference before his luncheon speech at the Mark Hopkins Hotel, Dr. Seaborg reviewed some recent atomic successes in optimistic terms.

Yesterday morning, he said, he visited the Air Force Satellite Control Center at Sunnyvale and watched produly while engineers tracked the new satellite that carries SNAP 10-A, the world's first orbiting nuclear reactor.

The reactor is operating prefectly, Dr. Seaborg said; it is developing its full design power of 500 watts, and its command system from the ground is flawless.

Dr. Seaborg reported that America's development of nuclear-powered rockets for propulsion to the planets is also moving forward swiftly, toward a manned interplanetary mission by the late 1980s.

RUSSIA

As for Soviet progress in nuclear propulsion and in nuclear electric power for use aboard spacecraft, Dr. Seaborg said:

"I'm quite sure the Soviets are mounting a huge effort in both these areas, but we are obviously far ahead of them, both in ground tests and in space prototypes. The Soviet Union has no reactors in orbit."

Dr. Seaborg said the Russians are also lagging behind America in developing nuclear explosives for such peacetime applications as mining and excavating.

Within four to five years, Dr. Seaborg said, the United States will have developed an advanced nuclear technology effective enough to blast a full-scale canal across the Isthmus of Panama at a fraction of the cost of conventional explosives, and with minimal radioactive fallout.

TREATY

The Russians have now become intensely interested in the program, Seaborg said and he is optimistic that their interest will prod them to agree on the amendments that would be needed in the current nuclear test ban treaty in order to build a canal using nuclear blasting.

Dr. Seaborg commented briefly yesterday on a report by Governor Brown that the California power reactor planned as part of the State's water program is running into technical snags.

Design studies have shown that the proposed reactor's fuel elements would not last for the full nine years that would be required to assure economical operation, Dr. Seaborg explained.

"But I don't regard this as a surprising problem," he said. "The reactor is technically sound, and the difficulty can be overcome. It's the kind of problem we in the AEC are encountering and overcoming all the time."

Leontyne's Big Night at White House

Washington

Leontyne Price not only made her White House singing debut, she danced with the President and was awarded the medal of freedom on stage in the east ballroom.

It was all "a wonderful honor" as far as the Negro opera star was concerned and "a great thrill."

As for the President's dancing, she told inquiring reporters "he's quite light on his feet—quite gallant.

Miss Price was invited to sing Tuesday night at a state dinner in honor of visiting Italian Prime Minister Aldo Moro.

Associated Press

Oakland Tribune, April 27, 1965

The Seaborgs: Eight Californians In Washington

By NANCY SHARP

Washington, D.C.

"It's like living with your window on the world," is the way Mrs. Glenn T. Seaborg described her life in Washington, during a morning interview in a comfortably luxurious lounge of the city's exclusive Cosmos Club.

In general, however, the wife of the chairman of the Atomic Energy Commission finds her role less demanding now than during the years 1958 - 1961) her husband

World of Women

Oakland Tribune
Tues., April 27, 1965 31

served as chancellor on the University of California's Berkeley campus.

"I do less here," explained the slim gray-haired mother of six, "although what I do requires more effort."

Life is much easier in California, she feels.

"I USED TO think it was just me, but finally I got up courage to ask other women here how they felt and I found that they all agreed with me. I think it is probably because Washington is very nearly a Southern city. Most people don't realize it, but it is."

Although the Seaborgs now feel at home in Washington (the younget member of the family, kindergarten-age Dianne, has lived almost her entire life in the nation's capitol) they like the idea, Mrs. Seaborg said, of "coming home to California and our Lafayette home."

"The hardest part is not being with our California friends."

DR. SEABORG has been back to the Bay Area on several official trips in the four years since he accepted the A.E.C. chairmanship, but it has been three years since his wife has been on the West Coast.

In the family — in addition to Mr. and Mrs. Seaborg and Dianne — are Peter (a freshman this year at Harvard), Lynne, David, Stephen and Eric.

Highlights of her residence in Washington thus far, Mrs. Seaborg said, have been her attendance with her husband at three events:

—the session of Congress at which Col. John Glenn was honored after his space flight.

—the White House dinner hosted by President and Mrs. Kennedy in 1962 for Nobel Prize winners.

—the White House lawn party given this past summer by President and Mrs. Johnson for members of Congress.

THE LAWN gathering, Mrs. Seaborg said, was very festive. A band played old campaign songs, which were recorded and the recordings presented as souvenirs to the guests.

Washington entertaining, she said, varies considerably from season to season. It is at a peak when Congress is in session. The summer, on the other hand, is very quiet.

"THERE ARE always lots of receptions, especially at the embassies. And I'm always away from home for several meals a week."

There is great freedom in the ways in which persons entertain in Washington, she said, the manner usually depending on what best suits living conditions.

"I do feel, though, there has been a trend toward events requiring long dresses."

Mrs. Seaborg finds she needs many more long dresses in Washington than she did in California.

WHEN SHE and her husband entertain at home (and she much prefers to entertain there), it is usually at buffet supper, a service she considers most suited to their five-bedroom split level home in Northwest Washington.

For entertaining large

Fabian Bachrach photo

ATOMIC ENERGY COMMISSION CHAIRMAN AND MRS. GLENN T. SEABORG . . . with Lynne, Dianne, Peter, David and in foreground, Stephen and Eric

groups, they often use hotel facilities or rooms at the National Academy of Sciences.

"There is always some dignitary from the world of science visiting in Washington," she said.

Those not accompanied by their wives are often entertained by her husband alone, she said.

ASIDE FROM her official duties, Mrs. Seaborg has become quite involved with organizations revolving around the Washington school system.

She also is an active member of International Neighbors Club (an organization of wives whose husbands represent a variety of professional groups) and Independent Agency Wives Club (whose members are wives of Presidential appointees and women who are appointees themselves.

Through the neighbors group she has been able to tour Washington spots — including Blair House — usually "off limits" to visitors.

Although not a scientist herself, Mrs. Seaborg tries to keep up with her husband's work. She reads all his speeches. "Of course, there is much I cannot know because it's classified," she said.

AT ONE POINT in her life, however, she did carry out a scientific project.

It was when they were newlyweds in Chicago during World War II.

"My husband needed someone to keep the table of radioactive elements," she recalled. "He couldn't find anyone to do it, so he sent me back to college to take chemistry and handed over the job to me."

And it was in a scientific setting — Lawrence Radiation Laboratory in Berkeley —that Mrs. Seaborg met her husband.

An English major at U.C. from Santa Ana, she was working there as a part-time secretary for Dr. Ernest O. Lawrence.

Nancy Sharp, World of Women feature writer, has taken leave of absence from The Tribune and is now in Washington, D.C.

She is sending back first-hand reports on the Washington scene, with emphasis on news and personalities of special interest to readers of The Tribune.

This story is the first of several profiles of prominent women, to include local women who are now in the nation's capitol as well as nationally known figures.

Glen T. Seaborg

Wide Use Of A-Power Predicted

BY JEAN PEARSON
Free Press Staff Writer

There's no nuclear-powered automobile in your forseeable future, Dr. Glenn T. Seaborg said Monday, but by the turn of the century at least half of all electric power generated in the world will come from nuclear energy.

Seaborg, chairman of the U.S. Atomic Energy Commission, Nobel prize-winning chemist and native Michigander, spoke at the Economic Club of Detroit's Red Cross and Wolverine Frontiersmen luncheon at Cobo Hall on "The Atom's Power for Peace."

USE OF NUCLEAR energy to produce power in nations around the world presents both great economic promise and a grave nuclear weapons problem, Seaborg said.

This is because most nuclear power reactors under construction today also product plutonium — a fissionable material suitable for use in nuclear weapons.

CONSEQUENTLY, the supply of U.S. nuclear fuel or U.S. nuclear reactors abroad takes place only when the other nation has signed an agreement for co-operation.

"These agreements contain solemn guarantees by the recipient government that material or equipment it receives, and any resulting fissionable material which it produces, will be used exclusively for peaceful purposes," Dr. Seaborg explained.

Inspections are performed by an international organization of 91 nations with headquarters in Vienna.

"It is important that the world at large be satisfied that the ostensibly peaceful nuclear assistance provided by us is not being used for military purposes," Seaborg said.

"We must face the fact that in many countries, an assurance based on American inspection alone would not be acceptable."

The United States' policy of helping nations develop nuclear power, he said, was based on the realization that the spread of nuclear weapons would not be prevented by a policy of withholding our aid from friendly nations.

For one thing, he said, we knew a number of nations could achieve it independently.

"We also realized that if we failed to co-operate . . . there would be other countries . . . willing to provide nuclear materials and technology without a firm assurance as to their eventual peaceful end use," Seaborg added.

Palo Alto Times
AN INDEPENDENT NEWSPAPER
PALO ALTO, CALIFORNIA, FRIDAY, JUNE 11, 1965 — 10c Copy—$2.00 Month

WEATHER
Fair through Saturday. Slightly cooler. High, 68 to 73; low, 45 to 50. Afternoon wind, 10 to 17 m.p.h. High in Palo Alto Thursday, 72; low this morning, 54; Barometer at 8 a.m. today, 29.93 Humidity at 1 p.m. today, 69 per cent. More weather data on page 4.

AEC seeking dea on Woodside lines

Cost sharing major block

By RON GOBEN

The mighty Atomic Energy Commission is attempting to reach a compromise with Woodside over the controversial overhead power line into the Stanford Linear Accelerator Center, AEC Chairman Glenn Seaborg said today.

But regardless of what decision is reached about the power lines, congressional legislation to bypass a court ruling favoring Woodside in the long dispute must be passed to insure the future of the AEC programs, Dr. Seaborg said in a news conference at the accelerator site on Sand Hill Road west of Santa Cruz Avenue.

He was strongly supported by Rep. Chet Holifield, D-Calif., chairman of the Joint Committee on Atomic Energy, who said at the conference that the Court of Appeals decision May 20 "has far-reaching implications which go to the very heart of the AEC's entire program."

Regarding the compromise on power lines, Seaborg indicated the major stumbling block was the lack of a "firm offer" of $150,000 Woodside has agreed to contribute, to place the power line underground.

He said putting the line underground would constitute a "great sacrifice" to the government because such a project is "technologically not really sensible now."

However, he added, the AEC was willing to make the sacrifice in the interest of aesthetics if "we can work out some sort of cost-sharing."

Seaborg said he met this morning with representatives of Woodside and San Mateo County to discuss possible compromises.

The county and Stanford University would also be involved in any compromise on the power line controversy, he indicated.

COUNTY BARRED

He said he understood the county could not legally contribute money toward placing the lines underground, but that it could place underground lines now strung from poles in the hillside area where the AEC has intended to put up 11 poles.

Seaborg said it would be "embarrassing" to the AEC to be forced to put lines underground when overhead lines were strung in the same area.

Stanford's position in the matter was outlined by Dr. Frederick E. Terman, vice president and provost. He said the university trustees had taken the position that funds used for endowments and tuition could not be spent for underground wiring.

The legislation now before Congress, Seaborg said, was "not the suggestion of the AEC" and is needed "quite apart from the Stanford Linear Accelerator Center to carry out the operation throughout the country."

Rep. Holifield said that if the interpretation of the Appeals Court ruling on the Atomic Energy Act "became binding generally, major adverse consequences throughout the entire AEC program could result."

He said that if local governments could overrule activities of the AEC, it would place an "intolerable burden" on the agency and would deny to the AEC "powers available to every other federal agency."

The congressman said it would cost $2,770,000 to place the SLAC power lines underground, as compared with $668,000 for normal power poles and $1,052,000 for shorter, more attractive poles that Seaborg said the AEC had agreed to construct.

By RON GOBEN

In addition, he said, it would be necessary to construct another underground line by 1971 at a cost of $2,640,000, making the total for underground lines $4,358,000 more than the modified overhead poles the AEC is willing to erect.

Seaborg said that a failure in the underground wires could cause a delay of as much as a month in work at the accelerator center while repairs were made, while it would take only a few hours to repair overhead failures.

He said he believed that in the future he expects it will become "technically feasible" to put high-voltage wires underground, but that problems involved with such wiring at present are immense.

High-powered visitors
Dr. Glenn Seaborg, left, and Rep. Chet Holifield discuss the power pole controversy at the Stanford Linear Accelerator Center.

Oakland Tribune 6/12/65

Contract Let for U.C. Science Hall

BERKELEY — A $4.4 million contract has been awarded for building what will become the Bay Area's most prominent man-made landmark—the University of California's Lawrence Hall of Science.

Dr. Glenn T. Seaborg, chairman of the United States Atomic Energy Commission and former Berkeley chancellor, will be the speaker at groundbreaking ceremonies June 12.

Carl W. Olsen and Sons, a San Mateo contracting firm, is in charge of building the circular structure on top of La Vista del Cerro, in the Eastbay Hills. It will be visible around the Bay.

The center is for training high school science teachers and to popularize science studies. It is to be named in honor of the late Dr. Ernest O. Lawrence, inventor of the cyclotron, and the first Californian to win the Nobel Prize.

Seaborg, who will speak at the time of graduation ceremonies at Berkeley, had made the suggestion seven years ago, which led to planning of the center. Seaborg, who said he was alarmed at the need for improved science training in this country, suggested that U. C. had a chance to inspire young people with an interest in and understanding of science.

The project was approved by the regents in 1959. It has since been endorsed by leading scientists from many parts of the nation. The design for the building is by the San Francisco firm of Anshen and Allen, winners of an architectural competition.

Total cost of the project is expected to be $5.86 million. Financing is entirely through private capital. The regents have provided $4 million from the Lawrence Memorial Fund. The rest is being sought from foundations, corporations and individuals.

The major part of the building will be for science education research. On three levels beneath a broad plaza will be teaching laboratories, teacher training studios, a 300-seat auditorium and workshops in metals, woods and electronics.

There will be a science library and information center, and two museum rooms. Later, plans call for construction of a second, larger auditorium, planetary space hall and six more museum rooms.

Construction of the first building is scheduled for completion by mid-1967. The current proj-

SAN FRANCISCO CHRONICLE June 12, 1965

Seaborg's Views on A-Weapons

GLENN SEABORG
Inspection necessary

Only a world-wide system of nuclear arms control—with inspection—can prevent more nations from duplicating Red China's development of the atom bomb, Glenn Seaborg warned yesterday.

The Nobel Laureate chemist, who is chairman of the Atomic Energy Commission, discussed problems of nuclear war and peace in an address to the Commonwealth Club.

The talk was part of a busy weekend schedule. Seaborg also discussed power poles and atomic research at Stanford yesterday morning, and delivered the commencement address at American River Junior College in Sacramento last night.

Today he participates in commencement ceremonies at the University of California, where he was Chancellor from 1958 to 1961, and helps break ground for the new Lawrence Hall of Science on the campus.

FACILITIES

In his talk on arms control, Seaborg hailed the work of the International Atomic Energy Agency, which inspects nuclear fuel production facilities in many countries to make sure they aren't being used to make bomb materials.

"It is the first program of international inspection in the arms limitation field to be put into actual operation," he said, and it operates "with the full blessing and encouragement" of both the United States and the Soviet Union.

"Except for the limited test ban treaty," Seaborg said, "there are few more important steps being taken to preserve international peace and security."

DANGER

But the next step, he said, must be the creation and enforcement of a "comprehensive program of arms control and disarmament." China's recent nuclear weapons tests "have shown us all that there is still a way to go," Seaborg said.

Other nations now developing nuclear technology can also produce weapons, he said, vastly increasing the danger of nuclear war.

He praised "the wisdom of India's leaders and people" for refusing to use nuclear plants for anything but peaceful purposes.

Plutonium Process Is PATENTED

Seaborg's Method Was Filed in 1945

By STACY V. JONES
Special to The New York Times

WASHINGTON, June 25—The first patent for the production and separation of plutonium was granted this week to Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission, and two co-inventors.

The patent is regarded as historic; plutonium was the first synthetic element to be seen by man. The world learned of its existence through the nuclear bomb dropped on Nagasaki slightly less than 20 years ago—on Aug. 9, 1945.

Patents of the Week

Dr. Seaborg once remarked, "no other fundamental scientific discovery exploded in man's face as this one did."

The patent application was filed in December, 1945. For more than a decade it was kept secret, and then became involved in lengthy Patent Office auctions.

Patent 3,190,804, which is assigned to the A.E.C., was granted to Dr. Seaborg, the late Dr. Joseph W. Kennedy, and Dr. Arthur C. Wahl of St. Louis.

The patented procedure includes treatment of uranium in a reactor to produce plutonium and to separate and recover the plutonium by a method called oxidation reduction. The basic production process is still in use, but other ways of separation have been developed.

Plutonium itself, or element 94, is not covered by the patent, presumably because it was disclosed in technical papers. Last year, Dr. Seaborg patented americium and curium, probably the only elements for which patents may ever be granted.

The isotope plutonium-239 was recognized in 1941 as fissionable and as usable in a nuclear weapon. The first bomb dropped, that released over Hiroshima Aug. 6, 1945, was a uranium bomb.

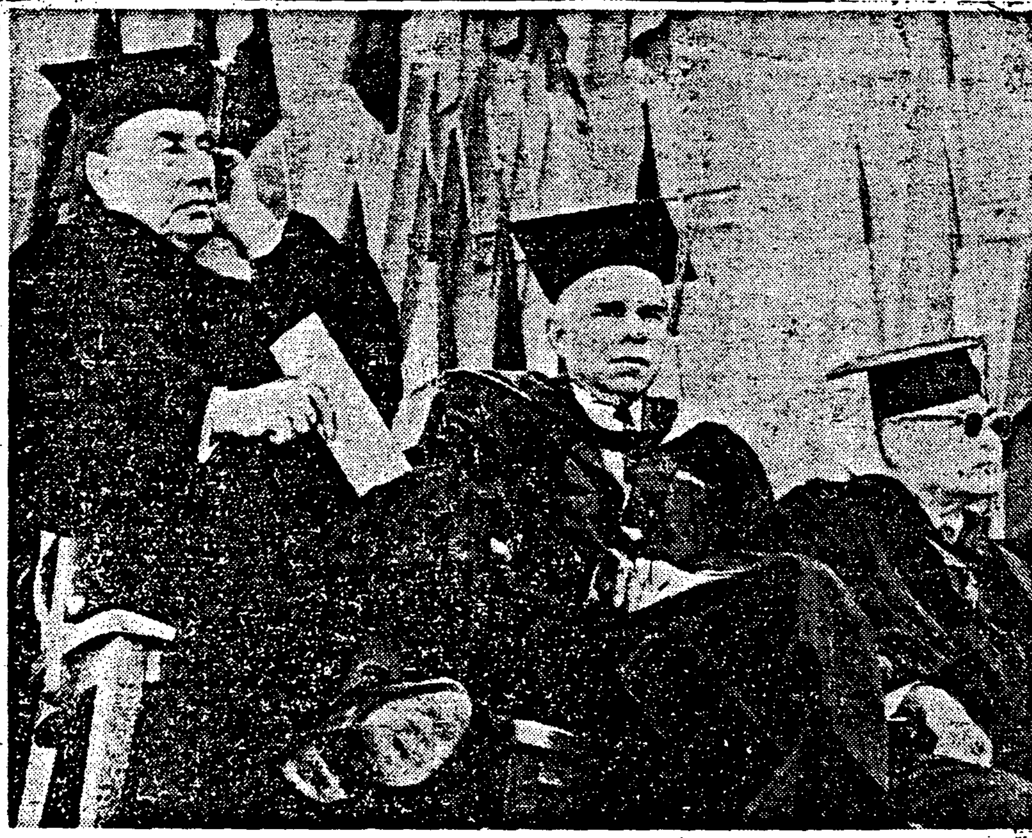
Plutonium is produced in much larger quantities than any other synthetic element. From the slight traces created by Dr. Seaborg and his associates at the University of California in the early nineteen forties, the output at the A.E.C. plant in Hanford, Wash., has grown a billion billion times.

Dr. Glenn T. Seaborg

Dr. Seaborg is recognized as co-discoverer of plutonium and its isotope 239. He received the $50,000 Enrico Fermi Memorial Award in 1959 for his work with plutonium and other elements.

For similar research, he and Prof. E. M. McMillan of the University of California received the 1951 Nobel Prize in chemistry.

Monday, June 28, 1965 THE WASHINGTON POST



Associated Press

Repeat Performance

Apparently unaware of the hole in the sol· of his shoe, U.N. Ambassador Adlai Stevenson listens to the address of Carlos P. Romulo at a University of California convocation on Saturday honoring the 20th anniversary of the United Nations. A similar hole brought him considerable attention when he was the Democratic nominee for President in 1952. Seated next to him, from left, are Dr. Glenn Seaborg, AEC Chairman, and Ralph Bunche, Un[illegible] Secretary of the U.N.

Among officials attending the dedication of the new inorganic materials research laboratory on the University of California campus here was Glenn T. Seaborg, right, chairman of the Atomic Energy Commission and former UC chancellor.

Seaborg Dedicates Lab

Chairman Glenn T. Seaborg of the Atomic Energy Commission today called for the training of new scientists, specialized in their own fields but equally aware of "the problems, work and accomplishments of others."

"In today's world the technological problems facing us are so complex that we need all of the scientific forces and concepts working together to achieve solutions," Seaborg said.

He made the remarks in a speech at the dedication of an inorganic materials research laboratory at the University of California.

Seaborg, former UC chancellor, described the laboratory an attempt to bring "under one roof" chemists, physicits, metallurgists and ceramists—"Those people knowledgeable and studying distinct areas of the material sciences."

"Conducting their research under these intimate conditions," Seaborg said, "each group, hopefully, will become aware of the other's work."

Seaborg said the new laboratory should prove of "immeasurable value" to the university, the AEC, and, "most of all, to science."

ASAHI EVENING NEWS
MONDAY, SEPTEMBER 20, 1965

U.S. Delegates Here For IAEA Conference

Dr. Glenn T. Seaborg

James T. Ramey

John G. Palfrey

Led by Dr. Glenn T. Seaborg, chairman of the U.S. Atomic Energy Commission, 21 Americans and four members of the U.S. Congressional Joint Atomic Energy Commission, 21 Americans and four members of the U.S. Congressional Joint Atomic Energy Committee are in Tokyo to attend the Ninth General Conference of the International Atomic Energy Agency opening Tuesday.

Dr. Seaborg will serve as principal American delegate. Alternate representatives at the conference will be Kenneth Holum, Assistant Secretary of the Department of the Interior; Verne Lewis, resident U.S. representative to the IAEA in Vienna; John G. Palfrey, U.S. Atomic Energy Commissioner; James T. Ramey, U.S. Atomic Energy Commissioner, and Ambassador Henry D. Smyth, chief of the U.S. mission to the IAEA.

The four members of the U.S. Congressional Joint Atomic Energy Committeee scheduled to attend the conference are Representative Chet Holifield (D-Calif), chairman of the Committee; Representative Craig Hosmer (R-Calif.), ranking member of the committee; Senator Wallace F. Bennett (R-Utah), and representative John B. Anderson (R-Ill). Both representatives Holifield and Hosmer will serve as congressional advisers to the U.S. delegation.

While in Tokyo, Dr. Seaborg will speak before the Japan Atomic Industrial Forum this afternoon. He is also scheduled to address the general conference Wednesday morning. This is to be followed by a news conference on the afternoon of the same day.

The conference, expected to last about 10 days, will be held in the Tokyo Prince Hotel.

The decision to meet in Japan was taken during the eighth regular session of the general conference last September following an invitation by the Japanese Government. The conference will have before it the board of governors' report on the agency's activities and, for its approval, the proposed budget for 1966 (estimated at $11,222,000, which is a small increase over the previous year).

The conference also will consider the revised safeguards system against the misuse of nuclear materials and installations for military purposes. Another proposal of the board of governors is to extend the appointment of the present director general, Dr. Sigvard Eklund of Sweden, for a second four-year period.

TIMES-DISPATCH
Richmond, Va.

Date NOV 5 1965

Science, Democracy Called Compatible

Although today's science and technology pose ominous challenges to preserving freedom and individuality, the Nobel prize-winning chairman of the Atomic Energy Commission (AEC) says, he foresees a favorable outcome—at a price.

That price, Dr. Glenn T. Seaborg told the annual Miller & Rhoads Virginia Woman's Forum here yesterday, involves enlightened citizens who can help guide the directions of the present scientific-technological revolution.

Dr. Seaborg, who won the Nobel prize in chemistry in 1951 for his work in nuclear chemistry, was one of four speakers at yesterday's forum at Hotel John Marshall.

The AEC chairman, whose work during the war years played a vital role in unlocking the powerful energies of the atom, noted that science and technology today are the major moving forces in current society.

AS SUCH, they constitute a major revolution, "characterized by rapid and far-reaching change, by change which has had and will increasingly continue to produce widespread social upheaval in our country and around the world."

Among the most serious of the challenges being presented by this revolution, Dr. Seaborg said, are the population explosion, the threat of unemployment as a result of automation, the pollution of the environment and the question of "whether we can prevent the tremendous new forces at man's disposal from being used destructively."

But above such questions hang more basic questions, he said.

How well can the forces of the scientific - technological revolution be directed in a free society? To what extent can freedom and individuality be maintained in the swift current of change and growth brought about by such a revolution?

Dr. Seaborg is optimistic.

"**I BELIEVE** that a scientific society and a democratic one are not only compatiable, but that the partnership of science and freedom offers us the best possibility of achieving the kind of world which most men seek today," he said.

"I also believe that if free men want to live in a modern scientific age, enjoy its benefits and control its destiny, they must grow with that age, they must educate themselves to higher and higher levels and they must develop their capacity, through education, for the highest rational, humane and ethical conduct.

"Of necessity, I think we will see the third revolution (the scientific - technological revolution, which follows the American and industrial revolutions) forging a new breed of men and women in the crucial years ahead," he said.

Controlling the course of events and solving problems present the greatest challenge from this revolution, he said.

Education is the major answer to this challenge, according to Dr. Seaborg, who noted there is a tendency to delegate responsibilities and decision-making for many things to experts.

QUOTING JEFFERSON — "There is no safe despository of the ultimate power of society but in the people themselves"—Dr. Seaborg urged that "we must all strive to be more of the 'expert' ourselves. . . ."

Citizens should seek as broad a knowledge as possible of scientific-technological matters that affect everyone, he said.

Besides providing informed leaders, education can also help establish "an enlightened citizenry who can understand most of what is taking place in their rapidly changing world, make intelligent decisions on important matters and participate in guiding their government in doing likewise," said Dr. Seaborg.

Dr. Glenn T. Seaborg
Woman's Forum Speaker

DR. GLENN SEABORG (LEFT) GIVES AWARD TO WALLACE B. REYNOLDS
Dr. Edwin McMillan, U.C. Radiation laboratory director, joins in ceremony

Retired Radiation Official Receives High AEC Citation

BERKELEY—Wallace B. Reynolds, recently retired business manager and managing engineer of the University of California Lawrence Radiation Laboratory of Berkeley and Livermore, has been awarded the Atomic Energy Commission's citation for "outstanding service to the U.S. atomic energy program."

The presentation, accompanied by a symbolic medallion, was made yesterday by Dr. Glenn T. Seaborg, AEC chairman. Only 11 others have received the award.

Reynolds, until his retirement Aug. 31, had been associated with nuclear research at Berkeley since its inception in 1931 under the late Dr. Ernest O. Lawrence in a basement room of a campus physics building.

8,000 EMPLOYES

It grew to the present laboratory complexes at Berkeley and Livermore, where 8,000 persons are employed. The current budget, funded by the AEC, is about $150 million annually.

Project manager for early cyclotrons devised by Dr. Lawrence and his associates, Reynolds became managing engineer in 1942.

During the World War II years he served as liaison between the scientists and engineers in construction of the electro-magnetic plant at Oak Ridge, Tenn., which made possible construction of the first nuclear bomb.

LIVERMORE GROWTH

Reynolds also played a major role in establishment of the Livermore laboratory in 1952 and its subsequent development.

He supervised construction of all the laboratory's research and experimental facilities, including the bevatron, one of the largest atomic accelerators in the world.

A native of Oakland, he received his engineering degree at U.C. in 1927 and joined the grounds and buildings staff of the university the same year. He and his wife, Frances, live at 1652 Tacoma Ave.

KNOXVILLE NEWS-SENTINEL DECEMBER 15, 1965

Backstairs at the White House

Ranch Too Raunchy for Visits of State

by Helen Thomas

WASHINGTON — (UPI) — Backstairs at the White House: Newsmen covering President Johnson at the LBJ Ranch have yet to become confirmed Texans.

During a discussion on world affairs by two reporters covering the Texas White House, one of them, thinking aloud said: "I wonder how we can get out of Vietnam?"

With a wide grin, the other newsman quipped: "I wonder how we can get out of Austin."

But their loneliness for Washington is not shared by Mr. Johnson who has spent six weeks convalescing at his 438-acre hill-country homestead from his gallbladder surgery.

The President feels he has been able to make a more rapid recovery in the relaxing atmosphere of the ranch, rather than the "four walls" at the White House.

DOESN'T HAVE TO DRINK

When he wants to get out in the sunshine and walk for miles, he can, undisturbed by curious crowds. When he wants to ride down the familiar dusty road to see his old cronies, he can without a cavalcade of cars following him.

He also feels he can pursue a tougher regime of exercise, proper diet and no drinking in ranch country rather than in Washington where social demands involve some indulgence.

"This is where Lyndon comes to recharge the batteries of his body and spirits," Mrs. Johnson once said—and it still applies.

The cattle grazing along the banks of the Pedernales River in front of his white frame house have a soothing effect on Mr. Johnson as he weighs the world's problems.

It was quite clear that he would have preferred to see the three foreign leaders he is meeting this week at the bucolic ranch, instead of in hectic Washington.

But even the question of household logistics was enough to rule such a setting out of the question. Pakistani President Mohammed Ayub Khan, British Prime Minister Harold Wilson and West German Chancellor Ludwig Erhard are all traveling with a sizable entourage of experts.

NOSTALGIA WINS OUT

Mr. Johnson would have preferred the cozier backdrop of his LBJ sitting room for the man-to-man talks. But the White House lends the conferences a more official and more formal status which some of the foreign chiefs preferred.

It would have fallen to the First Lady to try to put up some 50 guests at a time during the three consecutive visits —all in one week.

There is no question that Mr. Johnson is in constant and instant touch with Washington when he is at the ranch. There is an elaborate communications setup with telephones and radios everywhere.

Mrs. Johnson once confided to a friend that she felt she couldn't carry on personal chit chat with a friend without the feeling that "Big Brother" was watching her.

At times correspondents, and even the First Lady, have tried to lure the President into taking a vacation at a more luxurious watering spot in the tradition of Palm Beach and Palm Springs.

But he feels he has the same kind of sunny weather through the winter months and much more freedom in Texas—not to mention the nostalgia he always feels to go "home."

SEABORG HAD SOLUTION

Dr. Glenn Seaborg, chairman of the Atomic Energy Commission, charmed reporters at the Texas White House recently with his droll humor.

Seaborg teased them about the vast interest in the site for the proposed new atom smasher.

"I thought I might actually announce the selection of that site here this afternoon but I was told there wouldn't be any interest in that announcement, so I'll withhold it," he said.

"Actually," he continued in the same vein, "we have changed the type of accelerator there, due to the wide interest. We had planned, you know, a huge circulating accelerator about a mile in diameter, but since you could only put that in one place we decided to change it to the linear type that we could put in all 48 contiguous states. I'm only kidding."

THE EVENING STAR

Washington, D. C., Friday, December 17, 1965

Medal Awarded to Seaborg

CHICAGO (AP)—Dr. Glenn T. Seaborg, chairman of the U.S. Atomic Energy Commission, has been awarded the 1966 Willard Gibbs Medal of the Chicago chapter of the American Chemical Society.

He was honored not only for outstanding contributions to pure and applied chemistry, but for contributions to scientific and academic administration and to government service.

Dr. Seaborg is best known as the co-discoverer of the element plutonium. He was a Nobel Prize winner in 1951.

NEW YORK TIMES, DECEMBER 17, 1965.

Gibbs Medal for Seaborg

CHICAGO, Dec. 16 (AP)—Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission, has been awarded the 1966 Willard Gibbs Medal of the Chicago section of the American Chemical Society, it was announced today.

Udall Meeting Here on Nuclear Desalting Plant

United States Interior Secretary Stewart L. Udall was due here late today for a top level meeting on a huge program for desalting sea water through nuclear energy.

The meeting with Metropolitan Water District and U.S. Atomic Energy Commission officials is described as "one of the most important meetings ever held on practical steps for desalinization."

Prime topic at the International Hotel meeting is a proposal for Federal financial assistance in building a huge $357 million water desalting and nuclear electric power plant on a manmade island off the Orange County coast.

The meeting was arranged after an engineering firm submitted its proposal for the plant which would have 30 times the capacity of the largest existing conversion plant.

Scheduled to attend the meeting in addition to Udall and MWD officials are Glenn T. Seaborg, chairman of the AEC, and Frank Deluzio, director of the Interior Department's Office of Saline Water.

The MWD, Interior and AEC jointly financed the Bechtel Corporation of San Francisco's study.

Washington reports say that President Johnson has taken a personal interest in the saline conversion proposal as a giant step towards solving future shortages of water facing many sections of the country. For that reason, say the Washington reports, he has personally sent Udall here for the meeting.

CUTBACKS

It is believed that the nuclear desalting plan is one of the few new programs which could survive Federal cutbacks instituted because of the Viet Nam war.

The report said the plant's ultimate cost would be 27 cents per 1000 gallons of delivered water. This is higher than the estimated 20 cents for Northern California water delivered through the Feather River Project due for completion in the early 1970's and the current cost of 10 cents for Colorado River Water.

WORKABLE

But a MWD official points out, "it's getting within the ballpark and represents a workable figure, the best converted seawater figures we've heard before were around $1 per 1000 gallons."

The plant could be completed about the same time as FRP water reaches here, namely the early 1970's, according to Bechtel's study.

It would produce enough electricity to meet the needs of a city of 2 million people, exceeding the power output of Hoover Dam and the water needs of a community of 750,000.

REACTORS

The dual purpose plant includes two 3-million thermal kilowatt nuclear reactors, three turbine generator units with a total capacity of 1.8 million electrical kilowatts and a multistage flash type water distallation plant.

The report said the ideal location would be a 43-acre artificial island 3500 feet off Bolsa Chica State Beach.

Approximately $200 million of the cost could be borne by local public utilities who would purchase the power. The contemplated customers are the city Department of Water & Power, Southern California Edison Co. and San Diego Gas & Electric Co.

By Charles Del Vecchio, Staff Photographer

THE LIGHTER SIDE OF SCIENCE—Lord Snow, Parliamentary Secretary of Great Britain's Ministry of Technology (left) had a laugh with Chairman of the U.S. Atomic Energy Commission Glenn T. Seaborg at a reception Wednesday night at the British Embassy Rotunda. Lord Snow gave a lecture on "Science and the Advanced Society."

Scientist Peers Into Future

By Dorothy McCardle
Washington Post Staff Writer

Lord Snow, Parliamentary Secretary of Great Britain's Ministry of Technology, trained his scientific perceptions on the future Wednesday night and had a group of fellow scientists at the British Embassy shivering, over all of the progress that's ahead.

The Age of the Computer is about to take over, he said, and this will bring a split personality of boon and boredom, too.

Nobody will be sending out checks any more. Computers will do the job. Making out the income tax will be lots easier, and evading the tax lots harder.

The coming era will make more work for the scientists and less for 90 per cent of the rest of the people. Life will become so easy, that Lord Snow sees possible endless frustration ahead.

"The computers are going to change the world," Lord Snow told a group of British and American scientists at a reception in the Rotunda of the British Embassy.

"For good or ill, our lives are going to be very different."

THEN HE proposed a hypothetical question that snowed his listeners.

"Imagine what life will be like if work is taken from us?

"I have felt that some of our American and British preoccupation with sex today is because much of the purpose of life has disappeared.

"Boredom and despair will come upon people if we can't find non-work vital."

Lord Snow sees plenty to be done in the next two or three generations since the poor will continue to get poorer and the rich get richer unless some greater equity is found.

He predicts that millions of people will die in India this year because there is no way to distribute food to them.

Such conditions of famine and poverty can only lead to war he said.

"People don't fight when their major material needs are satisfied," he said.

So there should be peace, he thinks, by the time of his great grandchildren. But he's wary of all this peace, plenty and boredom.

"WILL THE climate of the world be a little like intellectual New York today with a feeling of a lack of purpose?" he asked and answered himself by saying:

"I don't believe it. I cannot accept this fashionable bourgeois despair."

With need for work eliminated, he predicts that science will come up with something else to fill in the "workless void."

This is the room on the UC campus where the element plutonium was discovered in 1941. Its designation as a National Historic Landmark yesterday brought Dr. Glenn T. Seaborg, one of the five discoverers, back to his old lab, with, at left, Undersecretary of Interior John Carver, Arthur C. Wahl and Edwin M. McMillan. Basin at right had its uses in being on the balcony, because plutonium stinks. That, said Seaborg, is why it was given its chemical name, Pu.

Editorials

Landmark Event In 307 Gilman

IN CEREMONIES including the placement of a plaque by the Under Secretary of the Interior, Room 307 of Gilman Hall, on the Berkeley campus of the University of California, was designated a National Historic Landmark yesterday.

The room so distinguished is a cramped and cluttered chemical laboratory which qualifies for eminence through having had plutonium discovered within its four walls 25 years ago. Plutonium is a poisonous, machine-made, radioactive metal with a faculty for setting off nuclear reactions—attributes which make it one of the most useful elements now at the command of mankind. It was the explosive in the Nagaskai A-bomb and it will be the source of power and energy that supplements and eventually replaces exhaustible fossil fuels.

Three of the five co-discoverers of this handy element were present at yesterday's ceremonies: Dr. Glenn T. Seaborg, now chairman of the Atomic Energy Commission; Dr. Edwin M. McMillan, director of the Lawrence Radiation Laboratory (both Nobel laureates), and Arthur C. Wahl, professor of chemistry at Washington University, St. Louis.

THEY FOUND something new and strange when they bombarded uranium with neutron beams in December 1940, and they separated it and identified it as plutonium in Seaborg's laboratory—307 Gilman Hall—on the night of February 23-24, twenty-five years ago.

The glorification of this room permits California to preen itself for the wisdom that supplied the machines, and trained the men, and supported the research that made it a national landmark—rather costly undertakings in the days before Federal moneys were available for basic scientific research.

That the wherewithal came from private as well as public sources becomes evident at this time as wreckers dismantle the last remainders of the Crocker laboratory, which housed the 60-inch cyclotron that produced the neutron beam that created the first plutonium. The building was erected through a contribution from the late W. H. Crocker, a greater benefactor than he knew.

Monday, March 28, 1966 . . . BERKELEY DAILY GAZETTE

Atomic Energy Commission Chairman Glenn Seaborg examines first tiny sample of fissionable nuclear fuel, plutonium-239, ever created.

The sample, placed in a cigar box 25 years ago by Seaborg, was uncovered last fall at Lawrence Radiation Laboratory here.

World's First Plutonium Sample Uncovered in Old Cigar Box at UC Lab Here

The world's first sample of plutonium-239, forming an invisible coating on a piece of platinum the size of a dime, will be presented today to the Smithsonian Institution, in Washington, D.C. together with the cigar box in which it had been stored here for a quarter of a century.

The presentation will be made by Dr. Glenn T. Seaborg, chairman of the U.S. Atomic Energy Commission and Dr. Emilio Segre, chairman of the Department of Physics at the University of California at Berkeley.

Dr. Seaborg was a co-discoverer of plutonium and Dr. Segre was instrumental in demonstrating that the isotope plutonium-239 undergoes nuclear fission when bombarded with thermal neutrons, the reason for this materials great value.

The tiny quantity of the fissionable nuclear fuel plutonium-239, the first ever created by man, was rediscovered in an old cigar box that had been resting on dusty shelves in locked storage vaults for the last 25 years at the Lawrence Radiation Laboratory here. The presentation was made on the 25th anniversay of the day that the fissionable nature of the isotope was proved — March 28, 1941.

Plutonium-239 is one of two materials — the other is uranium-235 — that supply the explosive force of nuclear weapons.

The historic artifact was found last Fall as technicians in health chemistry at the laboratory were disposing of some old radioactive materials.

Dr. Seaborg, recipient of the Nobel Prize for his work as co-discoverer of plutonium and other transuranium elements, identified the cigar box, on a visit to Berkeley last November, as one of a number he had used back in 1941. Positive identification of a sample in the box as the original plutonium-239 was made after Seaborg consulted his notes.

In May, 1940, Dr. Edwin M. McMillan, Nobel Laureate and present director of the Lawrence Radiation Laboratory, and Dr. P. B. Abelson, now director of the geophysical laboratory at the Carnegie Institution in Washington, D.C., discovered the first element heavier than uranium-element 93, neptunium — using

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Historic Plutonium Sample Uncovered at Radiation Lab

FROM PAGE 1

the 60-inch cyclotron of the late E. O. Lawrence.

After Dr. McMillan left Berkeley that Fall for defense research, Dr. Seaborg, the late Dr. Joseph W. Kennedy, and Dr. Arthur C. Wahl, then a graduate student and now a professor of chemistry at Washington University in St. Louis, Mo., took up the search for element 94.

On February 23-24, 1941, they discovered plutonium, created by transmuting uranium in the 60-inch cyclotron. The first isotope discovered was plutonium-238.

In a parallel investigation the three scientists, together with Dr. Emilio Segre, Nobel Laureate and co-leader of a research group in the Lawrence Radiation Laboratory, searched for the highly prized fissionable isotope of the element, plutonium-239.

In a bombardment of uranium on March 3-6, 1941, in a slow neutron beam generated by the Berkeley 60-inch cyclotron, the scientists produced a submicroscopic quantity of plutonium-239 — about 1/60,000,000 ounce. The plutonium-239 was smeared on a small platinum disc, labeled "Sample A," and exposed to slow neutrons generated by the 37-inch cyclotron on March 28, 1941.

SAMPLE "A"

On May 12, 1941, Wahl dissolved Sample "A," and using the chemical properties of plutonium which had been learned in February he put the same plutonium-239 into a thinner sample containing less rare earth carrier material in order to obtain a better measurement of the fission efficiency. The result was "Sample B" — the artifact which turned up in the cigar box.

"Sample B" consists of a thin platinum plate, about a half inch in diameter, with a turned up edge. Wahl smeared the plutonium on the face of the disc, and glued the bottom of the disc to a piece of cardboard. On May 18, the team of scientists made their measurement, again using the slow neutrons from the 37-inch cyclotron.

Soon after the May 18 measurement, Sample "B" found its way into the cigar box, one of a number Seaborg obtained from the late G. N. Lewis, the great founder of the modern chemistry school at Berkeley. Lewis imported cigars from Manila, and smoked incessantly.

IDENTIFY METHOD

To identify the scientific bric-a-brac he stored in the boxes, Seaborg had taped paper on the tops. Identifying legends on the paper had various labels. The legend on the box containing the historic plutonium-239 sample warned: "CAREFUL! Please do not distrub in any way. G. T. Seaborg, J. W. Kennedy, E. Segre."

Last fall a health chemistry technician, Rosemary Barrett, began disposal of the last of the materials in the vault, and noticed the old cigar boxes with the Seaborg notations. On recommendation of Dr. Isadore Perlman, head of the nuclear chemistry division of the Laboratory, she wrote to Seaborg describing the boxes and their contents.

Dr. Seaborg subsequently examined the box and identified the historic "sample B."

Page 18—S.F. Examiner
Mon., Mar. 28, 1966

Original Plutonium Found

First Sample to Smithsonian

The original specimen of plutonium 239, a key forerunner of the nuclear age, joined the Nation's historical treasures today after it was rediscovered in a cigar box on the University of California's Berkeley campus.

Both the precious sample and the box in which it had lain forgotten for a quarter of a century were presented to the Smithsonian Institution in Washington.

The presentation was made by Glenn T. Seaborg, chairman of the U.S. Atomic Energy Commission, and Dr. Emilio Segre, head of UC's physics department.

Nobel laureate Seaborg was a co-discover of plutonium and Segre was instrumental in proving that the isotope plutonium 239 produces nuclear fission when bombarded with thermal neutrons. The ceremony at the Smithsonian marked the 25th anniversary of the historical achievement.

THE TINY quantity of the fissionable nuclear fuel placed on public display today—forming an invisible coating on a platinum disc the size if a dime—had been resting in its box on dusty shelves in locked storage vaults at UC before it was rediscovered last fall

It was found by technicians in health chemistry at the university's Lawrence Radiation Laboratory. Doctor Seaborg identified the cedarwood cigar box during a visit to Berkeley last November as one of several he had used in 1941 to store "miscellany."

Positive identification of the original plutonum 239 was completed after a radioactive count of the sample and after Seaborg consulted his research notes of 25 years ago.

IT WAS early in 1941 that Seaborg and Segre, along with other scientists, started searching for plutonium 239 in the Berkeley laboratories. They agreed that "if this isotope could be created and if it was fissionable, a major route to the development of a nuclear weapon would be open."

They found that the efficiency of fission in plutonium 239 was higher than that of uranium 235, the only previously known fissionable material. On March 28, 1941, the scientific team, working on "Sample A," reached what was called an historic observation" that the isotope was fissionable with "slow" neutrons.

Later, one of the researchers dissolved Sample A and put the same plutonium 239 into a thinner sample to get better measurement of the fission efficiency. The result was "Sample B," the "artifact" that turned up in the cigar box.

Shortly after the measurement, Sample B found its way into the box, one of many that Seaborg got from the late G. N. Lewis, the famed founder of UC's modern chemistry school. Lewis, an inveterate smoker, imported his fine cigars from Manila.

SEABORG, a research assistant to Lewis in the late '30s, would often be on hand to inherit the professor's cigar boxes when they became empty and discarded.

Seaborg stored notes and scientific bric-a-brac in the boxes and taped paper strips on the top of each to identify the items. On the box containing the historic plutonium 239 was a warning written by Seaborg:

"Careful!! Please do not disturb in any way. G. T. Seaborg, J. W. Kennedy, E. Segre."

Dads to Insist on 'Seaborg School'

March 31, 1966 South Gate Press

Plan to Name School for Seaborg Loses

Gazette 3/31/66

SOUTH GATE, Calif. (UPI) —The board of education has frustrated city council attempts to rename a school in honor of native son Dr. Glenn Seaborg, chairman of the Atomic Energy Commission.

The board ruled Tuesday elementary schools must be named for the streets on which they are located and junior high schools cannot be named for living persons. Said Mayor Milo Bellmann: "I'd rather give flowers to people while they can still smell them."

South Gate City Council Monday night authorized Mayor Milo Dellmann to continue efforts to get Los Angeles School District board to rename South Gate Junior High in honor of Dr. Glenn T. Seaborg, famous South Gate son, nationally known physicist and chairman of the Atomic Energy Commission.

The action was taken after discussion of a letter from Ralph Richardson, school board president, saying that secondary schools are named only for individuals whose notability survives their lifetime.

"In other words, you gotta be dead" to have anything named after you," the Mayor said, obviously annoyed. "They won't give you flowers while you can smell them — that's the gist of it," he added.

No on Victoria

The mayor gave a brief history of the Council's moves to get a local school named after Dr. Seaborg, who was raised here and graduated from Jordan High School before South Gate High was built.

The Council first adopted a resolution seeking to have Victora Avenue School renamed for Dr. Seaborg, and was advised that school board policy has always been to name elementary schools only after adjoining streets. Subsequently, the Council earlier this year adopted a resolution seeking the renaming of South Gate Junior High. Dr. Richardson's letter, outlining board policy, was in response to this resolution.

City Clerk Dorothy McGaffey told the Council she talked with a member of the school board staff after Richardson's letter arrived, and was told that the naming of secondary schools only after deceased famous persons had never been a "hard and fast policy."

Mayor Dellmann asked Council permission to pursue the matter, even to going down to the school board to "bang his fist on some desks" if necessary.

Vice Mayor Joe Henville jokingly suggested that the mayor borrow some stationery from Earl Warren High School in Downey on which to write the letter to the L.A. School Board.

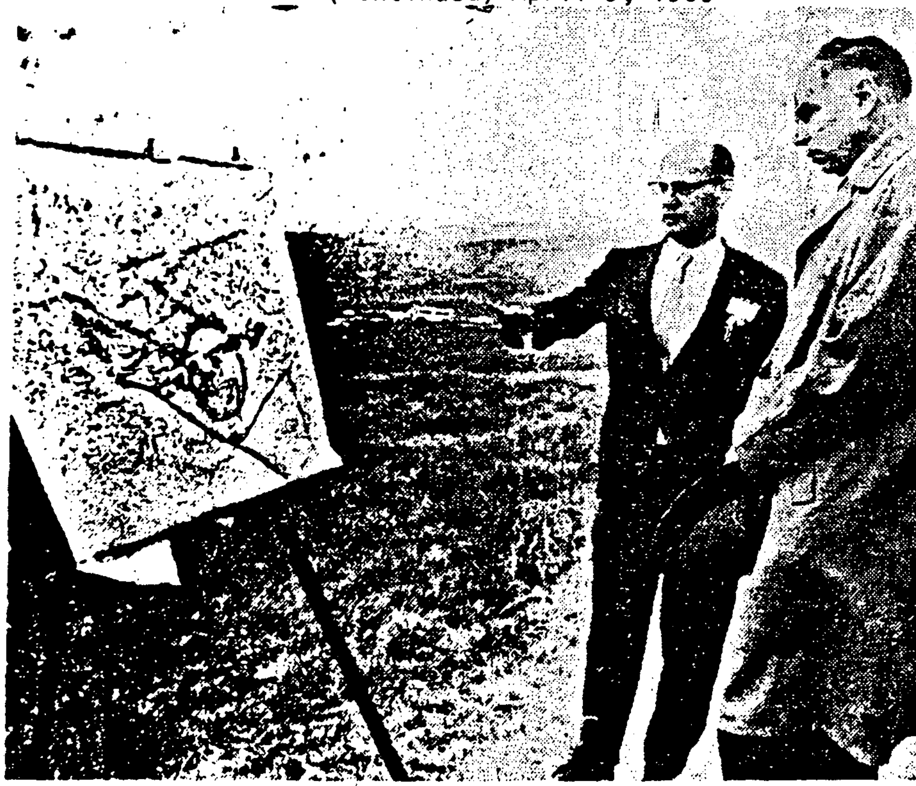
ILLINOIS STATE JOURNAL APRIL 9, 1966

Arthur Theriault, mayor of Weston, speaks to residents of his community northwest of Chicago Friday as Gov. Otto Kerner (center) and Jack Hill of Aurora (right) look on. An Atomic Energy Commission inspection team visited Weston as part of a tour of proposed sites for the world's biggest atom smasher. — UPI.

THE SACRAMENTO BEE
Saturday, April 9, 1966

Dr. Glenn T. Seaborg, left, chairman of the Atomic Energy Commission, talks with Gov. Edmund G. Brown, center, and Dr. Edwin McMillan, director of the Lawrence Radiation Laboratory. They are at the proposed site for a $375 million atom smashing plant east of Aerojet-General Corp.

THE SACRAMENTO BEE (Continued) April 9, 1966



A plot map of the proposed atom smasher site is examined by Dr. Edward J. Lofgren in charge of the design of the plant, left, and Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission. Bee Photo

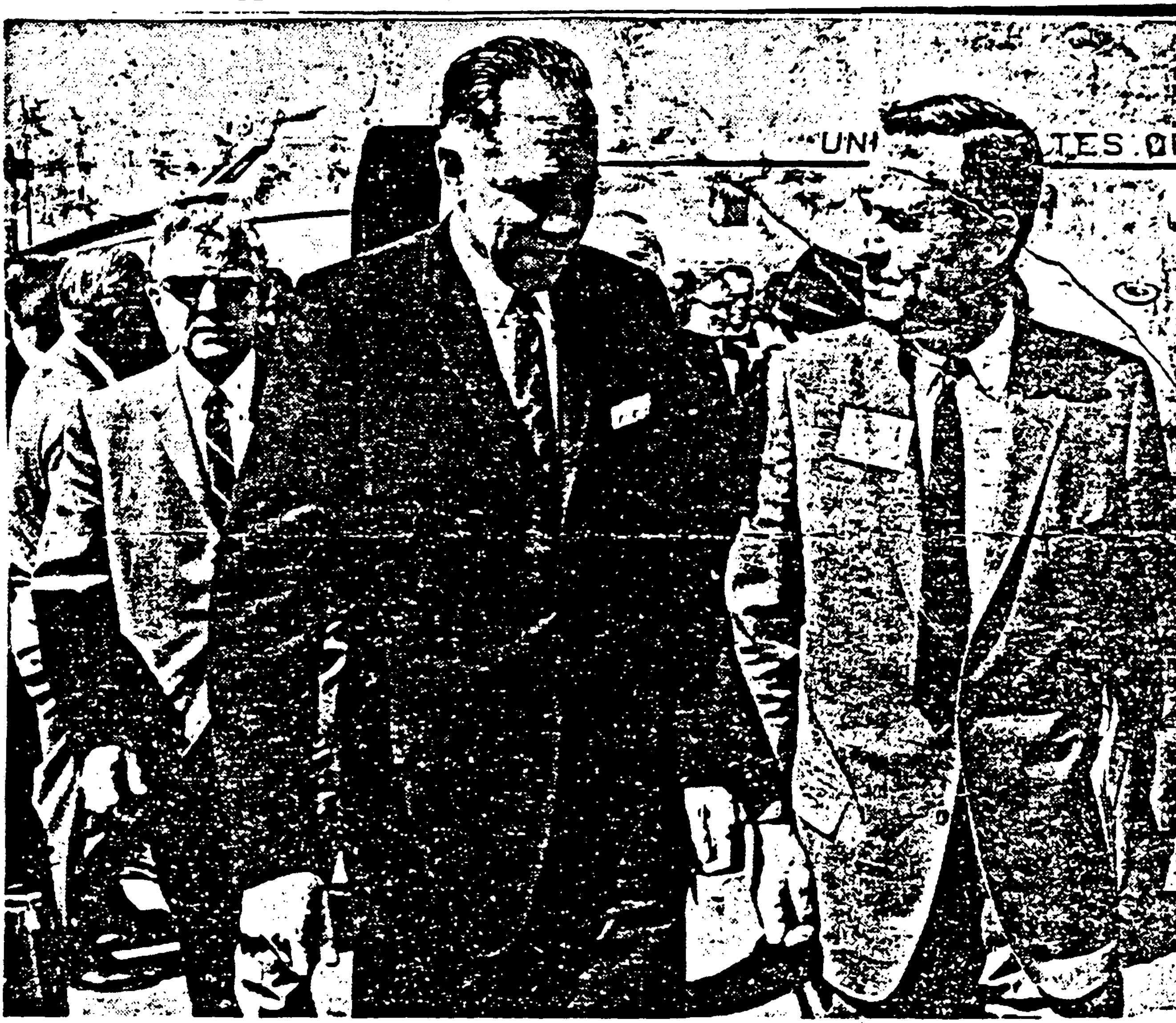
DENVER POST APRIL 10, 1966

Denver Post Photos by Ed Maker

DR. GLENN T. SEABORG, AEC CHAIRMAN, LEADS INSPECTION TEAM AND COLORADO DIGNITARIES

Following are U.S. Rep. Roy McVicker, D-Colo., left, and Denver Mayor Tom Currigan, right. Standing at far right is U.S. Rep. Byron Rogers, D-Colo. The AEC team inspected the proposed site for an atom smasher on the Friday tour.

DENVER POST, April 10, 1966



GOV. JOHN LOVE, RIGHT, WALKS BESIDE DR. GLENN T. SEABORG AFTER WELCOMING AEC TEAM
Following at left is U.S. Sen. Gordon Allott as the inspection team arrived at Denver's airport.

Albuquerque Tribune
April 28, 1966

Dr. Seaborg Elected Science Service Head

By Science Service

WASHINGTON — The annual election of officers of the board of trustees of Science Service has been announced.

The officers elected are Dr. Glenn T. Seaborg, chairman of the U. S. Atomic Energy Commission, as president; Edward W. Scripps II, vice president of the E. W. Scripps Co. as vice president; Dr. Wallace R. Brode, foreign secretary, American Chemical Society, as treasurer; O. W. Riegel, director, Lee Memorial Journalism Foundation, Washington and Lee University, as secretary.

Dr. Seaborg, a co-winner of the Nobel Prize in chemistry in 1951, will preside over the annual and any other meetings of the board of trustees, and Mr. Scripps will be chairman of the executive committee of the board. Members of the executive committee are Dr. Seaborg, Mr. Scripps, Dr. Brode, Mr. Riegel and Dr. Harlow Shapley, retired director of Harvard College Observatory.

Dr. Leonard Carmichael, former secretary of the Smithsonian Institution and now vice president for research and exploration, National Geographic Society, has served as president of Science Service since 1954.

Science Service, Inc. is the institution for the popularization of science organized in 1921 as a nonprofit corporation, with trustees nominated by the National Academy of Sciences, the National Research Council, the American Assn. for the Advancement of Science, the E. W. Scripps Estate and the journalistic profession.

ST. LOUIS POST-DISPATCH, May 5, 1966

By a Post-Dispatch Photographer

Compton Laboratory Dedication

Participants in dedication ceremonies for the Arthur Holly Compton Laboratory of Physics at Washington University yesterday (from left) are: Chancellor Thomas H. Eliot; Mrs. Compton, widow of the former university chancellor, and Glenn T. Seaborg, chairman of the Atomic Energy Commission.

EURATOM SEEKING RECORD PURCHASE OF U.S. PLUTONIUM

$43-Million Deal Viewed as Vital in Strengthening Ties on Peaceful Atomic Study

By JOHN W. FINNEY

Special to The New York Times

WASHINGTON, May 8—The United States and Europe are proposing to strengthen their cooperation in the peaceful development of atomic energy through a record-breaking sale of plutonium — the fissionable material once used exclusively to make atomic bombs.

The European Atomic Energy Community—the six-nation organization known as Euratom —recently offered to buy 1,000 kilograms of plutonium from the United States.

The material would be used by Euratom and its six member nations—France, West Germany, Italy, the Netherlands, Belgium and Luxembourg — in their cooperative research efforts to develop an advanced type of atomic power plant.

If approved, the sale would represent the largest international transaction thus far in the precious, manmade element. At the present United States Government price of $43 a gram, the cost of the material could run as high as $43-million.

Vital Trans-Atlantic Ties

The significance of the proposed sale, in the opinion of both American and Euratom officials, goes far beyond the size of the commercial transaction.

More important, in their opinion, are the political implications in strengthening trans-Atlantic cooperation in peaceful atomic research and in establishing the principle of international controls over nuclear energy.

One little-noticed but, to American officials, encouraging fact about the Atlantic alliance is that despite all the difficulties in the political and military fields, Europe and the United States have been able to maintain close cooperation in peaceful atomic energy projects.

In a technical sense, the proposed sale is designed to provide the "fuel" for continuing such cooperative research.

For Breeder Projects

Since 1962 the United States and Euratom have had a cooperative arrangement for developing breeder reactors—an advanced type of atomic power plant that produces more fissionable fuel than it consumes.

This is unusual since the six European nations among themselves and with the United States are cooperating—through exchange of information and personnel—in developing a type of atomic power plant that one day may cause intense commercial competition amongst them.

In 1963 the United States sold Euratom 500 kilograms of plutonium. But now the European countries, which in some ways are more advanced in their breeder reactor research than the United States, are running out of plutonium fuel for their experimental breeder projects.

They have turned to the United States, which at this point has the only available supply of plutonium at relatively low prices. The new shipment of plutonium would be used primarily in breeder research projects being carried on by the French at Cadarache and by West Germany at its Karlsruhe center.

The Euratom request is being favorably considered by the Atomic Energy Commission and the State Department, but there are still some political problems before it can gain Administration approval.

One of the difficulties that has developed in the atoms-for-peace field is that officials at the policy-making level—both at the State Department and White House—have little intimate knowledge of how the research program works or of the system of international controls that have been developed to prevent military diversion.

Every time the question of selling fissionable materials arises, therefore, there is a problem of convincing policy-making officials that the sale would not contribute to the weapons-making potential of any nation.

Safeguards Assured

It is being stressed by both Euratom and American officials, therefore, that the sale would strengthen international controls and provide additional assurance that such nations as West Germany would not be able to divert the atomic technology and materials they acquire from the United States to military purposes.

The material would be subject to Euratom controls against military diversion. Since the controls also extend to the reactors in which the material is being used, there would be assurance that the reactors, which by their nature produce large amounts of plutonium usable in weapons, are not being used for military purposes.

Dr. Glenn T. Seaborg, head of Atomic Energy Commission, discussed plutonium.

Indirectly, however, the question of international controls has become an issue in the negotiations now going on between Euratom and the State Department.

Euratom fears that the United States will attempt to use the sale as a lever to get Euratom acceptance of controls by the International Atomic Energy Agency—a step thus far resisted by the European organization.

A more basic question, now being reviewed by the A.E.C., is whether the United States will be able to make such a large sale without impairing its own weapons requirements for the material.

A somewhat paradoxical situation has developed on plutonium supplies. With the recent rapid expansion of atomic power plants, which produce plutonium as a byproduct, the world is faced with a growing and potential surplus of the element.

It was estimated recently by Dr. Glenn Seaborg, chairman of the A.E.C., that by 1980 civilian power plants in the United States would be producing 30,000 kilograms of plutonium annually, and that total world production would be more than double that figure.

Thus, Dr. Seaborg said, "one can foresee a large abundance of plutonium in the decades to come."

But for the near future, the demand for plutonium for peaceful research will exceed the production from civilian reactors.

To obtain the plutonium for Euratom, therefore, the United States would have to turn to the production reactors that were designed to turn out high-grade, high-cost plutonium for weapons.

CHICAGO SUN-TIMES Saturday, May 21, 1966

Dr. Seaborg Tells Of A New Isotope

By Richard Lewis

A new isotope of the transuranium element called fermium may have been produced in a nuclear explosion two weeks ago, Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission, disclosed here.

The co-discoverer of the best known transuranium element, plutonium, spoke at the Palmer House Friday night. He was awarded the Josiah Willard Gibbs gold medal by the Chicago Section of the American Chemical Society for his role in advancing chemistry.

Weston In Running

Seaborg said Weston, Ill., is "still very much in the running," as the site of the 200-billion electron volt accelerator the AEC plans to build. The major rival, he added, is Brookhaven, Long Island.

As to fermium, Seaborg said that scientists from Argonne National Laboratory at Lemont, Ill., the Lawrence Radiation Laboratory at Livermore, Calif., and the Los Alamos (N.M.) Scientific Laboratory "are now in the process" of seeking a new and heavier isotope of fermium from the blast.

The explosion was one of a series conducted underground. Seaborg said he believed nuclear explosions are more likely to produce new, stable isotopes than are atom smashers.

The AEC chairman predicted that new and heavier elements with atomic numbers up to 126 will be created in the laboratory by transmutation.

Heaviest element occurring in nature is uranium, with an atomic number of 92. By bombarding it and other elements with neutrons, scientists have created elements with atomic numbers as high as 103.

While elements immediately beyond that number may exist only for a fleeting instant, Seaborg said, there are indications that stable elements will appear beyond the atomic number 105. The atomic number refers to the number of protons in the nucleus of the atom.

This kind of research not only involves pure science, but is rich in potential applications, the AEC chairman reminded Chicago area chemists.

Double Use

For example, the fissionable isotope, plutonium 239, not only is an explosive ingredient for nuclear bombs but also is useful reactor fuel to generate electricity, he said.

The isotope plutonium 238 can be used as a compact source of electricity, Seaborg continued. The heat it emits by radioactive decay can be converted directly into electrical energy by a thermoelectric battery.

Such a device has been tested in a satellite that has been orbiting Earth since June 29, 1961, Seaborg noted.

"It is still powering equipment that is still sending signals back to Earth," he said.

On Earth, he said, plutonium 238 can be used to power pacemakers for heart patients, or even a complete artificial heart. Also, curium 244, another isotope of a transuranium element, can be used as fuel for another, efficient, compact nuclear battery.

Seaborg predicted important by-product uses of the heavier transuranium isotopes if they can be produced in large quantities. He, himself, holds patents which he assigned to AEC for two such elements, curium and americium, and he received the Nobel Prize in 1951 for his work in transuranium elements.

Founded by the Chicago Section of the Chemical Society in 1911, the Gibbs award is one of the most coveted in science. Among past winners were Mme. Marie Curie, discoverer of radium; the electrical wizard, Irving Langmuir; and chemists Harold Urey and Linus Pauling.

SEABORG SEES DISCOVERY OF 22 ELEMENTS

AEC Chief Makes Prediction Here

Dr. Glenn T. Seaborg, chairman of the Atomic Energy commission, predicted yesterday that scientists would eventually create at least 22 more new elements to add to the 104 that are known.

Seaborg

Many of these man-made elements may turn out to be stable and useful, Dr. Seaborg said in a speech before the Chicago section of the American Chemical society in the Palmer House.

600 Attend Ceremony

More than 600 chemists attended the ceremony, at which Dr. Seaborg was given the Willard Gibbs Medal award for his scientific achievements. Dr. Seaborg, who is a co-discoverer of several manmade elements, won a Nobel prize in chemistry in 1951.

There are 92 elements which naturally occur on earth. The heaviest of these is uranium. Since 1940, 12 new ones have been made by scientists, including plutonium which is used in atomic bombs and in nuclear reactors.

Dr. Seaborg said there are indications that some of the new elements may be relatively stable and that some of them may have properties similar to the natural elements such as tungsten and tantalum.

Lauds Scientists Ingenuity

"I will bet on the ingenuity of scientists and the increasing sophistication of their apparatus and equipment and predict that the atomic number barrier will be broken again and again," he said.

Asked before he spoke if a decision on the site for a proposed $375 million atom-smasher could be expected soon, Seaborg said investigators were still gathering information, and no proposed site was favored over any other at this time. He said he expected a decision before the end of the year.

Weston, in Du Page county, is one of the proposed sites.

BUFFALO NEWS JUNE 10, 1966

Seaborg Says World Agency Holds Hope for A-Arms Curb

Use of Nuclear Power to Raise Output Of Explosives, He Warns, Calling for Controls

By NAT FINNEY
Buffalo Evening News Bureau

WASHINGTON, June 10 — A new approach to the problems of curbing a world atomic weapons race is being pushed, with Presidential approval, by Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission.

And because this country's first privately owned and operated nuclear-fuel processing plant is located in the Buffalo area at Ashford, Western New York seems destined to play a special role in Dr. Seaborg's plan.

Furthermore, two Western New Yorkers, former Rep. W. Sterling Cole of Bath and James J. Wadsworth of Groveland, played major roles in the birth and early development of the international agency that may play the key role in future development.

Sees Rise in Output

Rep. Cole, after long service on the original Joint Committee on Atomic Energy, was the first director general of the International Atomic Energy Agency (IAEA) at Vienna, and as a special representative Mr. Wadsworth directed negotiations to establish the IAEA.

Dr. Seaborg outlined his ideas for practical restraints on proliferation of nuclear explosives at the National Association of Manufacturers' conference on industrial science and technology here.

A highlight of his speech was a prediction that by 1980 the world's atomic power plants will be producing byproduct nuclear explosives at a rate of more than 100 kilograms a day — enough to provide the explosive ingredients for more than 10 bombs.

Peaceful Uses Stressed

The Atomic Energy Commission chairman's forecasts were that nuclear power will play a bigger role in supplying energy than was expected as little as two years ago, and he dismissed earlier notions that atomic power development can be restrained to limit available amounts of nuclear explosives.

The AEC chairman openly quashed recent suggestions that electricity can be generated without producing nuclear explosives. The two things go hand in hand, he told the industrial experts.

Dr. Seaborg made no bones about the dangers of nuclear-weapons proliferation involved in a massive growth of atomic power, but he told the industrialists the United States has firmly decided upon a policy of "helping other nations to develop the peaceful uses . . . under conditions which assure the peaceful use of nuclear equipment and materials which we supply."

Safeguards in Effect

He foresaw "the forerunner of a fully international safeguards and control system" in the IAEA, which now has 96 nation members.

"I am hopeful," Dr. Seaborg declared, "that the future will show a continued increase in the application of these IAEA safeguards and controls and eventually we may have a worldwide system under which all nations will be able to share the peaceful atom free from fear of a potential nuclear threat.

The safeguards of which Dr. Seaborg spoke are in effect at the Nuclear Fuel Service Inc., plant at Ashford, and at the Yankee Electric nuclear power plant near Boston that ships its spent fuel to Ashford for reprocessing.

Stanford A-Smasher

An Electronic Whiz Two Miles Long

By David Perlman
Science Correspondent

Standford University

Stanford's n w two-mile-long linear accelerator, a "phenomenal success" in its very firts trials, has already set and broken its own high-energy record three times.

The unexpected and near-flawless test performances of the argest cientific tool evr built by man have spurred a swift re-shuffling of schedules, it was disclosed yesterday.

Instead of launching full-scale research next year, as the project's scientific chiefs originally planned, the first nuclear physics experiments with the big atom smasher will begin this fall—perhaps as early as October.

DR. GLENN SEABORG
"Phenomenal success"

The accelerator, which operates like a gigantic microscope to probe the particles in beam of sepeding electrons, was first turned on at close to full power on May 21.

Its electrons, flashing down the two-mile underground tube at almost the speed of light, developed a beam of 10 billion electron bolts. The Machine's operators shattered that record quickly with a beam of 16.35 billion electron volts.

And yesterday Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission, anounced the machine has just achieved a peak energy of 18.4 billion volts. The accelerator is now running every night.

TOUR

Seaborg toured the new Accelerator Center yesterday, and it was he who described the first tests as a "phenomenal success."

He paid tribute to the Centers' 1100 employees who have designed, built and tested the huge structure precisely on schedule, and noted with delight they have accomplished a feat most unusual for any big project.

They did it without spending a panny more than the $114 million budgeted by Congress for the research machine five years ago.

PRAISE

Dr. Seaborg offered nigh praise for Dr. Wolfgang K. H. Panofsky, the Accelerator Center's director, and described him as "a most unusual high-energy physicist, believe me!"

The new accelerator is de3signed eventually so it can be expanded to yield electron beams of up to 40 billion volts. Its present capacity is theoretically half that energy; but Panofsky and his colleagues sadi yesterday it appears that the machine can now reach energies of 21 billion volts or more. This is many times greater than any electron beam has ever achieved before.

These high energies are the key to successful exploration of the atomic nucleus. Just as a light beam illuminates objects like cells in an optical microscope, so a low-energy electron beam "illuminates" far smaller objects like viruses in an electron microscope.

ENERGY

The Stanford accelerator, however, multiplies the energy of an electron beam enormously and becomes a microscope powerful enough to see inside the infinitely small particles that lie inside the nuclei of atoms.

Dr. Panofsky said the first group of experiments will begin probing this unknown world of small-scale matter as soon as the machine's research areas are complete.

In their first experiments scientists will look at first for new extremely light nuclear particles called leptons, Panofsky said; they will examine the internal structure of the protons and neutrons that make up the nucleus, and they will measure the intensity of the unstable particles that can be created by bombarding matter with the accelerator's electron beam.

Seaborg noted with a smile that one thorny controversy over the atom-smasher now seems fully settled. The high-voltage power lines, which Woodside residents unsuccessfully fought, have been strung down the wooded hillsides from the ridge atop Skyline drive—and they are indeed invisible.

Reporters tried to spot the power poles in the green foliage of the hills and couldn't. The slim structures have been placed cunningly by helicopter, without carving trails or felling trees.

THE EVENING STAR
Washington, D. C.
Saturday, June 25, 1966

—Star Staff

SCIENCE SERVICE CHIEF RETIRES

Dr. Watson Davis (right) chats with Dr. Frederick Seitz (left), president of the National Academy of Sciences, and Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission, at a reception for Davis yesterday at the Academy's Great Hall. Davis is retiring as director of the Science Service Foundation.

Saturday, August 13, 1966

The Mining Journal, Marquette, Mich.

Dr. Glenn C. Seaborg, a native of Ishpeming and chairman of the U.S. Atomic Energy Commission, is shown with his family and a first cousin in Marquette. The Seaborgs are visiting in the area. In background are Mr. and Mrs. Edward Cuyler, Westwood Rd., Marquette. From left of Seaborg are Mrs. Seaborg and their children, Eric, 11; Stephen, 15; David, 17, and (front) Dianne, 6. Seaborg and Mrs. Cuyler are first cousins. Photo was taken at the Cuyler residence here on Westwood Rd. — (Mining Journal photo.)

AEC Plans Aired By Seaborg During Ishpeming Visit

ISHPEMING — Michigan is still being considered as a possible site for the 200 Bev Accelerator which the Atomic Energy Commission plans to build. Ann Arbor remains as one of the "candidates" for the project.

Dr. Glenn C. Seaborg, chairman of the U. S. Atomic Energy Commission, visiting in Ishpeming with his wife and their four youngest children, was a surprise guest at an informal gathering of the directors of the Ninth Federal Reserve Bank, who were being hosted at the Mather Inn by the Cleveland-Cliffs Iron Co.

"We anticipate making a decision before the end of the year," Seaborg said. "There is a great deal of data to be evaluated, and it must be recognized each of the six sites still under consideration has much to recommend it. They are rather evenly balanced.

"We are looking for proper physical characteristics. We need adequate foundation, which is bed rock, an absence of ground water or easily disposable ground water, good load bearing qualities of the ground, lack of seismic activities, attractiveness to scientists for such factors as proximity to university, accessibility, lack of discriminations, and the like.

National Project

"It should be remembered this is a national not a local project and accessibility will be one of the great considerations. Three fourths of the scientists involved will be traveling to and from home laboratories.

"Then, we must consider costs of construction and operation, and we are hopeful of maintaining an operating budget of 60 millions a year."

Seaborg pointed out that about $375 million is expected to be spent in the seven-year construction period, and lower costs schedules could well be one of the determining factors.

Other Sites Considered

The sites still being considered, in addition to Ann Arbor, are Brookhaven on Long island; Chicago, Madison, Denver and Sacramento.

He said that his group is still trying to "pack more wallop" into warheads of given weight and in the development of anti-ballistic missiles.

One of the encouraging factors is that at present slightly more than 50 per cent of the commission's efforts is toward the development of peace time uses of nuclear power.

Seaborg foresees 100 million kilowatts of electric energy being developed by nuclear power by 1980 and he told the bankers that the development in this field is moving faster than had been earlier anticipated.

He stressed that he referred to this figure as a competitive one, making two qualifications one, that as of now nuclear energy can be competitive only where 500,000 kilowatts can be created at one plant and, second, that in special areas where oil or coal is extremely plentiful and locally produced, nuclear energy might not be competitive.

New Source Provided

He also pointed out that history once more is providing a new source of energy for mankind as another shows signs of wearing down.

"Not," he said, "that we are at the end of coal or oil, but it is only a matter of decades that these two sources would be hard pressed to maintain the wants of man if consumption were to be continued on an ever increasing basis."

The Post-Register, Idaho Falls, Idaho Sunday, August 28, 1966

Seaborg Sees Idaho Role

PRESIDENT and Mrs. Johnson study the bottom steel plate of a reactor assembly Friday during a tour of the Atomic Energy Commission's nuclear plant near Idaho Falls.

White House Responsibility

When he was interrupted briefly by an inadvertant announcement over the public address system, he smiled and quipped:

"I can see we are having no trouble with the public address system here tonight. And I would like to point out that the difficulty we experienced at the reactor station today can be laid to the door of the White House engineers. They provided the system. And I am most happy to say that the AEC was not responsible."

The first few minutes of President Johnson's dedication address at the reactor station Friday morning could not be heard because of a breakdown in the public address system — a difficulty which was corrected after about four minutes of his address.

AEC Commissioners James T. Ramey, Gerald Tape, and Samuel Nabrit, the latter a new appointee, also spoke briefly at the banquet. They expressed appreciation for the local arrangements for their visit and underscored the contribution of the Idaho AEC site to the rapidly expanding nuclear technology over the world.

Pays AEC Tribute

Admiral H. G. Rickover, who goes officially by the title of director of the naval reactors division of the AEC but who is known worldwide as the father of the nation's nuclear Navy, emphasized the AEC's role in forwarding the first nuclear submarine, the Nautilus.

"The AEC provided the engine when the Defense Department failed to demonstrate interest. And later it was the Defense Department who seemed to be strong about giving our secret away," he said.

He said the "community here has always supported our work and we were greatly appreciative of this support . . . and incidentally of the wives you have given to our Navymen training here," he said.

Alex Creek, president of the Eastern Idaho Chamber of Commerce, and Mayor S. Eddie Pedersen of Idaho Falls, expressed gratitude to AEC leaders at the meeting for "your fruitful work in Idaho, and may we cooperate fully here in your continued efforts."

Dr. Seaborg also lauded William Ginkel, Idaho AEC manager for "his very effective arrangements today."

Mayor Pedersen noted that "a most impressive array of Senators and Congressmen attended the ceremony at the site today but, because of other commitments, could not be with us tonight." Then he read a list of 10 senators and Congressmen from other states, including Cong. Chester Holifield, chairman of the Joint Congressional Committee on Atomic Energy, who had to leave early Friday afternoon after the dedication rites.

A special citation to Argonne National Laboratory for its significant pioneering effort with the Experimental Breeder Reactor No. 1 — the object of the dedication — was presented by Dr. Seaborg, to Dr. George Beadle, chancellor of the University of Chicago. Dr. Beadle, in turn presented the plaque to Dr. Stephen Lawrowski, acting director of Argonne National Laboratory, who in turn presented the citation to Meyer Novick, Idaho division director for Argonne.

The AEC plans a large part of its future development in Idaho, Dr. Glenn T. Seaborg, Washington, D.C., chairman of the AEC, told a banquet crowd of some 750 at the Idaho Falls Elks Lodge Friday night.

"The Idaho site will have a good future, I am sure we can say," Dr. Seaborg emphasized in brief remarks at an evening banquet staged for visiting notables attending the dedication ceremony at the Idaho reactor station Friday morning.

The banquet was sponsored by the Eastern Idaho Chamber of Commerce.

Dr. Seaborg disclosed at the meeting that President Johnson was "very pleased with his reception in Idaho".

President Pleased

"I know when I was on the helicopter with him flying to the atomic station, he inquired of me whether people would actually drive the 50 miles to the Idaho reactor station for the ceremony. When he got off the plane and saw the huge crowd which was estimated at 18,000 I understand, he was most pleasantly surprised and pleased. Mrs. Johnson was also most pleased with the presentation made here today in Idaho. And I want to say I will remember it pleasantly a long time and I have certainly been happy to take part in it all," the AEC chairman said.

Other pictures and stories on the presidential junket here appear on page 7.

LOKALCHRONIK

September 1966

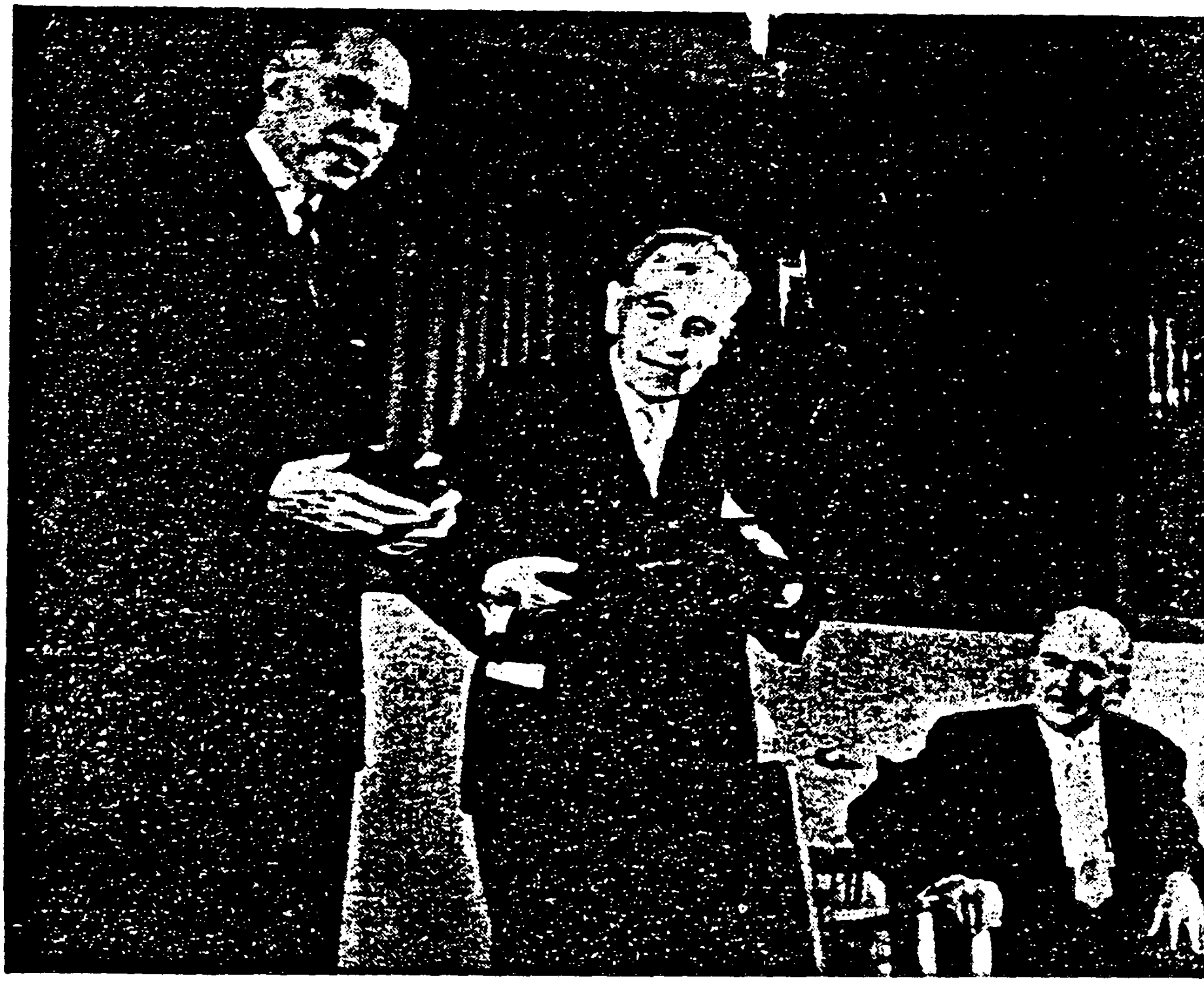


Photo: „Die Presse"/Kloss

EIN PIONIER DER ATOMWISSENSCHAFT WIRD GEEHRT

Lächelnd nahm am Freitag in der Wiener Hofburg der Atomforscher Otto Hahn (im Bild links) den Enrico-Fermi-Preis aus den Händen des amerikanischen Chefdelegierten Glenn T. Seaborg entgegen. Der Preis ist die offizielle Anerkennung der US-Atomenergiekommission für die bahnbrechenden wissenschaftlichen Arbeiten von Professor Hahn.

Fermi-Preis für Atomwissenschafter

Überreichung an Otto Hahn und Fritz Straßmann während der IAEO-Generalkonferenz in Wien

Eigenbericht der „Presse"

WIEN (rdk). Einen Höhepunkt auf der zehnten Tagung der Generalkonferenz der IAEO in der Hofburg bildete am Freitag die Überreichung des Enrico-Fermi-Preises durch den Leiter der amerikanischen Delegation, Glenn T. Seaborg, an die Atomwissenschafter Professor Otto Hahn und Professor Fritz Straßmann in Anwesenheit von Bundeskanzler Klaus. Da die Wissenschafterin Lise Meitner, die ebenfalls mit dem Preis ausgezeichnet wurde, nicht an der Generalkonferenz teilnimmt, wird ihr die Auszeichnung in England überreicht werden.

Dr. Hornig, der Sondervertreter Johnsons, verlas zunächst eine Grußbotschaft des amerikanischen Präsidenten, in der dieser darauf hinwies, es sei das erste Mal, daß mehrere Gelehrte den Preis gemeinsam erhielten, und es sei ebenso das erste Mal, daß die Auszeichnung einer Frau zuteil geworden ist. Dann erinnerte Seaborg daran, wie ihm als jungem Dissertanden und später bei seiner Arbeit am Plutonium Otto Hahns Werk „Applied Radochemistry" fast zur Bibel geworden war.

Otto Hahn dankte in herzlichen Worten für die Zuerkennung des Preises und berichtete kurz über die wissenschaftlichen Arbeiten, die schließlich zur Kernspaltung geführt hätten. Fritz Straßmann betonte die Wichtigkeit der chemischen Forschungen für die in der Kernforschung erzielten Erfolge. Anschließend an die Preisüberreichung folgten fünf Festvorträge von namhaften Gelehrten: Sir John Cockroft für Großbritannien, Prof. Louis Neél für Frankreich, Prof. Alexander Leipunski für die UdSSR, William Webster für die USA und A. R. Gopal-Ayengar für Indien. Der englische Redner teilte mit, daß gerade für Großbritannien die Atomenergie, von der man bis 1975 eine jährliche Kapazität von 13.000 Megawatt erreichen könne, von besonderer Bedeutung sei. Prof. Neél sprach über atomare Grundlagenforschung, während Prof. Leipunski von den technischen Möglichkeiten der Atomkraftwerke sprach.

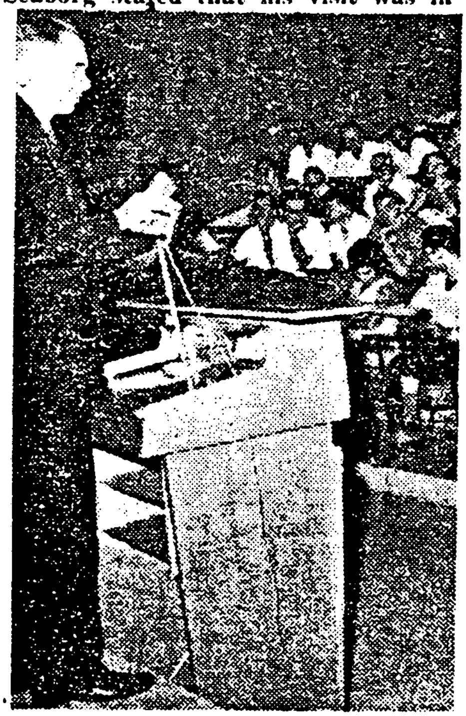
William Webster behandelte in seinem Vortrag die wirtschaftlichen Aussichten der Kernenergie und meinte, in etwa dreißig Jahren müsse man ein sechs- bis achtmal größeres Stromnetz als das heutige aufbauen.

Um die Ansichten der amerikanischen Regierung über sämtliche mit der Entwicklung der Atomenergiewirtschaft verbundenen Fragen darzulegen, veranstaltete der amerikanische Chefdelegierte Glenn T. Seaborg am Freitag eine Pressekonferenz. Als sehr wichtig vermerkte er den Umstand, daß in den wissenschaftlichen Beziehungen zwischen Amerika und der UdSSR trotz dem Vietnamkrieg keine Verschlechterungen eingetreten seien. Er behandelte auch sehr ausführlich die Anwendung der Atomenergie im amerikanischen Raumfahrtprogramm. Raketentriebwerke auf nuklearer Grundlage, so sagte er, würden in Amerika vor allem für länger dauernde Raumflüge über den Mond hinaus bis zum Mars oder zur Venus entwickelt. Er ging dann auf die Frage der Sicherheitskontrollen durch die IAEO über und forderte Kontrollen innerhalb von trilateralen Abkommen unter Einbeziehung der IAEO.

Eshkol & Seaborg confer on desalting

Jerusalem Post Staff

Professor Glenn Seaborg, Chairman of the U.S. Atomic Energy Commission, conferred with the Prime Minister for two hours yesterday. The chief topic is understood to have been the proposed joint Israel-U.S. nuclear desalination project. The meeting, at Mr. Eshkol's seaside hotel, was in the nature of an informal exchange of information, useful to both countries, and not in any way official negotiations. In fact, in an interview with The Jerusalem Post in Rehovot, Prof. Seaborg stated that his visit was in no way connected with the desalination project.



Dr. Seaborg addressing scientists and students at the Wix Auditorium at the Weizmann Institute yesterday afternoon.
(Photo by Newsphot)

He said he had come to meet nuclear officials — among whom he included Mr. Eshkol who is head of the Israel Atomic Energy Commission.

Following their meeting, Mr. Eshkol gave a dinner for his guest. Among those present were the U.S. Ambassador, Mr. Walworth Barbour, and the Scientific Attache of the Embassy, Dr. Robert Weber, and Professors David Peleg and Israel Pelah of the Weizmann Institute, Dr. U. Streifeld, Dr. Ya'acov Herzog, Director-General of the Prime Minister's Office, and Mr. Aviad Yaffe, Mr. Eshkol's Political Secretary.

During his three-day visit to Israel, Professor Seaborg visited the reactor at Nahal Sorek. Asked if he had also gone to see the Dimona reactor, the U.S. atom chief said it was "too far away." He denied emphatically that his visit was in the nature of an "inspection." Apart from wishing to meet nuclear physicists, with some of whom he had worked while at Berkley, he had chosen to come to Israel on his way home from the International Atomic Energy Conference in Vienna because "since I was a small child I've heard about this country and I've always wanted to see it."

Professor Seaborg predicted that Israel would be using atomic plants to produce much of its electric power by the 1970s. He thought a "New York Times" report that Israel could produce an atomic bomb "in a matter of months" to be "exaggerated."

Professor Seaborg lectured yesterday at the Weizmann Institute on the present status of trans-uranium elements. While in Jerusalem on Sunday Dr. Seaborg crossed into the Old City for a few hours to visit the Christian Holy Places. He is due to fly to Greece this morning.

Irish Independent, Thursday, September 29, 1966

President de Valera talks with Dr. Glenn T. Seaborg, chairman, U.S. Atomic Energy Commission, and the American Ambassador, Mr. Raymond Guest, after the President opened the "Atoms in Action" at the R.D.S. yesterday.

IRISH TIMES, SEPTEMBER 29, 1966

Atomic energy for peace

DR. GLENN T. SEABORG, chairman of the United States Atomic Energy Commission, currently holding an "Atoms in Action" exposition at Ballsbridge, Dublin, lectured last night to a full audience at the Royal Dublin Society members' hall, on the "Peaceful Uses of Atomic Energy."

Dr. Seaborg was introduced by Dr. E. T. S. Walton. It was their first meeting since they both received their Nobel Prizes in 1951.

In his lecture, well illustrated by films and slides, Dr. Seaborg spoke about the use of atomic energy to genereate electricity, to de-salt sea-water, to propel ships, to power space-rockets, to develop radio-isotopes for performing invaluable services in medicines, agriculture and industry.

On electricity he said: "Nuclear power is proving to be a safe, clean and efficient means of producing electric power and is responsible for a surge of interest on the part of electric utilities in the U.S."

Referring to an illustrating film he explained that uranium (enriched) was the element used in the reactors and that they burn less than 1% of their nuclear fuel. "We are already well under way in developing dual-purpose nuclear plants which will produce both electrictiy and fresh water in large amounts in the important use of nuclear energy of desalting sea-water", he said.

"When we harness the power of nuclear fission we will make further use of sea water by using the heavy hydrogen atoms in it as a fuel to produce fusion."

"This will give us an almost unlimited source of energy." Dr. Seaborg explained that the heat from decaying radio-isotopes is also an important source of energy which scientists are putting to use.

Having dealt with the nuclear powered rocket and illustrated much of the American space programmes, Dr. Seaborg went on to the "plowshare programme." This would help in the improving of excavation technology resulting in and aid to mining.

The radio-isotope had been called the most important scientific tool since the invention of the microscope.

Explaining the various uses of the Gamma Irradiation Facility in medicine, agriculture and industry, Dr. Seaborg mentioned as an instance that radiation from radio-isotopes had been used to create new plant mutations which were selectively bred to produce better crops. It had also been used to eradicate certain agricultural pests.

"Radio-isotopes" said Dr. Seaborg, "have been saving U.S industry about 500m. dollars a year in helping to create better products"

He hoped that the younger people in the audience would go on to become scientists and engineers in the nuclear energy field and get an opportunity to expand on what was being done today. The world of the peaceful atom was growing, and would be offering a growing number of opportunities.

BUFFALO EVENING NEWS, October 14, 1966

Nuclear Service Plant Milestone in History of Atom, AEC Head Says

By Buffalo News Staff Reporter

WEST VALLEY, Oct. 14 — Dr. Glenn T. Seaborg, chairman of the U. S. Atomic Energy Commission, today forecast that this area's new nuclear plant "will have a significant role in the growth of the nation's economy."

In dedicating the $32-million spent-fuel reprocessing plant opened April 20 by Nuclear Fuel Services Inc., Dr. Seaborg also hailed the plant as "an important milestone in the history of the peaceful atom."

He spoke before about 300 persons within the company compound.

Sees Bright Future

Dr. Seaborg was brought by car to the site of the state-sponsored Western New York Nuclear Service Center from Greater Buffalo International Airport where he arrived on a commercial flight from Washington.

The official hammered at the theme that the economy of the area and the nation, and the growth of the new reprocessing industry are allied closely with the projected proliferation of nuclear-energized power generating plants.

Sketching a bright outlook, Dr. Seaborg pointed out that the demand for electricity in this country has been doubling about every 10 years.

Nuclear Power of Age

He noted that the present annual generating capacity is about 250 million kilowatts and forecast that "this will increase to about 520 million kilowatts by 1980 and to about 1.6 billion kilowatts by the year 2000."

He tied the challenge to discover a new generating source to supplement fossil fuels to the harnessing of the atom almost 25 years ago.

"The development of this source of power to a point where it is now economically attractive in many areas, was a long, difficult task accomplished by close co-operation between government and private industry," he asserted.

"Nuclear power has come of age and we look forward to its playing a major role in supplying electricity to this country and the world." he added.

DR. GLENN T. SEABORG
Sees Major Role for Atoms

Foresees Area Benefits

Looking ahead again, Dr. Seaborg said "it is conceivable that by the year 2000 almost all of the new generating plants that are built will be nuclear."

He predicted "many benefits" to West Valley and vicinity "in the form of tax revenues, employment opportunities and the stimulation of area business."

Labeling the enterprise as a "noteworthy step in the development of a strong, self-supporting nuclear industry," he saluted officials of W. R. Grace & Co. and American Machine & Foundry Corp., parents of Nuclear Fuel.

He also lauded the roles of the five power utilities which invested $450,000 in a study that concluded "such a privately owned facility would be feasible."

Dr. Seaborg noted that the AEC policy to shift the emphasis on peaceful nuclear energy to private enterprise was born in 1954, and that the Town of Ashford plant is the first of its kind anywhere solely under industry auspices.

Dr. Seaborg had another role in the exercises. He unveiled and presented to T Charles Runion, NFS president, a bronze plaque bearing President Johnson's message issued when the plant began operating.

Oliver Townsend, chairman of the State Atomic & Space Development Authority, presented a second plaque with similar comments from Gov. Rockefeller, released at the same time.

May Be World Force

Dr. Seaborg reminded his audience that the plant also will focus worldwide attention on Cattaraugus County because of its potential toward helping restrict nuclear energy to "peaceful and constructive purposes."

He reviewed a United States offer in Vienna last month to open the plant to inspection by the International Atomic Energy Agency.

The need for developing international safeguards is vital, Dr. Seaborg explained, because "it would be possible for a country to use the plutonium from reprocessed fuel as the explosive ingredient in nuclear weapons instead of for peaceful endeavors."

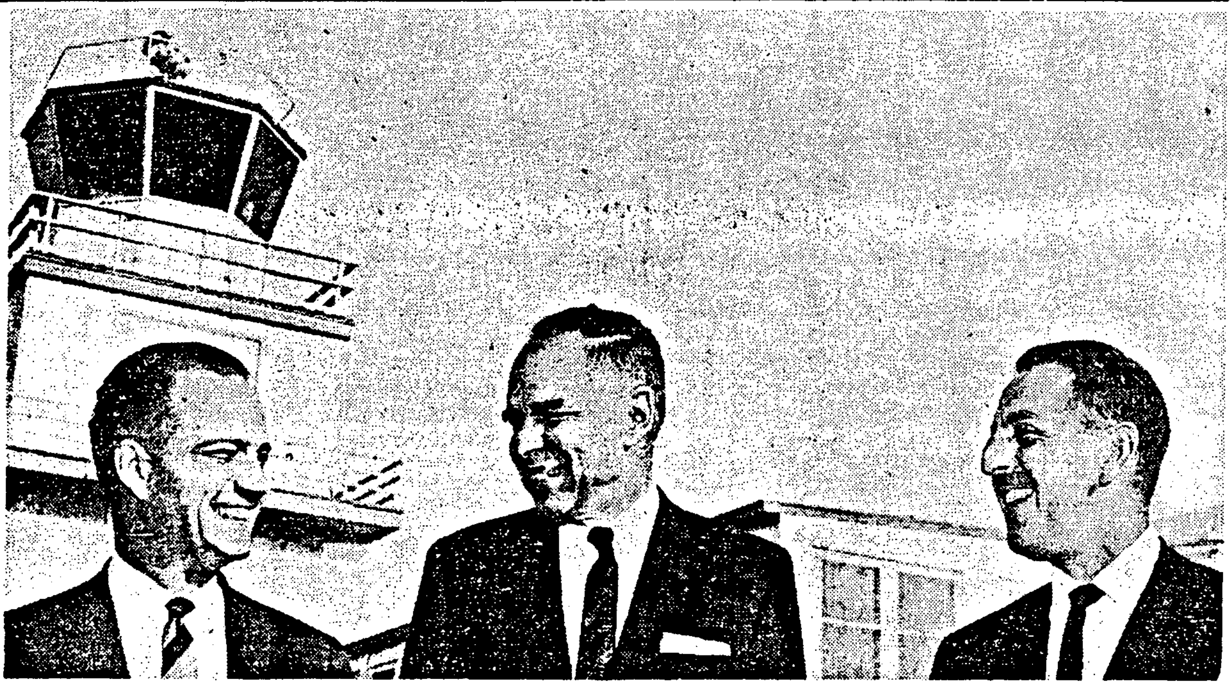
Safeguard Manual Authorized

Under the offer made jointly by AEC and NFS, the plant might become a global campus for the training of IAEA inspectors, he said.

In this connection, Dr. Seaborg revealed that AEC has authorized the company to prepare a safeguards training manual based on its operations.

"As a result, the International Agency should be better prepared to enter the new field of safeguards for nuclear fuel reprocessing plants, and this plant will play an important role in mankind's quest to develop and share the peaceful atom." he declared.

Tri-City Herald
Telephone: 582-5151
Tuesday, October 18, 1966 VOL. 62, NO. 247 Pasco, Kennewick, Richland, Washington COPY 10c



Dr. Glenn Seaborg, center, chairman of the Atomic Energy Commission, was greeted at the Tri-Cities Airport this morning by Donald G. Williams, left, manager of the AEC's Richland operations. Dr. Seaborg, accompanied on the one-day visit by Julius Rubin, right, his staff assistant, was given a briefing by local AEC officials and Hanford contractors.

By CARROLL CLARK
Herald Staff Writer

A site for the fast flux test facility, estimated to cost $100-million, is expected to be picked in another 6 months to a year.

Dr. Glenn Seaborg, chairman of the Atomic Energy Commission, said at a press conference at the Tri-Cities Airport this morning that "more will have to be known about the facility" before a site is selected.

Battelle-Northwest is in charge of engineering and design for the FFTF, a test facility for developing advanced nuclear fuels and providing engineering and scientific data for development of economic power breeder reactors. Hanford has been mentioned among the possible sites for the facility.

Dr. Seaborg, making a one-day visit to the Tri-Cities for briefings by local AEC officials and Hanford contractors, also said he didn't see any great problems with locating private or public utility power reactors on the Hanford reservation.

NOT FAMILIAR

He added, however, that he wasn't totally familiar with the situation and "I don't know if it would even be necessary to use Hanford for sitings," for the reactors.

Bonneville Power Administration said last week it could use an additional one-million kilowatts by 1971 and a new one-million kilowatt nuclear plant would be needed each year starting in 1975 to meet the power needs of the growing Pacific Northwest region.

Dr. Seaborg, commenting on the AEC's Hanford laboratories operated by Battelle, said "I think the laboratory has a very good future" in relation to AEC programs. He expressed pleasure that the $5-million appropriation has been approved for the new biology laboratory in the 300 Area.

"The Hanford group over the years has made significant contributions to the biology programs" and "it is very proper they be furnished with facilities to carry on their excellent work."

APPOINTMENT

The AEC chairman also lauded the appointment of W. E. Johnson, former Richland councilman and general manager of General Electric's operations at Hanford.

He termed Johnson "a good man" who "adds balance to the commission with his industrial background. This is now as balanced and good a commission as we have ever had."

Commenting on the state of Washington's plan to enter into an agreement with the AEC to give the state certain regulatory powers over radioactive materials, Dr. Seaborg said it is good for states to take over the regulatory function and the AEC encourages this.

However, national regulations always will be required and the AEC always will have a national responsibility.

As for the advent of the nuclear power plant era in the Pacific Northwest, Dr. Seaborg could see no regulatory problems so long as the standard, water-cooled reactors are used. If, however, the region gets into use of advanced type reactors, then the AEC involvement may be increased.

Dr. Seaborg, who arrived at 10 a.m. and was scheduled to depart at 6 p.m., was accompanied by Julius Rubin, his staff assistant. Greeting him at the airport were Donald G. Williams, manager of the AEC's Richland office, and A. M. Waggoner, assistant manager for administration.

TRI-CITY HERALD OCTOBER 18, 1966

Dr. Glenn Seaborg, center, chairman of the Atomic Energy Commission, was greeted at the Tri-Cities Airport this morning by Donald G. Williams, left, manager of the AEC's Richland operations. Dr. Seaborg, accompanied on the one-day visit by Julius Rubin, right, his staff assistant, was given a briefing by local AEC officials and Hanford contractors.

SEABORG TO SPEAK:

Science Called Key to Strong Democracy

The continued existence of a democracy and the continued economic well-being of its people are dependent on science and demand a public understanding of science, Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission, said here today in an interview.

Seaborg will be the keynote speaker when the 1966 Arches of Science Award is presented to Dr. Rene Dubos of Rockefeller University, New York, at a banquet this evening in the Pacific Science Center.

SEABORG, 54, said improved school curriculums and institutions like the Pacific Science Center are giving the coming generation the understanding of science that will be needed.

In discussing nuclear testing, Seaborg said:

The nuclear devices being tested by Red China are "relatively crude," but the tests indicate the ability to produce better devices.

A comprehensive nuclear-test - ban treaty would require on - site inspection. This requirement is based on the United States' policy seeking further reversal of

DR. GLENN T. SEABORG

the nuclear-arms race.

Russia and the United States are continuing to make underground nuclear tests. There are no new off-site detection methods.

Regarding nuclear sources of electricity, Seaborg said:

The cost of nuclear power is comparable with traditional power sources in installations of 500,000 - kilowatt capacity and larger.

TWENTY to 25 power companies have prepared contracts to use a total of more than 5 million kilowatts of nuclear - energy - produced power.

Seaborg said he was surprised that the atoms he helped split in the 1940's could be producing commercial electricity so soon.

AEC Head: A-Power Due

BY STAN NAST

Even this state, which has prospered on inexpensive hydroelectric power, soon will be turning to atomic energy for its new production of electrical energy, the chairman of the U.S. Atomic Energy Commission said here Tuesday night.

Dr. Glenn T. Seaborg said the age of producing energy commercially from the fission of atom particles is already upon us.

"Right now," he said, "there are about 20 utilities that have ordered fission plants to produce some 15 million kilowatts."

BY SEABORG'S estimate of Seattle's consumption, one or two million kilowatts a year, that doesn't seem much, but he predicted that by 1980 the production from fission will be 100 million kilowatts.

With high-output hydroelectric sites in this state practically used up, some of those fission plants might be here, he added.

"A fission plant for a million kilowatts costs around $125 million," Seaborg said. "That is slightly more than the cost of a steam plant fired by coal or oil for the same output, but the fuel cost will be less and this will offset the original higher investment."

A fission plant with a capacity of less than 500,000 kilowatts is not economically practicable, however, the scientist added, so small towns won't be building them.

THERE WON'T be any contamination of air, water, or soil from fission plants, Seaborg said. In fact, the main cost in such plants is the need for protection against accidents that could produce contamination.

"There will be a slight radioactivity in the emissions from stacks of fission plants," he said, "but it will be less than that from coal-fired steam plants."

Seaborg himself is a little surprised at the relatively sudden adaptation of atomic energy for the commercial production of energy on a large scale.

"When I produced the first plutonium in World War II I felt that it would be used someday for producing electricity," he said, "but I didn't believe then that it would be this soon."

HE IS HERE to address the Arches of Science Award banquet tonight in the Eames Theater of the Pacific Science Center.

The recipient of the award, announced earlier this month, is Dr. Rene Dubos of the Rockefeller University in New York City.

The award, from the Pacific Science Center Foundation, is $25,000 cash and a gold medal. It was established last year and is presented annually to someone who has contributed outstandingly to contemporary man's understanding of the meaning of science.

A Glittering Evening In Praise of Science

BY FERGUS HOFFMAN

The chairman of the Atomic Energy Commission, honoring the 1966 winner of Seattle's Arches of Science Award, Wednesday night told a glittering audience at the Pacific Science Center that "we are only at the beginning the the Scientific Revolution."

So saying, Dr. Glenn T. Seaborg called for general public faith in the virtues of science, the same faith which enabled Rene Jules Dubos, the Arches winner, to become the first physician to prevent infection by using antibiotics.

DR. DUBOS, a microbiologist, was extolled as a pioneer in medicine and science at the presentation banquet in the Eames Theater by Dr. Dael Wolfle, executive director of the American Association for the Advancement of Science. Dubos was the first to discover and use soil bacteria which kill dangerous organisms in man.

"For these contributions, and for paving the way for the development of other antibiotics, you have been called the father of the antibiotic era," Dr. Wolfle noted.

The gowned and black-tie assemblage of 400 invited guests applauded as Dr. Dubos received the heavy gold medal symbolic of the award, presented annually to a scientist who has made major contributions to public understanding of the role of science. Aside from his work in the laboratories at Rockefeller University, he is a lecturer and writer in the cause of spreading the understanding of science.

DR. SEABORG said:

"Thousands of people are employed today in flourishing industries which are based on knowledge that did not exist 10 years ago...

"By and large, the intangible future has always been hard for man to grasp. However, the future depends upon faith that, in the progress of science, history will repeat itself; that nature is only beginning to yield up its most fundamental principles, and that the new knowledge we gain will enable us to realize our dreams for the world of tomorrow."

SEABORG warned that confusion about what science is, often causes considerable mischief. Government support of scientific effort often comes under attack by people who do not understand.

"It is true that nuclear weapons were an outgrowth of new scientific knowledge," he conceded, "but so is the nuclear reactor, which promises to perpetuate a technological civilization that is dependent upon high quantities of energy.

"In other words, knowledge is born without moral properties.

"It is man who applies knowledge, and he applies it according to his acquired patterns of behavior. Man, not knowledge, is the cause of violence."

DR. SEABORG said he is convinced that "a large portion of the public" is interested in and capable of absorbing considerable scientific knowledge. The problem is to cultivate this interest.

"The need for (at least) minimum understanding is with us now," he stressed. "We must attend to it now, and at the same time building toward rising levels of understanding in the future."

Calling for wider discussion of the meaning of science in publications, public seminars and in all institutions of learning from kindergarten up, he added:

"I believe we are only at the beginning of the Scientific Revolution.

"As this revolution accelerates, so will our dependence upon the processes of science and technology.

"Wisdom in self-government requires that we as a people know more, and still more, about those processes of the Scientific Revolution that deeply affect our lives."

Oct. 23, 1966

St. Louis Post-Dispatch

EDUCATION

SEABORG CITES SCHOOL MISSION IN COUNCIL TALK

By WILLIAM K. WYANT
A Washington Correspondent
of The Post-Dispatch

WASHINGTON, Oct. 22—The Council for Basic Education, an organization that has served as a constructive gadfly to American education, is observing its tenth anniversary.

Glenn T. Seaborg, chairman of the Atomic Energy Commission and Nobel prize laureate, spoke at a public session of the council here Friday. Another speaker was Jacques Barzun, dean of faculties at Columbia University.

Seaborg commended the council's president, Mrs. Barry Bingham, vice president of the Louisville Courier-Journal and Times, and other leaders for the work done by the organization in strengthening the teaching of basic subjects in American schools.

". . . It has helped to alert both the public and the teaching profession," Seaborg said, "to the overriding necessity for raising the standards of instruction and achievement in basic disciplines — English, mathematics, science, history and foreign languages."

Function of the Schools

Seaborg said that although citizens of a democracy are born free, they are not born wise. It is the mission of the schools in a democracy, he said, to make free men wise.

"The only man who is truly free to choose is the man who knows the choices," Seaborg said. "This mission — together with the growing importance of science and technology in shaping local, national and world problems—makes it imperative that our schools produce both public-spirited scientists and scientifically educated citizens."

Seaborg said that both the sciences and the humanities must be further strengthened in the nation's schools. He continued:

"Without knowledge of the humanities, science would lack vision, inspiration and purpose. Without an understanding of science, the humanities would be unable to comprehend and express many significant conceptions of man and nature.

"And without a better understanding of both science and humanities, our citizens and their leaders may become helpless in guiding our destiny against the onrushing currents of technological change."

Seaborg cited great improvements in the teaching of science in the last 10 years. In the past it often seemed, he said, that school science had been swallowed up in the goal of "life-adjustment."

He expressed dissatisfaction that some 60 per cent of high school students at present do not study chemistry, his own subject.

Teacher Pay A Handicap

On the need for recruiting more teachers for the expanding school system, Seaborg pointed to the persisting difficulty of low pay. He said teachers in the 35- to 55-year-age group earn $2000 a year less than the median earnings of the total college graduate group in the civilian labor force.

"But just as bad, if not worse, than low salaries for teachers," he said, "is the lack of opportunity for advancement and for the assumption of that increased responsibility which in other professions usually accompanies merit and experience."

Dean Barzun, the French-born scholar and author, said that the blame for what he would call "the present predicament in education" cannot be placed on John Dewey, who like other great teachers attacked rigidity.

Barzun Pinpoints Trouble

"Our chief trouble," Barzun said, "is that we have made a rigidity out of looseness, while also neglecting or despising common sense.

"In our zeal to give everybody a drink at the nourishing founts of learning, we have doused with floods of tap water the milk and the wine and the honey."

The Council for Basic Education, organized in 1956, is not universally beloved by American schoolmen, but its influence has been great. Its executive director, Mortimer Smith, edits the council's 10-times-a-year Bulletin.

This year the council published a 156-page paperback called "A Decade of Comment on Education," in which it included selections from the trenchant, hard-hitting and frequently humorous Bulletin.

"It has been a happy experience," Smith says in a foreword, "to discover over the years that not all educationists are anti-intellectual clods who look on things of the mind as being the least of the school's concerns."

THE WASHINGTON POST
A 2 Monday, Oct. 24, 1966

Woman Who Released Atom 'Genie' Honored

By Peter Osnos
Special to The Washington Post

CAMBRIDGE, England, Oct. 23—"We were unaware," Lise Meitner said, "what kind of powerful genie we were releasing from a bottle."

Dr. Meitner and two colleagues released their genie in Berlin in the 1930s and showed the way to the atomic bomb.

Today, the frail, 87-year-old scientist was formally presented with a share of America's highest award for nuclear research, the Fermi Prize, at a brief private ceremony attended by only a few relatives and her host, Cambridge professor and Nobel Prize winner Max Perutz.

"Lise was always very shy," Dr. O. R. Frisch, her nephew and a professor of natural philosophy, said.

Even if she had been well, he added, she probably would have preferred the presentation to be in private.

He said that after she fled the Nazi regime in 1938 and went to Sweden, the allies asked her to help in the development of the atomic bomb and she flatly refused.

Dr. Meitner is a timid woman, now too ill to travel and somewhat appalled by the consequences of her early work. But today that work brought her part of the Fermi award and a special visit from Atomic Energy Commission Chairman Glenn T. Seaborg.

Dr. Seaborg, representing President Johnson, flew here especially for the presentation in Perutz' living room. He will return to Washington after a lecture tonight.

The idea for the presentation came after Dr. Meitner was too ill to go to Vienna last month and receive it with the two other winners—Dr. Otto Hahn, 87, and Dr. Fritz Strassman, 64.

Hahn and Strassman, who live in West Germany, worked with Dr. Meitner at the Kaiser Wilhelm Institute in Berlin and performed a number of experiments in the 1930s dealing with the splitting of the uranium atom.

Their discoveries, scientists say, led to Enrico Fermi's achievement of controlled and sustained release of energy by nuclear fission—and the atomic bomb.

Dr. Meitner is the first woman to receive the Fermi Prize, and the three winners of this year's award are the first scientists living outside the United States to receive it.

Dr. Meitner sat on a couch with Seaborg and chatted quietly. After accepting her share of the $50,000 prize, she submitted reluctantly to a short round of picture taking organized by Atomic Energy Commission officials.

OAK RIDGER November 4, 1966

Seaborg Gives Science Writers Fabulous Assignments For Future

By DICK SMYSER

The science writers who have been meeting in Gatlinburg since Monday and who came to Oak Ridge this morning for a day-long tour, were told Thursday night how very important they are by Glenn T. Seaborg, chairman of the U. S. Atomic Energy Commission.

And then, after citing their immense role, he gave them some rather fabulous assignments for the next 50 to 100 years.

Like:

Reporting on vast new systems of weather information and even control that will likely develop —systems that will make forecasts exceedingly accurate and long - range — will even allow vacationers to plan their trips to resorts with assurance that they'll have sunshine and warmth:

Reporting on the huge industrial complexes that might someday be established in remote areas —operated virtually completely by automatic systems — taking into them all of what we now consider the wastes of our civilization and recycling it into useful materials —the "junkless society."

Or reporting, something very apropos to this weekend before election, the results of "push-button plebiscites" — "instant democracy" — high - speed, electronic systems to provide an instantaneous sampling of public opinion that would be essential to maintaining democratic governments in a new world of a much more highly - educated populace —a society with little work to do in the sense that we think of work now, with a great deal more time for thought, intellectual development.

Seaborg doesn't see any of these things occurring immediately, but he feels they are definite possibilities — even more accurately probabilities — for the future.

And the science writers, he said, are going to be vital in seeing that these and other probabilities develop not only most rapidly, but most widely.

"You are in the challenging and enviable position of being the ones to take some of the mysticism out of science and bridge the gap between the growing body of people whom science affects and should have more say in its direction and use." he told the writers at a dinner Thursday night at Gatlinburg's Mountain View Hotel.

The advance of science is so momentous today, Seaborg said, that "we can ill afford ill-informed backseat drivers." He believes that public opinion does have and will have a great effect on the direction of science and he thinks that science writers can play a major role in assuring that public opinion is most enlightened and has, therefore, an effect on science for the maximum good.

Seaborg, saying that he wanted to, for a moment, play the "Devil's Advocate," cited what he sees as great world problems today created by science — overpopulation, created by scientific advances in medicine that keep people alive longer; pollution of air and water, created by great industrial advances made possible by science.

However, he went on to stress that he sees within science today the greater power to correct these science - created problems and he is optimistic that this is the direction in which the world is moving.

"I contend that, better than any time in our history, we do know where we're going and in general are choosing the best means and course in getting there. The very fact that today we have so much discussion of the forces of change, so much concern, and so much thinking and planning of the future makes me optimistic about our control of science and technology," he said.

The major role in the wondrous developments that he sees ahead will be played by energy, he said. And the major development in energy will be in nuclear energy. He cited the talk made earlier to the writers' conference by Alvin M. Weinberg, ORNL director, who told of the prospects for virtually unlimited breeder reactors and, in time, controlled fusion.

It is this immense energy supply — clean, self-perpetuating — that will open the doors to all of the amazing developments Seaborg foresees:

Others, besides those already mentioned: Casual living under seas, electric-powered cars riding piggy-back long distances on specially-built railroad cars, vastly improved methods of intercontinental transportation of cargo.

Some other quotes from Seaborg's talk:

"Unfortunately, while most of the books and articles on the role of science in society are interesting and informative their titles are not very intriguing. I think we could reach a wider public with this information if we used such titles as 'Science and the Single Girl' and 'Unscientific At Any Speed.'

"We might also refer to all our scientists and engineers by double-O numbers and give our organizations names whose initials spell out relatives like UNCLE. Somehow 'The Man from Oak Ridge National Laboratory' just doesn't have the right ring to it."—

"But as a scientist I remain optimistic. For as I have indicated, from a scientific and technological standpoint we have, or have confidence that we can develop, the means not only to control our future world population but to feed, house and generally raise the standard of living of far more than the six billion people whose presence is predicted for the year 2000. What is needed along with the science and technology being developed today is a comparable — perhaps an even greater — drive to organize and activate the social forces necessary to put our knowledge and resources to work. If there is any lesson to be learned from the problem created by the scientific revolution of recent decades, it is that civilization can no longer progress piecemeal. Technological change is now too rapid and far - reaching in its effects to allow us to muddle through."—

"The scientivic, economic, social, and moral implications of all this — of man's control of life itself — are too enormous for me to begin to delve into now. But I am sure this is an area about which all of you here this evening will be hearing, thinking and writing for years to come."

Chinese A-System Seen in Few Years

By DAVID MORGAN

Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission, said in Dallas Thursday Red China will have fully developed nuclear and thermonuclear weapons in "a matter of years."

But, he said, by that time the United States will have capable defense techniques.

"We have been watching progress in Red China several years now. She will have a capacity to build nuclear weapons—and eventually thermonuclear weapons.

"It will be a matter of years,". he said.

He said Red China is building more sophisticated delivery equipment and may have systems such as intercontinental ballistic missiles "sometime in the 1970s."

"She will have her weapons, but we also will improve ours," he said.

Dr. Seaborg spoke at a press conference at Love Field Thursday afternoon.

He said the use of nuclear power in the United States for peaceful purposes will continue to increase.

At the present time, he said, 1 million to 2 million kilowatts of electrical energy in the United States is produced by nuclear power.

He predicted "something over 10 million kilowatts in about 1970 to 1971," and foresaw "about 100 million kilowatts by 1980."

Nuclear power, he said, is used in some areas because it is cheaper there than conventional fuel. In Texas, he said, There is a plentiful source of fossil fuel and natural gas.

Dr. Seaborg said he foresees the day when all countries will use nuclear power.

He said changes brought about by nuclear power will enable countries to make economical advances and will allow them to increase their standards of living.

Dr. Seaborg addressed the Dallas Council on World Affairs Thursday night and warned of a threat posed by the use of nuclear power if unrestrained.

"Nuclear reactors which generate electricity also produce plutonium which in the absence of effective safeguards has the potential for use for military as well as peaceful purposes—that is, for nuclear weapons as well as for nuclear fuel.

"As the world's production of nuclear electric power increases, the world's production of plutonium will also increase," he said.

"Thus it is imperative that the world be protected against the use of this nuclear material for military purposes—against what, as you know, is commonly referred to as the proliferation of nuclear weapons."

—Dallas News Staff Photo.

Dr. Glenn T. Seaborg . . . urges cooperation in nuclear development.

He suggested that a sharing of unclassified nuclear information be started among all countries.

He said international agencies could be responsible for the control of the information and its use. Two of those are the International Atomic Energy Agency (IAEA) and the European Atomic Energy Community (Euratom).

"If safeguards are discriminatory, as some countries contend, they discriminate on behalf of an interest which all countries of the world should share—the paramount need to prevent the further spread of nuclear weapons.

WASHINGTON POST DECEMBER 17, 1966

AEC Chooses Weston, Ill., as Site Of World's Biggest Atom Smasher

12-17-66

By Thomas O'Toole
Washington Post Staff Writer

The Atomic Energy Commission yesterday decided to build a mammoth atom smasher in Weston, Ill., a small village that doesn't even have a post office, 30 miles west of Chicago.

The choice of Weston ended months of speculation over where the AEC would locate the machine, a 200-billion-electron-volt accelerator that had originally been sought by all but five of the Nation's 50 states in a sometimes frantic and bitter competition.

When built, the accelerator will be the world's largest scientific instrument. It will cost as much as $375 million, take 1200 full-time workers eight years to build, employ more than 2000 persons and require a budget of $60 million a year to pay for salaries and electricity and water bills.

Weston won out over five other finalists in the coast-to-coast competition. The losers were the Brookhaven National Laboratory on Long Island; Ann Arbor, Mich.; Madison, Wis.; Lowry Field, near Denver, and Sacramento, Calif.

"After weighing all the factors," said AEC Chairman Glenn T. Seaborg, "the Commission unanimously decided that the Weston site is the most suitable location for this large project."

There had been rumors that President Johnson would kill the accelerator project before the Administration began spending a great deal of money on it, and in one sense the AEC simply deferred the final decision on the project for one year.

This it did by asking for only $10 million for the project in fiscal 1968, for architectural engineering fees at the Weston site over the next year. To keep the project going, the AEC will have to fund $30 million for it in fiscal 1969 and $50 million in fiscal 1970. By that time, just about all the components will have been ordered and construction will be nearing the halfway mark.

In picking Weston over the five other sites, the AEC apparently decided that the Illinois site offered the easiest access to both east and west coasts and was at the same time the most economical of the six finalist sites.

State to Donate Land

The accelerator is to be built on 6800 acres of almost flat farmland to be bought by the State of Illinois and donated to AEC. Not only is the soil at the site easily excavated, it also hits bedrock as close as 50 feet from the surface. This is important because the heart of the accelerator—a 3-mile tunnel—is to be buried 20 feet below ground and may have to be fastened to the bedrock by steel pilings.

Weston is also easily supplied with the 200,000 kilowatts that will be needed to run the accelerator, since it is along the right of way of a 138,000-kilovolt transmission line operated by the Commonwealth Edison Co. of Chicago.

Weston likewise met the academic requirements for the site, being within short driving distance of Northwestern University, the Illinois Institute of Technology and the University of Chicago.

Immediately after the selection was announced yesterday, there were reports that Weston was chosen in an effort to spread some of the Nation's scientific wealth to the Midwest, which in the last five years has complained bitterly that it is not getting its share of the scientific dollar.

This was emphatically denied by the AEC, which claimed that the award to Weston was "on sheer fact and merit."

Background a Factor

An AEC spokesman said that Weston's background and history in civil rights was a factor, "but not an overriding one." Two weeks ago, a report had been circulated that this would be an important factor in the final site choice, and that for this reason the award might go to Sacramento or Denver, which had been given the highest civil rights marks of the six sites by the NAACP.

The choice climaxed almost four years of bitter lobbying and infighting for the accelerator site.

Originally, 118 formal site proposals came to the AEC from 45 states, and almost immediately the backbiting began. Dallas whispered that Houston had a subsurface water problem. Kentucky said Florida was too close to sea level. San Francisco was dismissed as being earthquake-prone.

The competition reached an absurd level when an AEC spokesman was quoted in June of last year as saying, "Our problem is to find a site where scientists can continue their little girls in ballet school." The next day, one city in the running said it had 40 ballet schools while another said it had "a fourth generation" school where ballet was taught.

Then, last March, at AEC insistence the National Academy of Sciences trimmed the original list to the six finalists, which were visited and discussed by dozens of AEC committees in the nine months until the winner was chosen.

When it is built, the accelerator will be the world's largest and will dominate the tiny town of Weston. The 200-billion-electron-volt machine will be six times the size of the 33-billion-electron-volt machine in Brookhaven, now the Nation's largest, and almost three times as big as the 70-billion-electron-volt machine now being built by the Soviet Union in Serpukhov, 56 miles south of Moscow.

The accelerator actually will consist of four separate accelerators, each feeding the other with high-energy protons in a tunnel of steel buried 20 feet below ground and measuring more than three miles in length.

First, a conventional accelerator will fire a beam of protons to a 500-foot-long accelerator which will boost the beam up to 500 million electron volts of energy. This beam will then be directed into a 1200-foot ring of magnets and radio accelerating stations that will push the beam up to 8 billion electron volts.

Finally, the beam is ejected into the main accelerator, which is a ring of 500 magnets and three powerful radio stations more than three miles long. These boost the beam up to 200 billion electron volts, which are sent smashing into a hydrogen bubble chamber to produce the high-energy particle collisions every physicist in the United States is waiting to see.

DAILY TELEGRAPH JANUARY 6, 1967

US scientists for Aust. talks, lectures

The Chairman of the U.S. Atomic Energy Commission (Dr. Glenn Seaborg) arrived in Sydney yesterday for discussions with Australian Atomic Energy Commission officials.

THE Nobel Prize-winning scientist will also lecture high-school students at the Science Foundation for Physics Summer Science School next week.

Dr. Seaborg and his wife were among the group of six top American nuclear scientists who arrived in a U.S. Military Aircraft Command Boeing 707 at Mascot yesterday.

Government officials and Australian Atomic Energy Commission representatives met them at the airport.

After their arrival, the scientists met the Minister for National Development (Mr. Fairbairn).

They will visit the Lucas Heights research establishment today, where Dr. Seaborg will address Australian Atomic Energy Commission staff.

Discussions on the exchange of information under the Australia-U.S. Agreement for Co-operation in Civil Uses of Atomic Energy will be held later today.

Shared

Dr. Seaborg shared the Nobel Prize in Chemistry in 1961 as co-discoverer of the element plutonium in 1941.

Five other outstanding scientists will lecture 162 Australian, New Zealand and American high-school students at The Physics Summer Science School, starting on Monday.

TCN Channel 9 will televise all 20 lectures during the school, which will continue until January 20.

The Federal Treasurer (Mr. McMahon) will open the school.

Of the 162 students awarded scholarships to attend the school, 87 boys and 43 girls will be from N.S.W.

Students from each of the other States and New Zealand have also been awarded scholarships.

The remaining 10 Foundation Scholarships, endorsed by President Johnson, were awarded to American students.

U.S. atomic chairman proposes joint plan

The American and Australian governments could co-operate in Australian development projects with atomic engineering methods, the chairman of the U.S. Atomic Energy Commission, Dr Glenn Seaborg, told a Press conference in Sydney last night.

Earlier, Dr Seaborg had discussed the possibilities of atomic engineering projects in Australian with the Australian Atomic Energy Commission.

'Change the face

of your nation'

Dr Seaborg said that his talks with commission members had covered projects which could change the face of the nation. These included the:

CREATION of a harbor on the west coast.

BLASTING a canal to link the coast with the rich Hamersley iron fields.

FREEING of huge quantities of natural gas.

MAKING of dams and underground storage containers for water.

Other projects could be the storing of natural gas in underground cavities and the recovery of underground ores.

Dr Seaborg (pictured left) said the United States possessed the highly sophisticated atomic weapons to carry out these projects.

Although the open air projects mentioned could not be carried out without modifications to the limited nuclear test ban treaty, planning for underground operations could begin at once.

CHEAPER METHOD

"Nuclear engineering on this scale is far cheaper than using conventional methods," Dr Seaborg said.

"In fact, in some cases it is the only method. Nuclear explosives can be used in cases where chemical explosives don't work."

Dr Seaborg was especially optimistic about the increasing use of atomic energy as a source of electrical power.

Now more than half the electric stations contracted to be built in the U.S. were to be powered by nuclear energy, and he expected conventional fossil fuels such as coal and oil to be completely superseded by 2000 AD.

Dr Seaborg agreed that the progress of nuclear power had not been as rapid as had at first been expected.

But he said that increasingly efficient plants would be built, and that by about 1980 20 per cent of America's electricity would be generated by atomic fuel.

"At present, plants do not use uranium fuel efficiently — only about 1 per cent of the fuel is used," he said.

"But soon 5 or 10 per cent will be used, and finally we will build breeder reactors that will use essentially all their fuel."

Dr Seaborg said the breeder reactors would be much more economical and efficient.

"We will have unlimited fuel for centuries," he said.

Dr Seaborg said he was convinced efficient fission reactors would be operating long before fusion plants could be built.

NO CONTAINER

Fusion plants used water for fuel, and had no dangerous waste products. However, temperatures of hundreds of millions of degrees were needed to stop them, and a container to withstand this heat had not yet been devised.

"There are four government laboratories in the U.S. working on this problem now, but I think it will take decades to solve," Dr Seaborg said.

Dr Seaborg won a Nobel Prize for work in forming plutonium.

DAILY TELEGRAPH, Sydney, January 7, 1967

NUCLEAR BLAST IDEA FOR N.W. AUST. PORT

Australian and American scientists yesterday discussed the possibility of using nuclear explosives to blast a deep harbor in north-western Australia.

ONE of them said later the only major obstacle preventing the use of nuclear explosives in civil engineering was the treaty banning nuclear tests.

Six American nuclear scientists, led by Dr. Glenn Seaborg, Chairman of the United States Atomic Energy Commission, are visiting Australia.

They had talks in Sydney yesterday with officials of the Australian Atomic Energy Commission.

They discussed several Australian engineering projects.

Dr. Seaborg said one of the proposed projects was the use of nuclear power to blast a channel to the port at Pilbara, in Western Australia.

This would allow 100,000-ton ships to load iron ore.

Water storage

They also discussed the use of nuclear explosives to blast deep water-storage areas and to help build dams.

Dr. Seaborg said the only project discussed which would not violate the nuclear test ban treaty was the blasting of huge underground caverns to store natural gas.

The treaty bans atmospheric tests but does not forbid underground explosions.

Asked if Australia could purchase nuclear explosives for engineer work he said: "When the time comes the Australian Government could make arrangements with us for the use of these explosives."

Dr. Seaborg said that in some instances conventional methods of excavation in engineering were of no use because of the vast cost.

The use of nuclear explosives was far cheaper in most cases, he said.

SYDNEY MORNING HERALD
January 7, 1967

Nuclear blasts may boost supply of gas

By NOEL LINDBLOM, Our Science Correspondent

The chairman of the U.S. Atomic Energy Commission, Dr Glenn T. Seaborg, and Australian scientists yesterday discussed the possibility of boosting Australia's natural gas supplies with small underground atomic explosions.

After their meeting in Sydney, Dr Seaborg said there was no reason why this kind of nuclear engineering should not go ahead.

Dr Seaborg said that, unlike the blasting of harbours and canals by nuclear devices, underground blasts did not infringe the limited nuclear test ban treaty.

The underground blasts could be used to stimulate the flow of natural gas or to create vast storage cavities for it, he said.

It is understood that the Australian Atomic Energy Commission will send an observer to America's first test of an underground blast of this kind this year.

Known as Operation Gas Buggy, it will be the explosion of an atomic device equal to 10,000 tons of T.N.T.

AMENDMENT

It will take place underground at a natural gas site in New Mexico in July.

Dr Seaborg told a Press conference last night that he saw no insuperable obstacles to the eventual use of nuclear blasts for peaceful purposes above the ground.

"But there may have to be an amendment to the nuclear test ban treaty before we can proceed," he said.

Australian scientists were interested in the possibilities of blasting out harbours and canals with nuclear devices, and building dams in a number of sites.

Dr Seaborg said that when the time came for these feats of nuclear engineering, he expected Australia to come to an arrangement with America for the supply of the nuclear devices.

LECTURE TOUR

"After all, these are the most sophisticated nuclear devices ever made, and I think you would need to get them from us," he said.

Dr Seaborg, a Nobel Prize winner, is on a lecture and inspection tour of Australia.

He will lecture at the Lucas Heights Research Establishment of the Australian Atomic Energy Commission, and at the Summer Science School at the Sydney University School of Physics, which starts next Monday.

He is accompanied by other officials of the American Atomic Energy Commission and of the State Department.

SUNDAY TELEGRAPH, JANUARY 8, 1967

Travelling in style

MRS. GLENN SEABORG flew into Sydney from the United States on Thursday by special Military Airlift Command jet.

"There were only about a dozen people aboard," she said.

"And they had sleeping berths, so we could lie down. A very pleasant way of getting here."

Mrs. Seaborg, a grey-haired and soft-voiced mother of six, rated the special jet because she and her husband, Dr. Seaborg, are here at the invitation of the Australian Atomic Energy Commission.

Dr. Seaborg is the chairman of the United States Atomic Energy Commission, and a Nobel Prize-winner for his work with transuranium elements.

He has been invited to Sydney to lecture at Sydney University's Summer Science School.

Meetings

"My husband travels a great deal, inside the United States and elsewhere," Mrs. Seaborg said. "Most people in the sciences do, nowadays — all those international meetings.

'But I can very rarely accompany him."

Mrs. Seaborg's six children range from seven to 20 in age. The Seaborgs "keep up a home" in California, but live permanently in "a rather ordinary split-level house" in Washington, D.C.

MRS. GLENN SEABORG wife of the chairman of the United States Atomic Energy Commission.

Mrs. Seaborg met her husband while she was working as secretary to Professor Ernest Lawrence, the director of the radiation laboratory at the University of California, Berkeley.

She has a BA from this university, with a major in English.

"I was working for Dr. Lawrence part-time while I was still at university," she said.

"My husband was then in the chemistry department."

Mrs. Seaborg was not interested in science before she married. After, she was obliged to learn a little.

"I won't say I've learnt a lot," she said, laughing, "but you pick up the words. I can handle the nomenclature, though it's all a little over my head.

Research

"My husband sent me back to university to take a course in chemistry after we married. I helped him on a radioactive isotope table.

"I did the research and he put the table together. It was during the war, when nobody had time to do this sort of thing."

Dr. and Mrs. Seaborg will return to the United States by air tomorrow, with stopovers in Thailand, India and Pakistan.

Mrs. Seaborg, who has never been to Australia before, is showing particular interest in our fauna. "I have already been to your Zoo," she said, "and I hope to visit the Koala Bear Park before we leave."

Free Press Bulletin, Bombay
Dated.. 9 JAN 1967

Understanding Science

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By Dr. Glenn T. Seaborg

Dr. Glenn T. Seaborg

Why should it be so important that people understand something about science? Why should people know what a scientist does, what motivates him, and the implications of scientific results?

There are two major, inter-related goals. The first is philosophical, involving the quality and the dignity of human life and the fullest use by man of his capacities; in sum, the increase in man's significance.

The evolution of cultures from the primitive to the sophisticated, from intellectual poverty to intellectual riches, from needless fears and superstitions to the relative security of relative understanding: these forward movements have been paced by the painstaking ascent of the mountain of knowledge.

Man lives better for knowing the sources of lightning and earthquakes, and for understanding that the earth, far from being the center of the universe, is but a tiny speck in a pageant of immense grandeur.

He is enriched by knowing why a tree is green and how it captures and stores the energy of the sun, and thereby grows.

To know that he inherits individual characteristics from a lovely, orderly strand of molecules and to comprehend the arrangement of those molecule seems to me to be a triumph for the human spirit, entirely apart from the future practical nature of this knowledge.

All of this knowledge, it seems to me, increases and in no way diminishes man. For me, the beauty of a starry night or a forest or a rainbow is enhanced by an understanding of them. Nor does scientific knowledge, in my opinion, reduce appreciation of a poet's sonnet, a musician's theme, or a painter's canvas.

SECOND GOAL

A second major goal, not unrelated to the first, is concerned with the continuation of freedom and of the most effective functioning of democratic government in a period of revolutionary social change.

This revolution is well-named "The Scientific Revolution," since the engines that drive it are science and technology. In the last three decades, science, once a peripheral preoccupation of a few intellectuals, has emerged as a central force in world affairs.

The outline of this revolution has been drawn by many thoughtful people. Knowledge, exploited by engineering and invention, is the capital of this revolution. The public supports science perhaps as no society has ever supported it at any time in history, and the main reason unquestionably is the hope of practical applications.

Science has responded with an unprecedented outpouring of knowledge.

Today, flourishing industries, employing thousands of people, are based on knowledge that did not exist a decade ago. Science and technology are instruments for improving the material quality of human life.

Moreover, man has become dependent on science and technology for the continuation of the kind of society in which he now lives. He must redouble these efforts if he is to realize present, and perhaps better, living conditions for immensely larger populations in the world of the future.

All of this means, of course, that some of the most important decisions affecting the lives of millions of people around the world revolve around science and technology.

The heart of freedom and its agency, democracy, is widespread, informed participation in the processes of government. The central forces of change in today's world — science and technology — are but dimly understood, or not understood at all, by the majority of the electorate.

Confusion over what science is and is not can do considerable mischief. Not uncommonly, men are hostile to what they do not understand.

Science receives much credit for its accomplishments. But it also is the whipping boy for those who would like to find a simple explanation for man's destructive weapons.

It is true, for example, that nuclear weapons were an outgrowth of new scientific knowledge. But so is the nuclear reactor, which promises to perpetuate a technological civilization that is dependent upon the production of huge quantities of energy.

MORALITY

In other words, knowledge is born without moral properties. It is man who applies knowledge, and he applies it according to his acquired patterns of behaviour. Man, not knowledge is the cause of violence.

There are certain fundamental ideas that virtually every citizen can grasp and that represent minimum attainable levels in public understanding. The minimum level that can be achieved almost universally, I believe, is an understanding of what science is, what technology is, and the difference between the two.

Science is a search for an understanding of new knowledge about nature. Generally, it does not have an immediately practical goal, although sometimes applications may be easy to foresee.

The essence of basic research is freedom of the scientist to pursue his curiousity where it leads him. New knowledge is hard to acquire; nevertheless. is necessary in order to synth size the bits and pieces in general laws representing m jor progress.

On the other hand, techn logy, or more correctly en neering development, involv the transformation of the kno ledge gained from basic scien into useful things.

Radios, television sets, aut mobiles, synthetic fibres a plastics, nuclear reactors, a moon rockets are full enginee ing developments rising fro towering edifices of basic kno ledge erected by chemists a physicists.

These distinctions betwe science and technology wou seem to be very elementary.

However, the future depen upon faith that, in the progre of science, history will repe itself; that nature is only begi ning to yield up its most fund mental principles; and that t new knowledge will enab mankind to realize its drea for the world of tomorrow.

Today's intangibles in scien are tomorrow's realities technology.

Seaborg lauds Thai strides in 'atoms for peace' program

CHAIRMAN of the US Atomic Energy Commission, Dr Glenn Seaborg, yesterday praised Thailand on "the rapid strides it is making in developing its peaceful nuclear program."

Speaking before about 100 Thai officials, students and local pressmen at the Thai Atomic Energy Commission for Peace at Bangkhen, Dr Seaborg said Thailand would be able to harness atomic energy to produce electricity, for the treatment and diagnosis of diseases, fighting insects destroying agricultural produce and in industry.

He predicted that Thailand would be able to achieve all this "within few years' time."

Dr Seaborg was making a one-day visit to this country on his way to India where he will represent the United States at the opening of a new nuclear energy facility there.

Accompanied by eight members of the AEC Dr Seaborg and his group were guests of the Thai government. Earlier he visited Australia.

During his two-hour long lecture, Dr Seaborg outlined his belief that nuclear energy would be the major source of power as the future unfolds.

"On my trip abroad," he said, "I have been impressed with the way that research reactor facilities serve to stimulate and strengthen the general level of scientific activity. I believe you find this happening in Thailand."

Dr Seaborg said, contrary to common belief, the development of nuclear energy "has come so far so fast."

"Radioisotopes and radiation are being put to use today in the most remarkable ways," said Dr Seaborg. They have become a major diagnostic and therapeutic asset to medicine, and new uses of the radioisotope and radiation in medicine are constantly being developed, he added.

Radioisotopes used in industrial processing and research are currently saving worldwide industry hundreds of millions of dollars annually and helping it to produce better products for the consumer—products ranging from sheet steel and automobile tyres to beer and appliasance.

"This is not all," he added. "Radiosotopes are serving the elimination of insect pests by the mass release of insects made sterile by irradiation, the radiation disinfestation of grain, the use of radiation to extend the shelf-life of perishable foods—these and other uses of ionising radiation are becoming increasingly important to man in his search for a more abundant life."

On the recent Red China nuclear explosion, Dr Seaborg said it would "certainly" pose as a threat to this part of the world.

He however expressed the hope that Red China and "other nations" would come to terms with other nuclear powers to ban the use of this energy for destruction.

During his stay here, Dr Seaborg called on the Prime Minister Thanom Kittikachorn and the Minister of the National Development, Pote Sarasin.

Also present at the yesterday lecture and press conference was Dr Swad Srisuk, Secretary General of Thai AEC who acted as translator for the local pressmen. Dr Seaborg presented to Dr Swad several books on atomic energy, including the works of Dr Seaborg himself. Dr Seaborg and his party left for India today.

Bangkok Herald
Jan. 11, 1967

Atoms For Peace

USEC Chairman Lauds Thai Nuclear Program

Dr. Glen Seaborg, Chairman of the U.S. Energy Commission congratulated the Thai nuclear program for peace on the occasion of his visit to the TAECP reactor center at Bangkhen yesterday afternoon.

Dr. Seaborg and his party made a one day stop over in Bangkok on invitation of National Development Minister Pote Sarasin with whom he had worked during Mr. Pote's function as the President of the 10th conference of the International Atomic Energy Agency.

An ardent advocate of nuclear energy for peace and a firm believer in its potential as the major contribution towards the conquest of hunger, poverty and disease, Dr. Seaborg has made many discoveries of fundamental elements of great worth in this field. He was the Nobel Prize winner of 1951 in chemistry.

At the Bangkhen reactor center Dr. Seaborg gave a speech to the interested local scientists on "Peaceful Uses of Nuclear Energy". He stressed on the importance and the significant role in the future of nuclear energy as generator of electrical power.

This means producing electricity has the advantage of having low cost compared to other generating means. Being the most versatile form of energy it can better the standard of living for the rapid growing world population through industrialization and by its increasing rate of productivity.

He said cheaper nuclear power offers the most significant potential to the developing countries, and eventually it may "equalize some of the economic disparitics among nations."

Further uses of nuclear energy were reviewed by Dr. Seaborg such as the manipulation of the radioisotope in the medical field, in industrial processing, and in the imporvment and increase of agriculture productivity. He also mentioned the power in compact form used as energy generator in space projects and marine development.

In answer to a reporter's question of using nuclear explosives in the possible channeling of the Kra Isthmus Dr. Seaborg said it is feasible from the technical point of view provided the means be developed to suit the task. He also told newsmen that Thailand may be able to install a nuclear power plant producing 300-400 megawatts providing there is sufficient need.

The AEC Chairman finally expressed his optimism that the incessant development of constructive nuclear power may eradicate the causes of war and that the nations may see this advantage overshadowing its destructive forces. He left at 7 p.m. for Germany.

World Photo by Manoj

Lecture. . . Dr. Glenn Seaborg, who was here in Bangkok on a brief visit, gave a lecture on the peaceful uses of atomic energy yesterday. He is seen here with Dr. Sawad Srisook (left), Secretary General of the Office of the Atoms for Peace.

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EVENING NEWS OF INDIA - Wednesday, January 11, 1967

Dr. Glenn T. Seaborg, Nobel Prize winning nuclear scientist and Chairman of the U. S. Atomic Energy Commission, arrived in Bombay last night on a two-day visit as a guest of the Government of India. On arrival he was greeted by Dr. H. N. Sethna (left), Director of the Atomic Energy Establishment at Trombay.

INDIAN EXPRESS, January 11, 1967

US atomic chief to visit Bombay

By A Staff Reporter

Dr. Glenn T. Seaborg, Chairman of the U.S. Atomic Energy Commission, who is a renowned nuclear scientist and Nobel Prize winner, will arrive in Bombay on Wednesday morning on a two-day visit, as a guest of the Government of India.

He has been Chairman of the U.S. AEC since 1961 when he was appointed to the post by President Kennedy. He shared in 1951 the Nobel Prize for Chemistry for his pioneering work in the discoveries of several elements heavier than uranium. He has also received numerous other awards.

Dr. Seaborg will visit India's nuclear facilities, including the U.S.-aided 380-megawatt atomic power station under construction at Tarapur.

He will also attend the ceremony at Trombay on Thursday when the Atomic Energy Establishment will be renamed in honour of the late Dr. Homi J. Bhabha.

Financial Express, Bombay
11 JAN 1967

IN THE NEWS

Pioneer U.S. Champion Of Atoms For Peace

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DR. GLENN T. SEABORG, chairman of the U.S. Atomic Energy Commission, who arrives in Bombay today for a two-day visit, is a world-renowned nuclear scientist and Nobel Prize winner.

Appointed to his post in 1961 by President Kennedy, Dr. Seaborg has emphasised commercially competitive nuclear electric power as the most important peaceful use of the atom. He believes that the benefits of nuclear energy do not belong to any single nation but are meant to be shared by all nations.

Until his appointment as chairman of the U.S. AEC, Dr. Seaborg was Chancellor of the University of California. It was for his pioneering work in the discoveries of several elements heavier than uranium that he shared the 1951 Nobel Prize in chemistry with Dr. McMillan, also of the same university.

DR. SEABORG

He was co-discoverer of plutonium (element 94) in 1940, discovered the plutonium isotope 239 the next year and uranium 233 in 1942. He has discovered seven other chemical elements belonging to the transuranium group.

In 1947, Dr. Seaborg was named one of America's ten outstanding young men by the U.S. Chamber of Commerce. Among the numerous awards he has won are the Enrico Fermi Award of the AEC, 1959 and the John Scott Award and Medal of the City of Philadelphia, 1953.

The U.S. Atomic Energy Commission, which Dr. Seaborg heads, was established by the U.S. Congress in August, 1946. Its tasks include the development of peaceful uses of atomic energy, the design and manufacture of nuclear weapons, the promotion of research in nuclear and related sciences and the control of scientific and technical information.

Among the nuclear centres in India which Dr. Seaborg will visit is the U.S.-aided 380-mw atomic power station under construction at Tarapur. On January 12 he will also attend the ceremony at Trombay to dedicate the Atomic Energy Establishment in honour of the late Dr. Homi J. Bhabha.

Dr. Seaborg is bound to find many among our leaders and atomic scientists who will echo his line of thinking partly epitomised in these words: "A future world living in peace and enjoying the fruits of advancing technology will greatly depend on the ready availability of inexpensive electric power". This can only be a gift of the atom.

THE TIMES OF INDIA, January 12, 1967

India, US Studying Use Of Atomic Energy For Peace

By A Staff Reporter

THE exchange arrangements between India and the United States for the peaceful uses of nuclear energy are being augmented, Dr. Glenn T. Seaborg, chairman of the U.S. Atomic Energy Commission, said in Bombay on Wednesday.

He told a news conference that he was holding discussions with Dr. Vikram Sarabhai, chairman of the Indian Atomic Energy Commission, which could involve additional U.S. aid in particular areas like the irradiation process.

Dr. Seaborg, who is here as the guest of the Indian Government to attend the ceremony to re-name the Trombay establishment after Dr. H. J. Bhabha, said he was impressed by the work going on at the establishment.

He termed as one of the most outstanding peaceful uses of atomic energy the work to increase the production of rice through mutation induced by radiation. He was impressed by the work done at AEET, and paid a tribute to Dr. A. R. Gopal Ayengar, director of the biology group.

Referring to the plutonium plant fabricated by Indian scientists, Dr. Seaborg said it was a very good technical achievement in the broad field of nuclear technology. Only China perhaps equalled India which had chosen, unlike the former, the peaceful path with an emphasis on the peaceful use of atomic energy, he said.

The possibility of increasing co-operation between the U.S. and India in the field of irradiation of food and disinfestation of grains was being investigated. "We have some actual proposals."

Another area of co-operation was in the use of radio-isotopes for diagnosis and treatment of diseases and destroying pests like flies. Yet another was in the production of electricity using nuclear fuel. Electricity from this source would be relatively cheap.

A Nobel Prize-winner, Dr. Seaborg readily answered queries on the peaceful uses of nuclear energy but could not be drawn to discuss its use in war. That was essentially the field of a politician.

To a query why ~~the U.S.~~ insisted on safeguards from India, he answered: "We do not require safeguards as a matter of personal friendship between one country and another. It is a matter of national policy." The U.S. wanted the safeguards to be applied uniformly to all countries, to be effective.

On nuclear proliferation Dr. Seaborg said in the long run the arms race had to be halted. The U.S. policy was to demand negotiations on a non-proliferation treaty and take other steps that would lead to a comprehensive test-ban treaty.

China posed a problem, he said. He was hopeful that, in time, China would see eye to eye with the other nuclear powers in her own interest.

In a handsome tribute to Dr. Bhabha, Dr. Seaborg said he was a "truly great scientist and a great man in the field of nuclear science."

US Expert Says India Can Make The Bomb

By A Staff Reporter

Indian scientists can produce an atom bomb with the know-how at their command.

This is the view of Dr. Glenn T. Seaborg, chairman of the U.S. Atomic Energy Commission.

Dr. Seaborg, on his first visit to the country, made this observation after he had visited the Atomic Energy Establishment, Trombay, on Wednesday.

Dr. Glenn T. Seaborg

THE INDIAN EXPRESS
January 12, 1967

India's A-power equal to that of China

—US scientist

By A Staff Reporter

"I would rate India's nuclear progress equal to that of China — the only difference being that you have chosen the peaceful uses of the atom and China the lethal ones", observed Dr. Glenn T. Seaborg, world's renowned nuclear scientist and Nobel Prize winner.

Addressing a Press conference on Wednesday, Dr. Seaborg, who is the chairman of US Atomic Energy Establishment, paid a handsome tribute to the late Dr. Homi Bhabha and the young Indian scientists, particularly, engaged in the field of irradiation of grains and production of radio-isotopes.

Answering a volley of questions, Dr. Seaborg categorically stated that after his visit to the Atomic Energy Establishment, at Trombay, he had come to the conclusion that "there is nothing that would indicate India is making the bomb." "This is my reply as a scientist, not as a politician" he added.

NON-PROLIFERATION

He was conscious of the fact that China posed a problem but, he added, the best course was to "stop proliferation" and then "a cut-back on the nuclear programme" by the nuclear nations.

Dr. Seaborg said that there was not enough evidence to show that China was manufacturing the more lethal "plutonium based" weapons as yet. Seaborg, however, laid great stress on the peaceful uses of nuclear energy in the matter of irradiation of grains, disinfestation of stored grains being eaten away by pests and the production of radio-isotopes useful in medical science.

Later in the evening, he addressed Indian scientists on "Transuranic Elements" at the Bhulabhai Desai auditorium.

INDIAN EXPRESS, January 12, 1967

Dr. Glenn T. Seaborg, Nobel Prize winning nuclear scientist and Chairman of the U.S. Atomic Energy Commission being greeted by Dr. H. N. Sethna, (left), Director of Atomic Energy Establishment, at the Santa Cruz airport on Tuesday night.

India equal to China, says US atom chief

By A Staff Reporter

AMERICAN Atomic Energy Commission Chairman Glenn T. Seaborg believes India's achievement in nuclear technology equals China's though India's emphasis is on the peaceful uses of atomic energy.

The Nobel Prize-winning nuclear scientist, on his first visit to India, told newsmen in Bombay on Wednesday that the Indo-U.S. co-operation programme on the peaceful uses of atomic energy would be augmented.

"Particularly, we are investigating the possibility of increasing our co-operation in the field of irradiation of food and disinfestation of food grains."

Dr. Seaborg, who visited the Atomic Energy Establishment at Trombay, praised Indian scientists' achievements, particularly the experiments being conducted in the Biological Division, under Dr. Gopala Iyengar, in the field of increasing rice production through mutation.

Asked about Washington's insistence on safeguards in the field of nuclear development, he said the U.S. was not viewing the question as a matter of personal relationship with any country. It was a matter of national policy. "If safeguards are to be effective they must be applied uniformly and without exception."

Hope

He was opposed to the proliferation of nuclear weapons. He hoped that in time China would also see the value of not going in for nuclear weapons from its own self-interest. "Obviously the U.S. is concerned about the matter and is watching the Chinese progress very closely."

Dr. Seaborg noted that Indian scientists with the know-how at their command were capable of making a nuclear bomb.

The U.S. would be prepared to have the International Atomic Energy Agency inspect its nuclear civilian power programmes if all the other nuclear powers, including China, were prepared for that.

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FREE PRESS JOURNAL (Bombay)
January 13, 2967

Isotope-powered artificial heart

Dr. Glenn T. Seaborg, chairman of the U.S. Atomic Energy Commission, visualises possibilities of a completely artificial heart, powered by radio-active isotopes being developed.

The Nobel Prize-winning scientist speaking at a function sponsored by the Government of India Department of Atomic Energy yesterday said the use of plutonium 238 could be used to operate an artificial heart.

The artificial heart, he said, could replace the natural heart in the chest cavity in the same position as the natural heart.

Pacemakers that are now being used for heart patients are presently powered by batteries that have to be replaced at short intervals.

The use of radio-active isotopes like plutonium 238 as a source of power with 90 years of half life would give a much more satisfactory power source, Dr. Seaborg said.

Dr. Seaborg, who addressed a large gathering of scientists on some aspects of the most recent transuranic research, said practical applications of transuranic elements that were totally unexpected had been found.

The elements, he added, would be found useful both in scientific research and industrial application.

He said, Dr. Vikram Sarabhai, Chairman of India's Atomic Energy Commission, and he had been discussing possibilities of further cooperation between India and America on the peaceful uses of atomic energy.

THE INDIAN EXPRESS, January 13, 1967

Seaborg hails 'plan with vision'

By A Staff Reporter

THE Atomic Energy Establishment at Trombay, one of the most outstanding of its kind in Asia, is a testimony to Dr. Bhabha's far-sighted planning.

So said Dr. Glenn T. Seaborg, Chairman of the U.S. Atomic Energy Commission.

"We in the U.S. recognised Homi Bhabha's great abilities and depth of understanding.

"We supported his election as the president of the first United Nations International Conference on the Peaceful Uses of Atomic Energy held in Geneva in 1955.

"It was at this conference that he electrified the audience with his prediction of the role that fusion would play in providing man's future energy needs," Dr. Seaborg said.

Prediction

In the light of recent developments elsewhere in Asia which jeopardised international peace and tranquility, India was to be commended for meeting its challenge by demonstrating its continued devotion to the many peaceful applications of atomic energy.

The work of Trombay was a major ingredient of that achievement and was thereby a most fitting, living memorial for Dr. Bhabha.

Through it, India had obtained a position of moral and scientific leadership among the nations of Asia.

"We in the United States look forward to strengthening our partnership with India and sharing in its efforts," Dr. Seaborg said.

The U.S. scientist said he had many opportunities to meet with Dr. Bhabha.

"I never ceased to be amazed at his great scientific ability and his depth of knowledge in many subjects.

"He not only was an outstanding scientist but also a skilled administrator and an effective spokesman for his nation.

"His keen wit and charm enlivened the many international meetings in which he participated."

THE INDIAN EXPRESS, January 13, 1967

Trombay dedicated to maker of nuclear India

By A Staff Reporter

THE Trombay atomic complex was renamed 'Homi Bhabha Atomic Research Centre" by Prime Minister Indira Gandhi on Thursday, honouring its founder and builder "who placed India in the forefront of the world of nuclear science."

Watching the solemn, simple dedication ceremony were leading nuclear scientists of the world, Nobel laureate Dr. Glenn Seaborg from the U.S., Prof. Perrin and Dr. Goldschmidt from France, Mr. Lorne Gray from Canada, Dr. Adamas and Dr. Pickavance from Britain, Commissioner Timbs from Australia, Prof. Duran from Spain and Dr. Goswami, representing the International Atomic Energy Agency.

And there sat among the distinguished guests, Mrs. Meherbai Bhabha, the mother of Dr. Homi J. Bhabha, vainly struggling to contain her tears—tears of pride and sorrow.

Mrs. Gandhi, as though echoing the sentiments of the mother, said that while the occasion made her feel proud of the achievements of the Atomic Energy Establishment, the absence of the man who left this legacy to the nation made her sad.

If only he had lived for some more time, he would have seen Indian scientists themselves build an atomic power plant.

Announcing the Government's "continuing support" to the Centre, Mrs. Gandhi said: "May the scientists here help to fulfil the dream that was dear to my father and Dr. Bhabha"—the dream of harnessing atomic power for the socio-economic progress of India's millions, whether they live in the remotest villages or high mountains.

Symbolic

Dr. Bhabha had built a "bridge between science and technology" and he had visualised the social implications of scientific research, be it in the field of medicine or history as instanced by the use of Carbon 14 method in dating archaeological findings.

The location of Trombay opposite the Elephanta Caves was symbolic of the old India and the new emerging India looking at each other. Prime Minister Nehru had often remarked about this location of the Trombay complex.

India had to take the fullest advantage of the modern science and technology and make their benefits available to the masses without losing its moorings of timeless values.

Many-sided

Reiterating that India was committed to the use of atomic power for peaceful purposes, Mr. Gandhi declared that long before the destructive power of the atom bomb was manifested in Hiroshima, Dr. Bhabha had visualised for India the peaceful uses of nuclear energy.

Dr. Bhabha, she said, had the ability and opportunity to translate his dreams into reality.

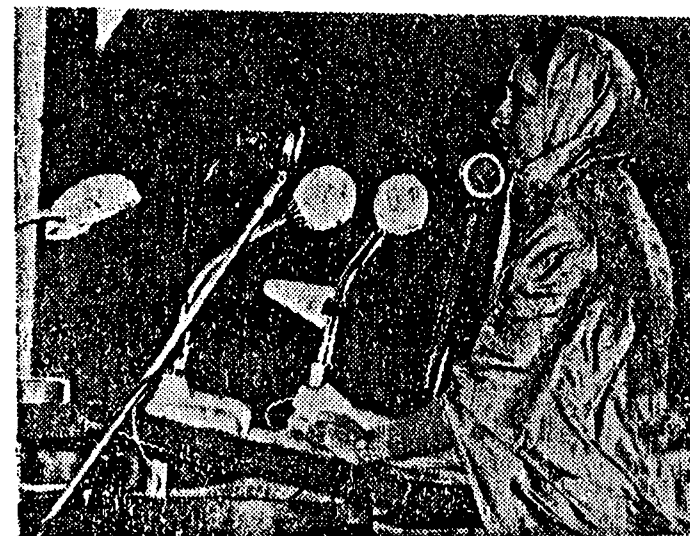
Emphasising that science was but a search for truth and beauty, she said Dr. Bhabha's was a well-rounded and many-sided personality.

Apart from being a great scientist, he was "an artist and a musician, of sensitive eye and ear, well read and well travelled."

Dr. Bhabha was the example of a perfect blend of science and aesthetics which had to go hand in hand. The architecture, the lay-out, the gardens, everything at the Trombay Establishment spoke of Dr. Bhabha's aesthetic sense.

"What makes Trombay distinctive is not the vast amount of investments or the size of structures, but the quality of the people who work here.

"The work of these scientists will have a significant bearing on the pace of our economic and social progress." Mrs. Gandhi said.



The massive dome of the Canada-India reactor at Trombay provides a striking background for Premier Indira Gandhi as she dedicates the Atomic Energy Establishment there to the memory of Dr. H. J. Bhabha. At left is part of the stack of the reactor.

Dr. Seaborg's assurance to Pakistan

INDIAN EXPRESS, January 13, 1967 (Continued)

U.S. not to help India make A-bomb

LAHORE, Jan. 13: Dr Glenn T. Seaborg, Chairman of the United States Atomic Energy Commission tonight held a categorical assurance that the United States Government would not let India make an atom bomb with the help of American nuclear assistance.

The assurance came at a crowded Press conference addressed by Dr. Seaborg at the local Atomic Energy Centre and in which he was closely questioned on American intentions vis-a-vis India's ambition to speed up its atom bomb manufacturing project.

The American Atomic Energy chief said: "I have no indications that they (the Indians) are devising it (the nuclear bomb) at all."

However, Dr. Seaborg went on to say "in the course of a number of years" India would muster up its resources to join the world nuclear club along with "eight or ten" other countries such as Japan, Sweden, West Germany, Israel and Argentina.

SAFEGUARDS

He said that American nuclear assistance, whether it was extended to India or any other country, carried proper safeguards against "diversion" of atomic energy to purposes other than peaceful.

The main safeguard in this connection was the "inspection rights", he said and added that every nuclear aid-receiving country was told that the inspection could be carried out "without notice."

Dr. Seaborg said the American Government had now decided to transfer the inspection rights to the International Atomic Energy Agency in Vienna.

He told a questioner that during his just-concluded Indian visit, he noted that India wanted to promote nuclear energy for peaceful purposes.

PRIVATE SECTOR

Asked what steps the American Government took to ensure that the private sector in the American nuclear industry did not enter into an agreement with a foreign country which could ultimately enable that country to develop a nuclear weapon, Dr. Seaborg said that such an agreement was not possible. A Government-to-Government agreement must precede any agreement between a foreign country and American nuclear industrialists and the moment the American Government came in the picture the safeguards against misuse of atomic energy were applied.

Dr. Seaborg replied in the negative when asked if it was a fact that the Indian Government had persisted in its refusal to open up its nuclear establishments for inspection by the International Atomic Energy Agency.

BREEDER REACTORS

Dr. Seaborg vehemently denied a recent Press report that the American Government was contemplating giving India Breeder reactors which would enable her to produce atomic bombs.

He explained that the Breeder type reactor which was intended to bolster generation of electricity from the atom, was still in developing stage. However, in the meantime the American Atomic Energy Commission hoped to have same prototype Breeder reactor.

PLUTONIUM

The attention of the American nuclear chief was also drawn to a recent All-India Radio report that under an agreement signed between India, the United States and Guyana, the United States would for the first time supply plutonium to India. He was also apprised of Pakistan's legitimate fears that supply of plutonium would make it easier for India to manufacture an atom bomb.

Answering the query, Dr. Seaborg said that American Government had not entered into any agreement for the supply of plutonium to India.

He, however, said that what perhaps had been misunderstood was that America would extend assistance to India in the form of technical know how related to what he called plutonium recycle process which he said, was something absolutely different from providing plutonium. This sort of know-how could also be extended to any other country including Pakistan, he added.

TRAINING FACILITIES

Dr. Seaborg did not agree with a correspondent who referred to reports that lately there has been slow flow of Pakistani scientists to America.

He said there had been no change in the policy of the American Government in accepting Pakistani scientists for higher training in America.—APP.

India has potential to go nuclear

—DR. SEABORG

By a Staff Reporter

Dr. Glenn T. Seaborg, Chairman of the U.S. Atomic Energy Commission, said in Lahore on Friday that he had no indication of India becoming a nuclear Power in the near future. But remarked that she was one of the eight to 10 countries of the world which had the potential of becoming nuclear in a number of years.

He was addressing a Press conference at the Atomic Energy Centre soon after his arrival from Rawalpindi.

He said that the statements of the Indian leaders that India would soon become a nuclear Power were not more than an expression of their national desire to go nuclear. He said that besides India, West Germany, Japan, Israel, Argentina, Brazil and Sweden had the potential of becoming nuclear in a course of time.

The chief of U.S. Atomic Energy Commission said that there was no agreement between America and India for the supply of Uranium or plutonium nor were any negotiations in progress for the supply of nuclear reactor. What they were discussing was the process by which plutonium could be used for boosting up the nuclear electrical energy.

Asked what steps would USA take if her nuclear equipment supplied for peaceful uses was misused for purposes other than peace, Dr. Seaborg said that the United States reserves her right to carry on surprise inspection of the country which receives aid under "Atom for Peace. Programme" but misused it for other purposes. He said that USA could carry on inspection of that country without any notice. Usually such inspection visits were made under trilateral agreements amongst the USA, the recipient countries and International Atomic Energy Agency (IAEA) which provided adequate safeguards against misuse of nuclear equipment advanced to a country for peaceful uses. USA had entered into such agreements with 20 countries besides bilateral agreements with the recipient countries. When the bilateral agreements expired the safeguards were applied with the assistance of International Atomic Energy Agency (IAEA). In this connection he discounted the fears that India would misuse the nuclear equipment provided for peaceful uses.

Replying to a question, Dr. Seaborg said that USA stood for non-proliferation of atomic weapons and she would make all efforts to prevent proliferation to non-nuclear countries.

The U.S. Atomic Commission Chief, answering another question, remarked that China was obviously a great danger to the 'free world' after she had developed into a nuclear power. "We are keeping a close watch on her nuclear progress", he added.

ROOPPUR PLANT

Dr. Seaborg said that USA had made no commitment to finance the Rooppur nuclear power plant of East Pakistan nor she had made any promise of aid for the project. The U.S. Atomic Commission had studied the technical feasibility report of the project but it did not mean that "we have made any commitment to finance the project." It was the job of the Agency for International Development (AID) to examine. He said that originally the Rooppur nuclear power plant was designed to generate 70 Megawatts of electricity but later it was redesigned to increase its capacity to 150 Megawatts. This changed the entire situation.

He said that Pakistan had shortage of hydro-electric potential and it desparately needed electricity to develop its economy. In his view nucler power was the only answer as he believed that Pakistan's industrial and agricultural problems could best be met with the development of nuclear power. With a nuclear power plant already under installation at Karachi and another being envisaged in East Wing, Pakistan would become a leading country in Asia as far as the development of nuclear power was concerned.

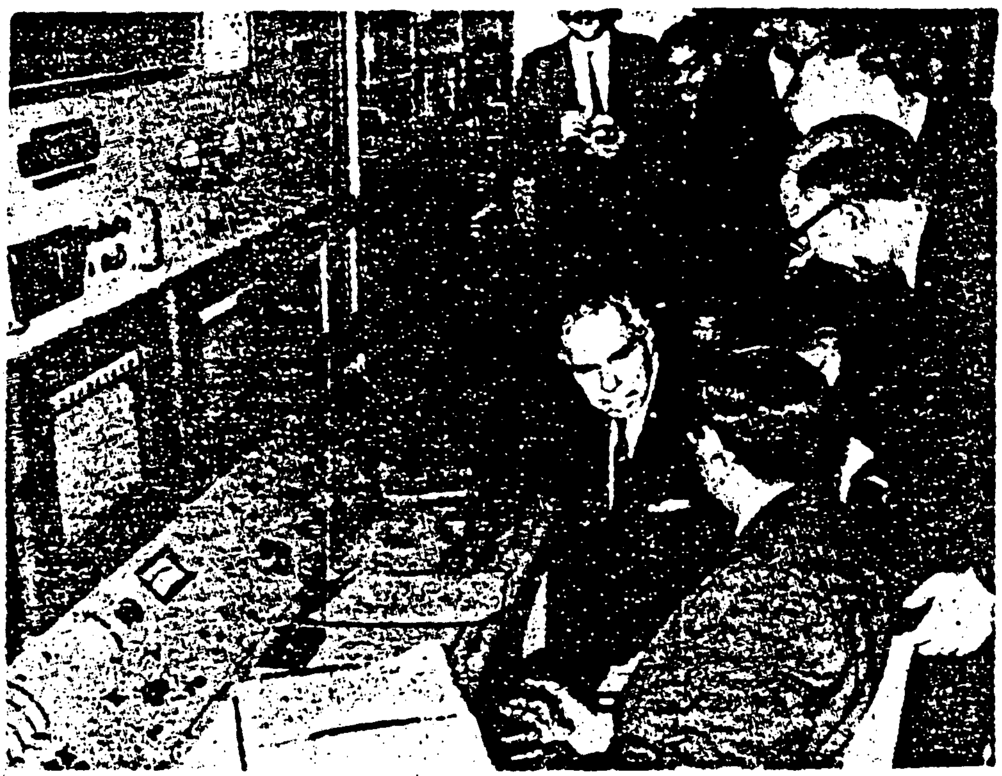
Dr. Seaborg said that USA was prepared to make an offer of 30,000 curies Cobalt 60 Irradiator to Pakistan for the preservation and disinfection of perishable food like fish, etc. The nuclear machine worth $75,000 would be provided to Pakistan if she was agreed to give USA the information regarding the results of research made on the irradiator. He said that the irradiator would be quite useful for agricultural purposes.

Replying to a question Dr. Seaborg said that about 100 Pakistani unclear scientists and engineers were working as "guests and employees" of the U. S. Atomic Energy Commission. He said that there was no change in U.S. Atomic Commission's policy regarding Pakistanis who were hardworking and competent to perform their duties. He appreciated the work being done by Pakistanis for the development of nuclear programme for peace. His visits to the Pakistan Institute of Nuclear Science at Islamabad and the Atomic Energy Centre at Lahore had impressed him much to believe that Pakistan had laid the basis of useful application of nuclear power for the benefit of the people.

Dr. Seaborg who was accompanied by Mr. Murphy Lock, U.S. Ambassador in Pakistan, arrived in Lahore from Rawalpindi on Friday. He had reached Peshawar from Bombay in the morning from where he proceeded to Rawalpindi. At Rawalpindi he visited the Nuclear Reactor and Pakistan Institute of Nuclear Science. He reached Lahore in the afternoon and was shown the Atomic Enregy Centre by Dr. I.H. Usmani.

THE
PAKISTAN TIMES

RAWALPINDI, SATURDAY, JANUARY 14, 1967—3 SHAWWAL-UL-MUKARRAM, 1386 A.H.



Dr. Glenn T. Seaborg, Chairman of the U.S. Atomic Energy Commission (sitting second from right) talking to a scientist on duty in the Control Room of PINSTECH Nilore, on Friday.

The Indian Express

January 16, 1967

Marching forward

IN an India that sometimes gives the impression of being unsure of its step the Atomic Energy Establishment at Trombay, now aptly renamed the Homi Bhabha Atomic Research Centre, is one of those "islands of self-confidence" which, as Dr Vikram Sarabhai put it, will help the nation to keep its head high, and march forward. The dedicated men and women working at Trombay have proved many things. They have proved that they are equal to the task of carrying on the work started by Dr Bhabha and for which he prepared them in a way only he could have done. They have helped to lift the so-called backward countries, now politely referred to as the developing countries, out of the role of hewers of wood and drawers of water which some of the sophisticated nations had presumed to cast them in. Above all, by concentrating steadfastly under the direction of their Government on the peaceful aspect of an element that has also the most deadly possibilities, they have vindicated Mr Nehru's oft-declared belief in the essential role of science in transforming not only the economy of the country but in transforming human beings as well.

There is indeed a long, hard road to travel before the Nehru-Bhabha dream of carrying the benefits of atomic power to India's millions living in the remotest villages and the high mountains, can become a fact. To an extent the pace of progress in this direction must inevitably be governed by the attitude of other nations in regard to the utilisation of their own atomic capabilities. However, as far as India is concerned, the pattern was set by Dr Bhabha at the first Atom for Peace Conference in 1955 when he pressed for a system that would ensure the peaceful development of atomic energy and at the same time provide to all countries the opportunity to share its benefits without discrimination. Especially in the face of recent developments elsewhere in Asia which have been calculated to jeopardise international peace and tranquillity, India's continued devotion to the peaceful applications of atomic energy is of immense significance. The Chairman of the U.S. Atomic Energy Commission, Dr Glenn Seaborg, has felt impelled to observe that, through the work done at Trombay, India has attained a position of moral as well as scientific leadership among the nations of Asia. If India is able to build progressively more such "islands of self-confidence" in other fields of national reconstruction, the country could look to the future with confidence.

Friday, January 20, 1967
SAN FRANCISCO
CHRONICLE

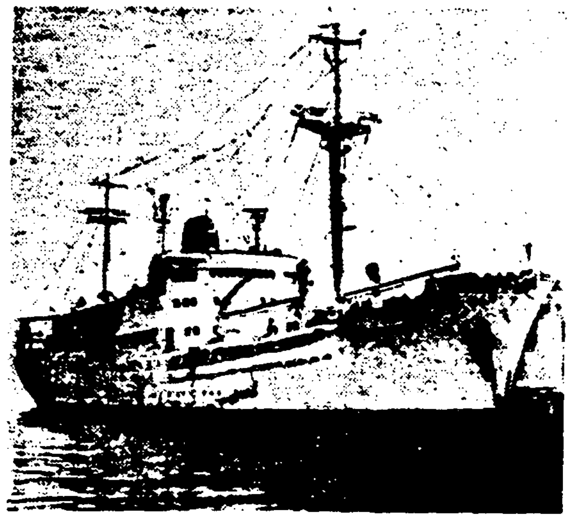
Russians' Day in the City

By Michael Grieg

Some 136 scientists and crew members from the Mikhail Lomonosov, the Soviet oceanography vessel, here for a five-day visit, got the—well—red-carpet treatment in San Francisco yesterday.

In shipboard ceremonies, Dr. Glenn Seaborg, Atomic Energy Commission physicist and a member of the National Council on Marine Resources and Engineering Development, brought greetings to the expedition from Vice President Hubert Humphrey.

And Seaborg himself praised the "radioactive measurements at sea" the ship's scientists are undertaking. He said he had heard many American specialists praising "your fine work in this area."



The Mikhail Lomonosov dockside at Pier 48A

TOUR

Captain Ivan Belyshav replied that the expedition "sincerely appreciates the hospitality of the city and the Vice President's greetings and hopes the visit will pave the way for future cooperation in many other fields as well."

While they spoke in the ship's recreation room, a portrait of Lenin, leader of the Bolshevik revolution, looked on and a Russian TV set, off to one side, flickered a soundless afternoon children's cartoon.

Earlier, a contingent of about 100 Russians, including eight lady oceanographers and nine female crewmen, boarded chartered Muni buses for a morning tour along part of the 49-mile Scenic Drive.

William Roddy, an aide to Mayor John F. Shelley, served as guide for the tour that took in City Hall, Golden Gate Park and Fisherman's Wharf.

"Your Golden Gate Park reminded us of the Summer Gardens in Leningrad," said Dr. Leonard V. Dragshinskiy, a meteorological physicist. "It was almost as nice."

CLOUDY

About the Golden Gate Bridge, he said. "It was so cloudy you could just see the San Francisco end of it. We'll have to come back for the other end, I guess."

The male members of the expedition had high praise for the San Francisco women they saw from the bus.

"They are nice, so well dressed, really beautiful, very feminine," enthused Dr. Siegfried Grittchenko, head of the ship's nuclear meteorology lab.

Commenting on the chilly weather, one Russian said: "We got plenty of sun in Tahiti. It was burning holes in the tops of our heads. So a little cold is good."

VODKA

The visitors, however, carried box lunches of Beluga caviar and smoked salmon along with what looked like flasks of brandy and vodka to add some warmth to the day's chilly mist.

Later, there was time for a shopping spree in the downtown area by the ship's lady members. But as the presence of box lunches indicated, there was no visit to one of the city's fine restaurants, and there was mere gawking than shopping.

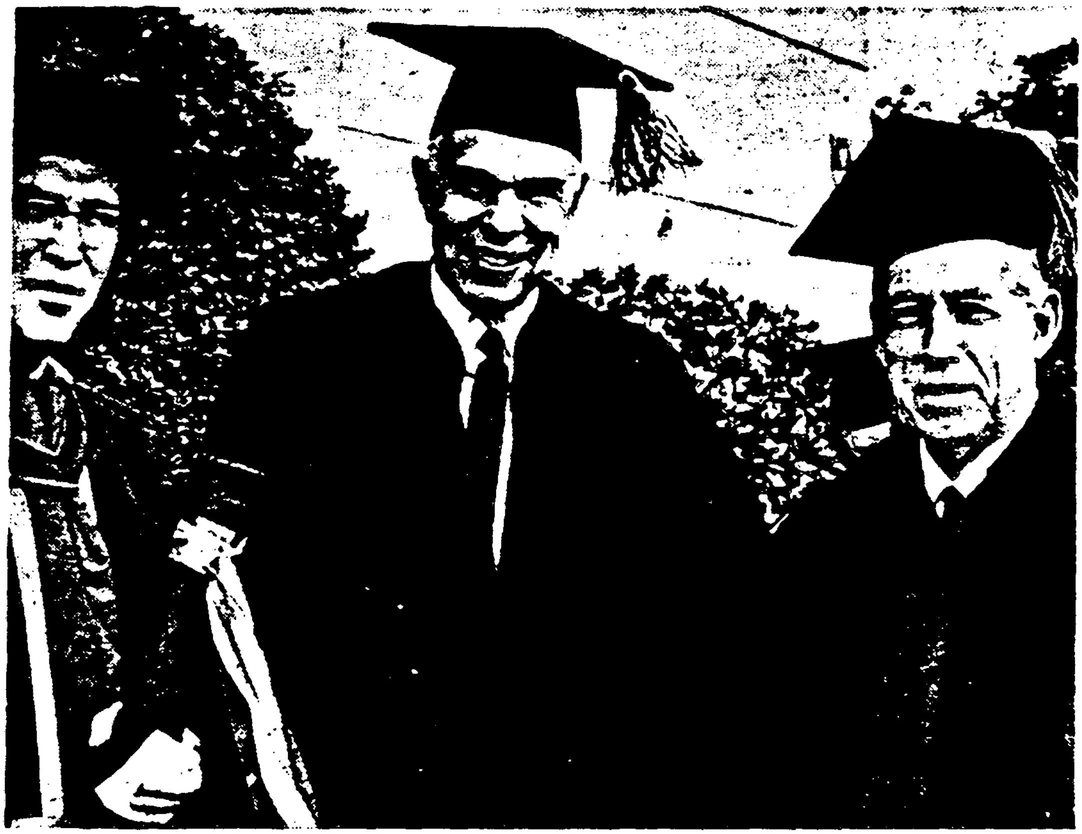
Meanwhile, back at the ship, a skeleton crew stood watch on the first Russian vessel to tie up here in five years.

The 334-foot Lomonosov, here from Vladivostok after two months at sea investigating the ocean floor, is scheduled to leave Monday for the Panama Canal and the Caribbean before returning to her home port in Sebastopol in May.

THE MIAMI NEWS

Local Front Page

Friday, January 27, 1967 3-A



Miami News Photo by Richard Gardr

DR. GLENN SEABORG SPEAKS AT UNIVERSITY OF MIAMI COMMENCEMENT
Escorted by Dr. Vergil Shipley, left, and James M. Cox Jr., Miami News Publisher

The Miami News, Friday, January 27, 1967 (Continued)

'Mould History,' U-M Grads Told

By HAINES COLBERT
Reporter of The Miami News

The present crop of young adults may influence the course of history for centuries to come, Dr. Glenn T. Seaborg said in a University of Miami commencement address today.

Dr. Seaborg, chaiaman of the Atomic Energy Commission and a former chancellor of the University of California at Berkeley, spoke at mid-term exercises at the Dade County Auditorium.

"You may argue that every new generation determines the course of history as it comes of age," he said, "but this younger generation is in a very special position.

"You have arrived on the scene at a time when the Scientific Revolution of the past few decades . . . is effecting the rapid evolution of a truly global civilization. And because of this you are inheriting the earth morally as well as physically."

Dr. Seaborg pointed out that more than one-half of the world population now is 25 or younger, and young people will tend increasingly to dominate the scene numerically.

"By the mid-1970s more than two-thirds, and perhaps three-fourths, of the U.S. population will be under 35," he said. "And on a world-wide basis it is forecast that, by 1986, 35 per cent of all the people alive will be less than 15 years old.

"Now all these statistics on youth bear more significance than just promising a great market for transistor radios, surfboards and mini-skirts. I think they point out, among other things, that 'the young shall inherit the earth.'

"Furthermore, I believe that . . . it is those of you now in the 20-to-40-year group who will, before the end of this century, determine the course of human history perhaps for centuries to come."

Dr. Seaborg received the honorary degree of Doctor of Science from the university in recognition of his contributions to nuclear research and education.

Dr. Henry King Stanford, president of the university, conferred degrees on 570 candidates. Sixteen received doctor of philospophy degrees and 113 received master's degrees.

The Miami Herald
Saturday, January 28, 1967
Complete Local News

Hood Goes on Dr. Glenn T. Seaborg
. . . scientist wins UM honorary doctorate

'Now Generation,' Key To Future, Grads Told

By JEAN WARDLOW
Herald Staff Writer

The chairman of the Atomic Energy Commission — a man of science and winner of a Nobel Prize — talked about the energy and ideals of the "Now Generation" as the University of Miami awarded 507 degrees at graduation ceremonies Friday.

An honorary doctor of science degree went to the speaker himself, Dr. Glenn T. Seaborg, who board of trustees chairman Oscar E. Dooly called "a brilliant scientist, educator and author.

"Dedicated as he is to science, he is also dedicated to humanity," Dooly said of the nuclear chemist, who was appointed by President Kennedy to head the commission in 1961.

The tall, angular scientist told the graduating students at Dade County Auditorium:

"I hope that on this important day for you, you will rise above any disillusionment or doubts you may have about the state of the world and the state of man, and turn every fiber of your being toward helping shape them toward your ideals.

"If ever there was a time to act positively and constructively toward those ideals, to which so many give lip service but fail to act, it is now — and you are the Now Generation," he said.

But he warned against taking impatient, youthful action only for the sake of action.

"There is a vast gap between expressing dissatisfaction and impatience with the way things are going and taking the positive, well-planned action toward constructive change," Dr. Seaborg said.

The Command Generation — "those of us over the age of Jack Benny," and the Now Generation, those under 25, make up one-half of the world's population today, Dr. Seaborg said.

"By the mid-1970's more than two-thirds and perhaps three-fourths of the U.S. population will be under 35," a statistic he said which bears "more significance than just promising a great market for transistor radios, surfboards and mini skirts.

"You have arrived on the scene at a time when the scientific revolution of the past few decades — forged under the current Command Generation — is effecting the rapid evolution of a truly global civilization. And because of this," he continued, "you are inheriting the earth morally as well as physically."

The degrees the UM awarded included 15 Juris Doctor degrees; 16 PhDs, and two doctorates in education.

for and about WOMEN

-C THE MIAMI HERALD Saturday, Jan. 28, 1967

—Herald Staff Photo by ALBERT COYA

Honored Guest

A luncheon honoring Dr. Glen T. Seaborg, chairman of the Atomic Energy Commission, center, followed Friday's commencement at the University of Miami. Dr. Henry King Stanford, UM president, left, and Mrs. Stanford were hosts at the luncheon for Dr. Seaborg, who was featured speaker during commencement on the campus.

AEC Chief Hails Rapid Progress Of Peaceful Atom

By AL PAGEL
Herald Science Writer

America's peaceful atom is rapidly leading its quiet strength toward building a better world, the nation's nuclear chief said Friday.

Atomic science is generating electrical power, destroying harmful insects, and playing an important role in medicine and industry, said Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission.

Dr. Glenn T. Seaborg
. . . 'a better world'

"And it's progressing at a faster pace than even the most optimistic of us expected," added the scientist.

He said programs were initiated last year for nuclear generating plants that will produce 20 million kilowatts of electricity.

"That's more than were started using the conventional generating fuels like coal and gas," he said.

Medicine too is feeling the increased impact of the atom, said the AEC head, both for treatment and diagnosis.

A radioactive isotope designed for tracing and controlling conditions in the thyroid and other organs was used a half-million times last year, he said.

In Florida, said Dr. Seaborg, nuclear science helped solve a serious livestock problem by eradicating the screw worm fly.

Masses of the male fly were sterilized by radiation and then released, he said, resulting in the flies mating without producing off-spring.

Dr. Seaborg said more than half of the AEC's \$2.5-billion annual budget is spent on developing the atom for peaceful uses.

He predicted that nuclear power will be used in the future to power artificial hearts and space ships.

Small nuclear-powered generators are being designed to furnish long-life electrical power for recording and transmitting information from the moon, said the atom chief. By 1980 nuclear power will help push man farther into space.

"A nuclear reactor will be used to heat a propellant such as liquid oxygen to about 4,000 degrees," said Dr. Seaborg. "The force from this heated propellant will then be sent out the rear of the ship creating a thrust such as we see in today's rockets."

He said the use of nuclear power would allow longer trips with higher payloads.

THE WASHINGTON DAILY NEWS, MONDAY, FEBRUARY 6, 1967

Even More Leisure Seen for Women

Glenn T. Seasborg predicted today that the woman of 2000 A.D. will have a man-handed robot "maid" capable ofdoing all the housework and then brewing a pot of coffee before putting itself away in a cupboard.

Such households as lack a "robot in the broom closet" may have a "live-in ape," specially bred for intelligent labor, which will perform not only cleaning and gardening chores but also serve as family chauffeur.

Dr. Seaborg, chairman of the Atomic Energy Commission, made these forecasts at a meeting of the Woman's National Democratic Club here. He made it clear that he was not predicting a perfect world.

Use of ape chauffeurs "might decrease the number of automobile accidents," but he doubted that anyone would ever invent a robot that could fit children into snowsuits and overshoes.

The AEC chairman said he believed that in the 21st century many more women than now will serve in Congress and the state legislatures, and many more will serve in Congress and the state legislatures, and many more will hold high state and Federal executive positions.

MORE TIME

By the turn of the century, he said, women should have more time and money and opportunity to educate themselves without sacrificing their child-bearing function. The computer will help to bring this about. He foresaw:

✔ Household computer consoles helping with everything from school work to menu planning. Housewives would "shop by videophone" without leaving home.

✔ Automated kitchens. At the appropriate times "mechinical arms would get out the pre-selected food, cook it, and serve it."

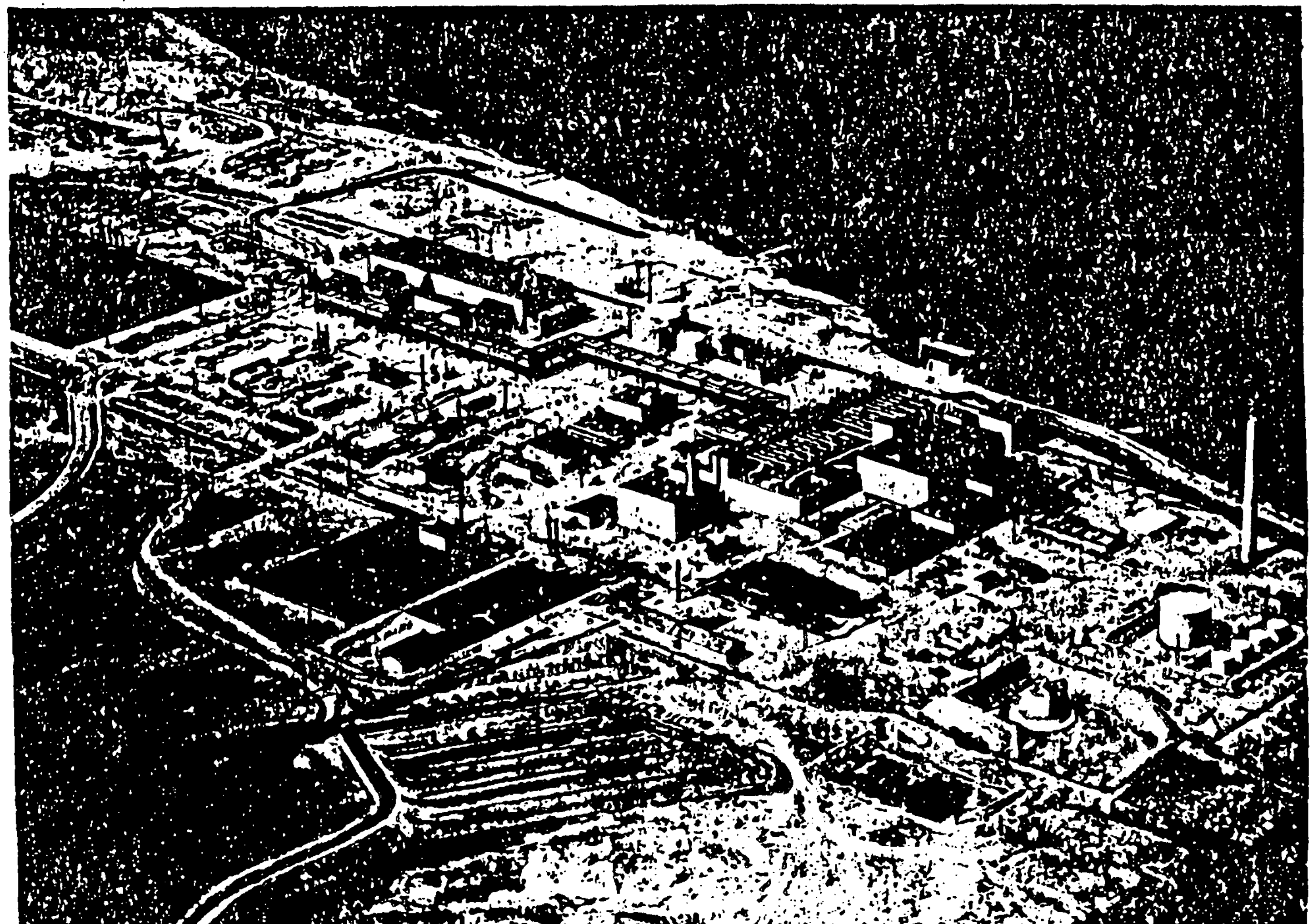
✔ Disposable dresses made from new synthetic fabrics which would make it unnecessary for women ever again "to be seen more than once in the same outfit."

✔ Improvements in foold production and processing with the result that "eventhe preparation time for minute rice and instant coffee will be shortened."

✔ Better control of infectious diseases, prevention of inherited defects, and advances in "spare parts medicine" — organ replacements, artificial hearts, and the like.

Dr. Seaborg also forecast use of drugs for "personality management." There haseven been discussion, he said, of an "anti-grouch pill" for those who are mentally healthy but chronically irritable. (UPI)

DUN To Take Over N Reactor Operatio[n]



The Washington Public Power Supply System steam plant-N Reactor complex at Hanford will be honored with the presentation of an Award of Merit won in national competition as an Outstanding Civil Engineering Achievement of 1967. Owen Hurd, WPPSS managing director, and Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission, will be presented identical plaques at 9 a.m. tomorrow in the Federal Building auditorium by Leland J. Walker, vice president of the American Society of Civil Engineers. WPPSS and the AEC are co-owners of the nuclear power facility. Douglas United Nuclear Inc. will take over operation of N-Reactor from General Electric Co. on July 1.

CHICAGO DAILY NEWS APRIL 14, 1967

Chicago Daily News

Seaborg Deals in Facts

Sen. W. Russell Arrington is right; nobody is saying that Illinois *must* enact a statewide open occupancy law. But the consequences of not doing so could be large—economically as well as socially.

What Dr. Glenn T. Seaborg told the Legislature on his visit to Springfield Wednesday was that Congress is unlikely to approve construction of the $300,000,000 nuclear accelerator at Weston unless the employes can be assured of a fair deal when they go looking for a place to live.

We do not interpret this as a threat by Seaborg, who as chairman of the Atomic Energy Commission has already termed Weston the most logical site in the country for the giant new plant. We interpret it simply as a statement of fact. The presence with Seaborg in Springfield of three of the other four commissioners is an indication of how seriously the AEC regards the situation. The Legislature should regard it just as seriously.

Precisely what kind of open occupancy law Illinois should have was not in Dr. Seaborg's province to say. He merely referred to "allegations of the existence of discrimination in housing in the site area and the absence of legal means at either the state or local level to deal with the situation effectively." It is left to the Legislature to follow its conscience and common sense in enacting the fairest bill possible.

On Wednesday The Daily News stated its views of the essentials of such a measure.

We said that the measure that in our opinion came nearest to being equitable was the one introduced in 1965 by Rep. Paul P. Boswell, "which would have required real estate dealers and subdividers to show residential properties to any qualified customer, but left with the owner the final decision of whether to sell or rent to any particular bidder."

Rep. Lewis V. Morgan (R-Wheaton) has now gathered 18 Republican co-sponsors for a bill resembling the original Boswell measure. The major exemptions under his proposal would be homeowners occupying their own homes, and developers of multiple-family dwellings with five units or less.

It will be argued that such a measure stops short of providing the buyer with utter freedom of choice. That is true, but it also stops short of depriving the individual owner of any discretion in choosing a neighbor for his neighbors. The only way we know to get past a roadblock resulting from the collision of two valid rights is by reconciling them.

We believe that adoption of such a measure—girded with suitable safeguards against its abuse or evasion—would be a long step toward solving the problem of housing discrimination in Illinois. We also believe it provides a position that can be soundly defended to Congress.

We suggest that Morgan try to enlist some Democrats among his co-sponsors, and that the Legislature treat it as a bipartisan project essential to the state's well-being.

It has been said that no open housing measure can make it in this session. We think there are enough good men in the Legislature to refute that claim.

WASHINGTON STAR
April 25, 1967

PHYSICISTS' TRIBUTE

Heirs Salute 'Oppie,' Genius of Generation

Wn Star 4-25-67

By WILLIAM HINES
Star Staff Writer

American physicists paid homage last night to the memory of the greatest one of their ranks who ever lived.

For two hours at the Sheraton-Park Hotel, members of the American Physical Society heard J. Robert Oppenheimer extolled as the guiding light of a generation of scientists. Two Nobel Prize winners joined in "celebrating—and rejoicing at—a very remarkable life."

These were the words of Charles H. Townes, provost of the Massachusetts Institute of Technology who won the Nobel Prize for his work on lasers. They opened the unusual ceremonial evening, which closed with Oppenheimer's own words played from a tape-recording by Atomic Energy Commission Chairman Glenn T. Seaborg, who won the Nobel laurels for discoveries in connection with atomic energy.

Oppenheimer, sometimes called the father of the atomic bomb, died of cancer Feb. 18 at the age of 62. In his scientific lifetime the center of theoretical physics shifted from Western Europe to the United States, partly through his efforts as a teacher and inspirer of younger men.

From the Beginning

Robert Serber, professor of physics at Columbia University, was one of these younger men, who studied under Oppenheimer at the University of California in the 1930s. He spoke last night on "The Early Years"—from the mid-'20s when Oppenheimer was a student in Germany until the outbreak of World War II and start of the atomic bomb project.

"Oppenheimer's fascinating personality played an important role in his impact as a teacher," Serber recalled.

Serber first encountered "Oppie" at the University of Michigan on summer.

"I was on my way to Princeton but after listening to him at Ann Arbor I reversed my direction and went to Berkeley" (where Oppenheimer was regularly teaching).

The seminars Oppenheimer held for his graduate students ranged across what was then the gamut of physics "and after we finished our problems the discussion would turn to wider topics." The action would continue well into the night, Serber recalled, sometimes "at a Mexican restaurant in Oakland or a good restaurant in San Francisco" where Oppenheimer would be host.

In those days there was no bridge across San Francisco Bay, and the students and their teacher would spend the hours waiting for an infrequent late-night ferry boat "in some waterfront bar."

The Presence

Not only Oppenheimer's intellectual brilliance — which all speakers emphasized — "but also his social presence" greatly influenced the lives of his students who emulated his way of speaking and his gestures, Serber said.

"We all of us owe him more than we can say for his greatness and for the greatness of his instruction," he concluded.

Victor Weisskopf, MIT physicist who until recently headed the European Center for Nuclear Research (CERN), discussed "The Los Alamos Years" when Oppenheimer built up the secret center in New Mexico where the atomic bomb was produced.

"The year 1939 changed many things," Weisskopf said. "It was the beginning of the most destructive war of all times, and also the beginning of a different kind of science."

This different kind of science was the discovery by the Germans Hahn and Strassmann of the fission, or splitting, of uranium. "The greatest change of our time came from the discovery of fission," Weisskopf said.

"Many of us," he recalled, "hoped that the number of neutrons produced in fission would be small enough so that no chain reaction would be possible. Oppenheimer was one of these."

Washington Star, April 25, 1967 (Continued)

Feasibility of the chain reaction was established late in 1942 and "Oppenheimer was chosen as the leader of the most critical part of (the) venture"—to build an atomic bomb.

Weisskopf drew laughter when he commented that "Oppie did not have what could be called administrative experience," but went on to say that he brought a special kind of leadership to bear at Los Alamos.

Forging the Prima Donnas

"He did not direct the development from the head office. In the laboratory and in the seminar room he was intellectually and physically present." And, Weisskopf added:

"It was a pleasure to see how Oppie handled that strange mixture of international prima donnas and forged them into a working organization."

Oppenheimer's problems with "security"—which were unwittingly the source of great trouble a decade later—were with him in the '40s, Weisskopf said. He continually fought the military's efforts to compartmentalize the difficult business of building a bomb:

"Everybody must know what is going on if he wants to have creativeness," Weisskopf quoted Oppenheimer as saying.

At the height of the atomic bomb effort, Weisskopf added, "Within this fence of Los Alamos the great world of physics was assembled, and we liked to think that the fence was there not to fence that world in, but to fence the rest of the world out."

Speaking of the aftermath of the bomb project, Weisskopf said, "We do not know the balance of the work at Los Alamos—whether it changed the world for the better or the worse. . . .

"One thing is certain, however. . . . We are sadly in need of the wisdom and the insight of Robert Oppenheimer."

Humiliation

Abraham Pais of Rockefeller University, New York, discussed "The Princeton Years" after World War II when Oppenheimer headed the Institute of Advanced Study at Princeton, N.J.

This was the period of what Weisskopf earlier called "the humiliation of this great man"—the time when Oppenheimer was stripped of his security clearances and subjected to an investigation by a board of the Atomic Energy Commission.

Speaking of Oppenheimer's trial, Pais said:

"The man was treated with gross injustice, but this is not the evening to elicit our own anger."

Pais did not speak of Oppenheimer's reaction to the security investigation. It is said to have embittered him, although he strove not to show his feelings.

Pais summarized Oppenheimer's contributions to science as "his own research work in physics, his influence as a teacher, his work at Los Alamos and his work at the Institute for Advanced Study and as its director."

Moved almost to the point of tears at the end of his talk, Pais said, "We remember Oppenheimer as one of the most outstanding personalities of this century."

Seaborg, representing the AEC which 13 years ago publicly degraded Oppenheimer, spoke of the scientist's "Public Service and Human Contributions." The choice of this official to make this talk was interpreted by physicists in the audience as a final government attempt to make amends for "the Oppenheimer case."

"It is not generally appreciated," Seaborg said, "how much of Oppenheimer's efforts at . . . meetings (of the AEC's General Advisory Council) went toward strengthening the commission and our country's national defense."

After listing commission after commission on which Oppenheimer served, Seaborg added, "This enumeration of his services to his country is only a small fraction of his total contributions."

As a result of these services, Seaborg said, Oppenheimer "was honored by three presidents" — Harry S Truman, who gave him the Medal for Merit; John F. Kennedy, who invited him to the White House Nobel Prize dinner and had planned to award him the Enrico Fermi Prize; and Lyndon Johnson, who actually conferred the $50,000 Fermi award upon him.

Seaborg did not mention former President Eisenhower, who ordered "a blank wall" to be erected between Oppenheimer and all government secrets

California's Great Future In Nuclear Era

SAN FRANCISCO EXAMINER
May 12, 1967

SF EXAMINER

California and the nation have the option of living in a junkless, unpolluted world, providing the bright promise of clean nuclear energy is actively pursued, Atomic Energy Chairman Glenn T. Seaborg told the Commonwealth Club here today.

Dr. Seaborg, Nobel Laureate and former professor of chemistry at the University of California, forecast an era of automated, underground, nuclear-powered industrial complexes which will —

". . desalt seawater, process natural resources, recycle old materials, and turn out new products while supplying electricity to cities and transportation systems."

The current acceptance of nuclear power is a step toward this goal, he said.

RAPID PROGRESS

The planning, design, and construction of nuclear power plants is proceeding so rapidly in the United States AEC predictions are continually short of the mark, he said, adding:

"As of May 1, the U.S. had 14 nuclear power plants in operation, 16 under construction, and plans for the construction of another 43.

"The total capacity of these 73 plants will be about 44 million kilowatts — enough electricity to meet the needs of 30 million persons."

More important than the numbers, he said, is the fact that more than half of all power plants planned by U.S. utilities will be nuclear powered. In short, the switch to atomic energy is snowballing.

'HIGH ENERGY'

"The great social, cultural and industrial complex that has blossomed here in California is in the real sense a "High Energy Society,"" Dr. Seaborg said. "There is direct relationship between advancement and the consumption of energy."

The state can no longer depend upon hydro power from mountain dams — most of the sites are already exploited; nor upon natural gas and oil — their waste products pollute the atmosphere.

California must turn to nuclear plants, which already compete economically with gas, oil, and hydro power (if one includes the extra costs of long distance transmission).

But California has two special problems in developing nuclear power, said Dr. Seaborg: Earthquake hazards and preservation of matchless scenic beauties.

STUDYING SITES

The AEC and U.S. Geological Survey are jointly studying earthquake activity on all of California's active fault lines to guide nuclear power engineers in picking good sites.

Today's nuclear plants, requiring large amounts of water coolant, must be placed along the sea coast or next to large rivers, here is where conflict with conservation arises.

Said Dr. Seaborg:

"If we built plants randomly along our coast and waterways I would be as much concerned as any other Californian. But I believe carefully selected sites can be found for the plants needed to meet future high energy requirements and that it will be possible for natural beauty and nuclear plants to coexist."

The Evening Star

With Sunday Morning Edition

Published by THE EVENING STAR NEWSPAPER CO., Washington, D. C.

SAMUEL H. KAUFFMANN, *Chairman of the Board*

CROSBY N. BOYD, *President* NEWBOLD NOYES, *Editor*

BENJAMIN M. McKELWAY, *Editorial Chairman*

WEDNESDAY, MAY 31, 1967

The Peaceful Atom

Chairman Glenn T. Seaborg of the United States Atomic Energy Commission gave a couple of excellent speeches recently in Denver and San Francisco. His theme was both simple and timely: Too many people all over the world have lost sight of the atom's actual and potential nonmilitary greatness. They have lost sight of it because it is too quiet, too undramatic, to win headlines of the kind that are always accorded news about nuclear weapons and their proliferation.

"By its very nature," said Dr. Seaborg in Denver, "the peaceful atom is a rather 'silent servant of man,' so . . . I plan to blow the peaceful atom's horn, and blow it loudly. I feel the necessity for doing this because for a good part of my life I have been associated with the peaceful atom and seen its talents grow, yet go relatively unnoticed, overshadowed by the military atom. I should point out that the growth of the peaceful atom has been so great in recent years that today more than 50 percent of the AEC's budget is devoted to work in this area, whereas a few years ago only a quarter of the budget supported it."

This area—which Dr. Seaborg describes as "the proliferation of the peaceful atom"—embraces virtually every field of human endeavor. Between now and the end of the century, assuming the absence of a nuclear Armageddon that could finish everything, the atom's preternatural force and versatility will be harnessed, according to the AEC chieftain, in a way that will have a significant impact on present practices in such fields as industry, agriculture, medicine and even police operations. All this, of course, wholly apart from the production of electrical power for the everyday requirements of a world whose population is growing at an explosive rate.

As far as our own country's needs are concerned, Dr. Seaborg, in both his Denver and San Francisco speeches, made the atom seem altogether miraculous in the area of electricity. Let us quote him: "As of May 1, the U.S. had 14 nuclear power plants in operation, 16 under construction, and plans had been announced for the construction of 43 additional nuclear power plants. The total capacity of these 73 plants will be about 44 million kilowatts. And this is enough electricity to take care of all the electric power needs of more than 30 million people." Moreover, it is just the start: "Our current projections indicate that by 1980 we should have an operating nuclear capacity of more than 100 million kilowatts. Twenty years later, by the turn of the century, total nuclear capacity should be about 700 million kilowatts."

These may seem to be fantastic figures, but they are conservative in Dr. Seaborg's judgment. More than that, they are remarkable because atom-produced electrical power does not pollute the air and is now reaching a point where it is cheaper, in some areas, than the power produced from oil, gas, coal and falling water. Dr. Seaborg is an optimist who believes that the proliferating peaceful atom will be triumphant over its grim military counterpart.

Seaborg at Commencement

Technology Is Friend, U-T Graduates Told

Technology is friend, not foe. That's the gist of what Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission, told 1000 U-T graduates and their parents and friends today at commencement in the Civic Coliseum.

He said the individual's fullest freedom and greatest opportunity for growth may come from a fully computerized society.

Can Enhance Life

While some fear the computer as the bane of individualism, Dr. Seaborg said he thinks the Computer of Cybernetic Revolution can enhance the life of the individual.

He acknowledged that "much of our current technology is having an adverse effect on our environment." And this causes some to cry that "technology is bound to destroy us."

"A few of these people would go back to the ax and shovel because the bulldozer has been used indiscriminately," he said.

Some Would Halt Progress

"They would shut down industry and turn off power plants to avoid pollution, and they would . . . denounce the discovery of the wheel as a solution to traffic congestion.

"But rational people would not resort to such alternatives any more than they would dream of halting the medical progress of the world—bringing back disease and reducing longevity— because of overpopulation.

"The reasonable and human approach to this problem lies in fostering acceptable methods of birth control—not in reintroducing the 'death control' of the past."

He said, "Of course if we view cybernation only in a negative light, we can project a frightening outcome.

"But let us take a look at its positive values. Properly applied, it is going to release man from most of the repetitive monotonous tasks he does today. It will be able to rescue the individual from the mass in a crowded world by allowing him or his records to be located rapidly for positive purposes—educational, business, or medical matters, perhaps matters of life or death.

Will Have Better Control

"It is going to give us far better control over our environment. Eventually, in combination with the power and knowledge being unfolded through man's ingenuity and cooperation, it may be able to produce a civilization of abundance that all can share and in which every man will enjoy new freedom, dignity and opportunity for individual growth."

Dr. Seaborg said one of the effects of some peoples' fear of modern society and the future is to delude people into the belief that as individuals they have less freedom today or are necessarily losing their freedom.

Wide Choice Offered

"To those of you who may believe this, let me offer some reminders. From the standpoint of any definition of freedom, most of us in this country have more of it than ever before and are gaining more of it than ever before not less. We have greater economic freedom through fuller employment, higher pay, shorter working hours and a wider variety of job opportunities than at any time in our history.

Our economy offers not only a record abundance of goods and services but a very wide choice of these—and choice, we should be reminded, is at the very basis of freedom. The fact remains that most of us enjoy far more economic freedom than our ancestors ever dreamed of."

Accomplishments Noticed

Those who feel that the individual today has less opportunity or plays a lesser role in society should be reminded that "our interest in science, in technology, and in the 'gadgets' of our times has not dulled the basic interest we have in other people," he said. "If anything, it has heightened it. We are almost voracious in our desire for news of other persons—their feats and accomplishments and, unfortunately, their shortcomings and failures when these occur."

In spite of the increased population and the growth of organizations, the accomplishments of individuals are recognized and appreciated today, Dr. Seaborg said.

WASHINGTON POST JUNE 23, 1967

Wash. Post 6-23-67

AEC, Swedish Firm Sign 1st Civilian Pact

The Atomic Energy Commission signed its first contract yesterday to process nuclear fuel for use in civilian power plants.

The contract with a private Swedish electrical utility was another step in a string of AEC efforts to minimize chances that nuclear technology will fall into the wrong hands and be used for building bombs.

That is "one reason why we offer a long-term guarantee" to enrich uranium and why it is done "at our cost," AEC Chairman Glenn T. Seaborg told reporters after the signing ceremony.

No Profit for AEC

The contract with Oksarshamnsverkets Kraftgrupp Aktiebolag (OKG) is to extend up to 30 years. It becomes effective Jan. 1, 1969, when the AEC becomes authorized to provide enrichment. Based on costs of enriching uranium today, the contract would amount to $45 million over that period, at no profit to the AEC.

The Swedish firm plans to buy most of its uranium from U.S. mining industry, under private contract.

"As in the case of all deliveries of U.S. enriched uranium overseas," an AEC announcement said, the material "will be subject to safeguards to assure it will be used only for peaceful applications."

Filtering Out U-235

Seaborg explained that the AEC thinks it can enrich the material more cheaply than anyone else. It thus hopes to undercut any movement in other countries to build their own enrichment plants as the demand for nuclear power plants increases.

Uranium is enriched by filtering out part of the form known as U-238, thus increasing the ratio of the fissionable form known as U-235.

The type of enriched uranium used in powerplants—the type to be provided the Swedish firm — contains nowhere near enough U-235 to be used in weapons. But if uranium is enriched far enough, it does become suitable for use in bombs and it is for this reason that the AEC would like to discourage foreign enrichment plants.

Enrichment contracts are not the only weapon in the AEC's antiproliferation arsenal. On the one had, it has been shutting down access to information in touchy fields of nuclear technology.

On the other, it has been declassifying secret data to assure the world that the AEC can provide all the enriched uranium anybody would need for peaceful purposes.

Diário da Noits laz

São Paulo, June 28, 1967

Presidente da Comissão de Energia Atomica dos EUA dia 4 em São Paulo

O sr. Glenn T. Seaborg, presidente da Comissão de Energia Atomica dos Estados Unidos, que chegará ao Rio de Janeiro sabado, às 22,30 horas, virá a São Paulo na proxima terça-feira, dia 4 de julho, devendo aqui permanecer até a manhã do dia seguinte, quando viajará para Buenos Aires. O sr. Seaborg visitará o Brasil como convidado do prof Uriel da Costa Ribeiro, presidente da Comissão Nacional de Energia Nuclear, para uma troca de idéias sobre o uso pacifico da energia nuclear.

PROGRAMA

O ilustre visitante desembarcará em Congonhas por volta das 9 horas, acompanhado de uma comitiva de seis pessoas, sendo recebido pelo diretor do Instituto de Energia Atomica de São Paulo, prof. Romulo Pieroni, e outros cientistas. Do aeroporto, o sr. Seaborg irá visitar a Administração da Produção de Monazita (ex-Orquima), na avenida Santo Amaro, 4693, e, às 11,15 horas, concederá entrevista coletiva à imprensa no Hotel Jaraguá. À tarde, depois das 14 horas, o presidente da CEAEUA visitará o Instituto de Energia Atomica, na Cidade Universitaria, e à noite, será homenageado pelo prof. Romulo Pieroni com um jantar na residencia do diretor do IEA.

PREMIO NOBEL

Ex-diretor da Universidade da California, o sr. Seaborg foi nomeado presidente da Comissão de Energia Atômica pelo presidente Kennedy, em 1961. O sr. Seaborg é um cientista nuclear de nomeada que, com outro cientista, recebeu o prêmio Nobel de quimica em 1951, por sua descoberta do netunio e plutonio. Descobriu, ainda, pelo menos nove outros elementos, todos no grupo mais-pesado-deque-o-uranio.

A Comissão de Energia Atômica foi criada por ato do Congresso dos EUA, em agosto de 1964. Suas responsabilidades são o desenvolvimento dos usos pacificos da energia nuclear, desenho e manufatura de armas atômicas, promoção de pesquisas em ciência nuclear e ciências correlatas, e intercambio de informações cientificas e tecnicas.

COMITIVA

Fazem parte da comitiva do sr. Seaborg: Robert E. Hellingworth, administrador geral da CEA; Myron B. Kratzer, administrador geral adjunto de atividades internacionais da CEA; sr. Arnold Fritsch, assistente especial do sr. Seaborg; Donovan Q. Zook, diretor do gabinete de assuntos de energia atômica do Departamento de Estado; Allan T. Dalton, chefe da Divisão Asiática, Africana e Latino-Americana da CEA e Herman Pollack, diretor interino de assuntos cientificos e tecnológicos internacionais do Departamento de Estado

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La Verdad
Caracas - Año 2 - Nº 577
Viernes, 30 de junio de 1967

Pionero del uso pacífico del Atomo

GANADOR DEL PREMIO NOBEL DE FISICA LLEGO A CARACAS

El Dr. Glenn T. Seaborg, ganador del Premio Nobel y pionero en los usos pacíficos de la energía atómica, llegó a Caracas para entrevistarse con destacados científicos venezolanos.

Fue designado por el Presidente Kennedy en 1961 presidente de la Comisión de Energía Atómica de los Estados Unidos. Anteriormente, el Dr. Seaborg abrió el camino al descubrimiento de varios elementos nuevos más pesados que el uranio, incluyendo el américo, el curio, el californio, el fermio y el einsteinio.

El Dr. Seaborg estará acompañado por seis científicos y funcionarios gubernamentales.

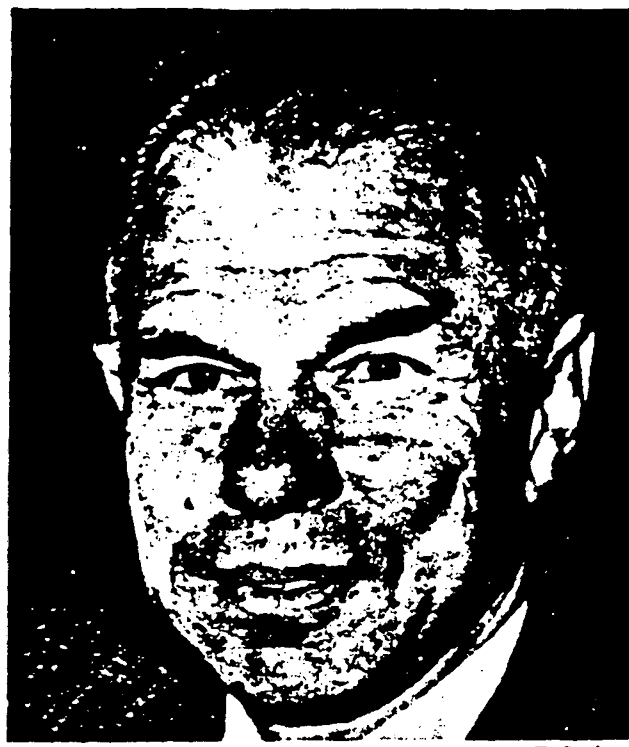
El viernes por la tarde, dará una charla sobre la reciente investigación acerca de elementos transuranios en la Asociación Venezolana para el Avance de la Ciencia (ASOVAC).

El sábado por la mañana, el grupo visitará las instalaciones, incluyendo las de energía nuclear, en el Instituto Venezolano de Investigación Científica (IVIC).

El sábado por la tarde, el Dr. Seaborg viajará por vía aérea al Brasil para proseguir su gira latinoamericana. Después, emprenderá viaje a Argentina.

Antiguo canciller de la Universidad de California, el Dr. Seaborg, de 55 años de edad, informó recientemente acerca del uso "casi común" dado ahora a los radioisótopos —creados por vez primera hace menos de 25 años— en los hospitales, plantas y laboratorios de todo el mundo. Esta no es sino una de las muchas actividades bajo el control de la Comisión de Energía Atómica de los Estados Unidos, cuyas responsabilidades abarcan el desarrollo de usos pacíficos de la energía atómica, la proyección y fabricación de armas nucleares, la promoción de investigaciones en las ciencias nucleares y conexas, y el control de la información científica y técnica.

Además del Premio Nobel, el Dr. Seaborg ha obtenido otras muchas recompensas y medallas, siendo miembro de ocho destacadas sociedades científicas, incluyendo la Real Sociedad Británica de Artes y Oficios y la Academia Nacional de Ciencias de los Estados Unidos.



EL DOCTOR Gleen T. Seaborg, presidente de la Comisión de Energía Atómica de los Estados Unidos y ganador del Premio Nobel, llegará a Caracas el viernes 30, en horas de la tarde para entrevistarse con científicos venezolanos. Es pionero en los usos pacíficos de la energía atómica, y estará acompañado por seis científicos y funcionarios gubernamentales. (Foto IPS)

Atualidade Científica

Posição atual da energia nuclear nos EUA

[illegible] no proximo dia 4, o dr. Glenn T. Seaborg, presidente da Comissão de Energia Atomica dos Estados Unidos e Premio Nobel de Quimica de 1951. O cientista norte-americano visita o Brasil como convidado do prof. Uriel da Costa Ribeiro, presidente da Comissão Nacional de Energia Nuclear, para uma troca de idéias sobre os usos pacificos da energia nuclear.

O ilustre visitante desembarcará em Congonhas em torno das 9 horas, acompanhado de uma comitiva de seis pessoas, sendo recebido pelo prof. Romulo Ribeiro Pieroni, diretor do Instituto de Energia Atomica, e outros cientistas. Do aeroporto, o dr. Seaborg irá visitar a Administração da Produção de Monazita, na av. Santo Amaro, e ás 11 e 45 concederá entrevista coletiva á imprensa no Hotel Jaraguá. A' tarde visitará o Instituto de Energia Atomica na Cidade Universitaria. Está prevista também a conferencia do prof. Seaborg no IEA sobre "Elementos transuranicos".

O CIENTISTA G. SEABORG

Nomeado em 1961 pelo presidente Kennedy para ocupar a presidencia da Comissão de Energia Atomica, orgão maximo da politica atomica nos EUA, tem, entre as suas atribuições, a tarefa de desenvolver os meios de aplicação pacifica da energia nuclear.

Considerado como um dos mais destacados cientistas dos EUA, recebeu em 1951, juntamente com Edwin McMillan, o Premio Nobel de Quimica por sua descoberta do Plutonio e Neptunio. Descobriu ainda, ou propiciou a descoberta de, pelo menos, mais oito outros elementos todos no grupo transuranicos. O notavel feito cientifico do dr. Seaborg originou-se de estudos levados a cabo pelo cientista, objetivando a produção de um elemento mais pesado do que o uranio.

Nascido em Ishpeming, Michigan, a 19 de abril de 1912, recebeu os graus de Bacharel em Humanidades e Doutor em Filosofia em 1934 e 37, respectivamente, na Universidade de California, em Los Angeles. Durante dois anos que se seguiram, foi quimico pesquisador da Universidade de California em Berkeley, onde se tornou instrutor do Departamento de Quimica.

Em 1942, o dr. Seaborg foi nomeado chefe de secção do Laboratorio Metalurgico do Projeto Manhattan. Nessa posição foi o responsavel pelo processo pelo qual o Plutonio foi separado de outros materiais de reator. Em 1946, regressou para Berkeley como catedratico de Quimica e foi nomeado chanceler da Universidade em 1948.

Em suas entrevistas gosta de contar a historia do homem que levou seu filho pequeno pela primeira vez ao zoologico. Diante da jaula do leão, o pai parou um pouco para contar alguma coisa ao menino que desse a impressão da ferocidade do bicho:

"Olhe, se o leão saisse dessa jaula, ele me estraçalharia e me comeria todinho", explicou. Então perguntou ao menino se ele tinha alguma pergunta a fazer. "Tenho sim, papai", respondeu. "Se aquele leão saisse dessa jaula e o estraçalhasse e o comesse, qual o onibus que eu tomaria para voltar para casa?"

Numa entrevista que concedeu o ano passado á revista Chemical and Engineering News afirmou que essa historia tem um significado especial. Relembra que foi esse mesmo tipo de pensamento que caracterizou a pesquisa nuclear no periodo que levou ao desprendimento da energia do atomo em 1942. Dr. Seaborg com a descoberta do Plutonio em 1940 assentou a pedra de toque para a bomba atomica e o consequente estabelecimento da energia atomica.

Nessa mesma entrevista assim definiu os primeiros dias que marcaram o inicio da quimica nuclear moderna.

"Atualmente a historia do Plutonio se volta para o outono de 1934 quando eu havia chegado a Berkeley vindo da UCLA para iniciar meu trabalho de graduação sob a orientação do falecido dr. Gilbert N. Lewis. Comecei lendo, de inicio, os excitantes relatorios italianos feitos por Fermi e Segre e depois os documentos igualmente fascinantes escritos por Hahn, Meitner, e de Strassmann, escritos em Berlim sôbre o bombardeamento de neutrons de Uranio.

"Naquela ocasião, a radioatividade procurida nesse bombardeamento era julgada como sendo isotopo de elementos de "transuranio", e eu fiquei tão interessado nesses relatorios que me tornei uma especie de especialista menor em elementos de transuranio", relembra o dr. Seaborg. "Eu continuaria com os estudos sôbre as propriedades desses "novos" elementos, em grande extensão e em grandes detalhes, e, em 1936, cheguei a fazer uma palestra de uma hora sôbre esse assunto no seminario de quimica que era realizado semanalmente na Escola. Não preciso lembrá-lo que em janeiro de 1939 Hahn e Strassmann identificaram aqueles elementos de "transuranicos" como produtos da fissão de Uranio e não elementos novos".

Após a descoberta do primeiro elemento transuranico, o Neptunio, por seus amigos dr. Edwin M. McMillan e dr. Philip H. Abelson na primavera de 1940, o dr. Seaborg dedicou-se á pesquisa do elemento transuranico seguinte mais pesado, o elemento 94. O sucesso dessa pesquisa realizada pelo cientista e seus co-autores, o falecido dr. Joseph W. Kennedy, dr. Arthur C. Wahl, e dr. Emilio Segre culminaram em março de 1941 com a descoberta historica do isotopo fissionavel Plutonio-239. Foi esse isotopo — como um ingrediente explosivo nas armas nucleares — que em breve teria um efeito tão profundo no curso dos acontecimentos humanos.

HONRARIAS

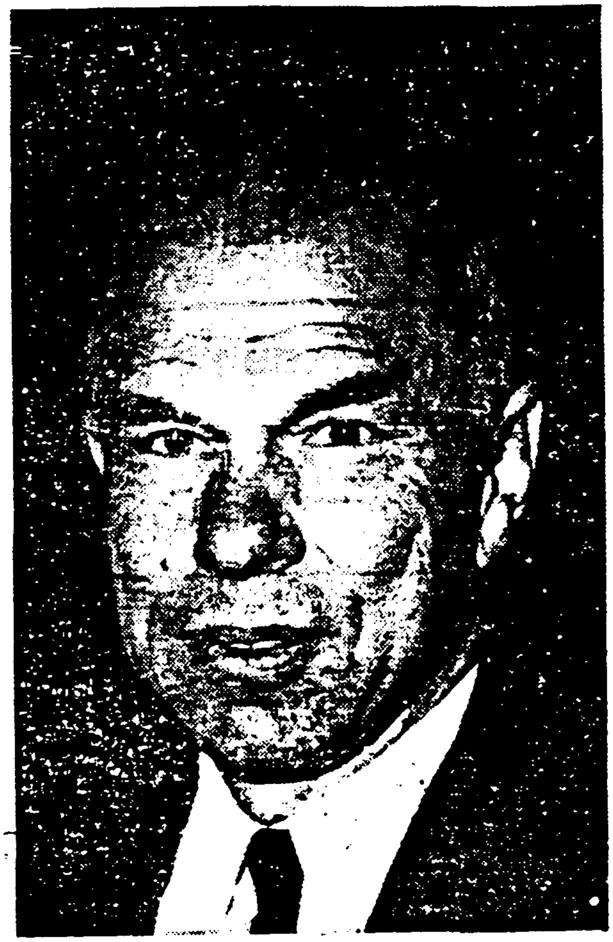
A enorme coleção de honrarias cientificas inclui o Premio Nobel, o Premio Enrico Fermi de US$ 50.000 da Comissão de Energia Atomica (1959), o Premio ACS em Quimica Pura (1947), a Medalha Nichols da Seção de New York da ACS (1948), a Medalha Perkin da Seção Americana da Sociedade de Industria Quimica (1957), e o Premio Charles Lathrop Parsons da ACS por serviço publico (1964) e o Premio Gibbs.

O dr. Seaborg deixou Berkeley na primavera de 1942 para se juntar ao Projeto Manhattan no Laboratorio Metalurgico da Universidade de Chicago. Antes disso, colaborou na descoberta do Uranio-233 e foi co-descobridor do Neptunio-237 e da existencia na natureza de quantidades extremamente diminutas de Plutonio.

Como chefe do trabalho sôbre Plutonio no programa da bomba atomica, dr. Seaborg se encarregou da tarefa de desenvolvimento de um processo quimico para separar o Plutonio de elementos combustiveis irradiados. Nessa época, muitos especialistas em quimica haviam dito que a escala de laboratorio para a produção em escala comercial não seria possivel de ser conseguida dentro do prazo disponivel.

As primeiras experiencias em Berkeley foram realizadas com quantidades tão pequenas como uma picograma, um milhão milhonesimo de uma grama. Mas no Projeto Manhattan falava-se sôbre a produção de quantidades de quilogramas de Plutonio-239 — ou uma escala de quase um bilhão de vezes mais.

Mas dentro de um ano dr. Seaborg e toda a equipe de talentos no campo da quimica que



Glenn T. Seaborg

ele havia conseguido para o projeto chegou ao processo desejado. Em junho de 1943 foi iniciada, secretamente, a construção dos trabalhos do gigante Hanford sôbre Plutonio. Nos fins de 1944 foi iniciada, em Hanford a produção em grande escala de Plutonio.

Foi nesse periodo que o genio do dr. Seaborg para organizar e dirigir programas cientificos e pessoal realmente se comprovou. Dizia-se que o dr. Seaborg "tratava com as pessoas de maneira tão habil como se estivesse tratando com seu equipamento de laboratorio". Os associados antigos dizem que ele possui uma habilidade sobrenatural para reconhecer as boas idéias para pesquisa e a determinação teimosa para levá-las adiante.

Quando ainda no Projeto Manhattan, dr. Seaborg e seus colegas descobriram mais dois elementos transuranicos, o elemento 95 (americio) e o elemento 96 (curio), ambos em 1944.

Livros

Genética

O Código da vida, de Ernest Borek, 208 páginas, tradução de Luís Edmundo de Magalhães, Editôra Cultrix, 1967.

Quase cem anos após Gregor Mendel ter formulado as Leis Mendelianas da hereditariedade, o dr. Marshall Niremberg, jovem bioquimico do Serviço de Saude dos EUA revelou em 1961, ao V Congresso Internacional de Bioquimica reunido em Moscou, a primeira letra do alfabeto genetico. As investigações, lutas e triunfos cientificos desse seculo constituem o assunto deste livro. Trata-se de uma narrativa das pesquisas que visavam ao esclarecimento dos mecanismos quimicos da vida.

O autor, das Universidades de Nova York e Columbia, leva o leitor ao laboratorio de Thomas Hunt Morgan, o mais conspicuo dos seguidores de Mendel, e de Friedrick Miescher, descobridor dos ácidos nucleicos. As duas linhas de investigação que se originaram do trabalho deles são seguidas até Oswald T. Avery que descobriu as funções dos ácidos nucleicos, e Watson e Crick, que vislumbraram a estrutura desses ácidos. Finalmente o leitor presenciará o estabelecimento de uma ligação entre estrutura e função graças ao trabalho de Marshall Niremberg.

O texto, exposto em linguagem acessivel, está ao alcance de compreensão do leitor leigo, tanto quanto do estudante de ciencias. Contém numerosos desenhos e fotografias.

N. R. — A fim de serem registrados nesta coluna, os livros cientificos, de tecnologia e divulgação devem ser enviados, pelos interessados, à secção Atualidade Cientifica, aos cuidados de Marco Antonio Filippi, neste jornal — rua Major Quedinho, 28, 4.o andar.

Folha de S. Paulo 1a, São Paulo, July 4, 1967

Energia nuclear no Bras a opinião dos EUA

RIO, 3 (FOLHA) — Numa conferencia pronunciada na Academia Brasileira de Ciencias, o presidente da Comissão de Energia Atomica dos EUA, sr. Glenn Seaborg afirmou que "está ciente da preocupação que se tem expressado no Brasil de que o compra de serviços explosivos nucleares pacificos de fonte exterior pudesse ter efeito adverso sobre o desenvolvimento economico da nação".

— Como os senhores sabem — acrescentou — os Estados Unidos indicaram sua capacidade de entrar sem ajustes nacionais para fornecer serviços explosivos nucleares pacificos que podem ser realizados com segurança onde quer que haja artefatos e tecnologia adequados disponiveis. Esses serviços seriam fornecidos em base não discriminatoria em termos atraentes identicos para os clientes tanto norte-americanos como de alem mar. Alem disso, quando esses artefatos e suas aplicações se tornarem exequiveis, não haverá escassez das unidades necessarias e todos os usos proprios poderiam ser ajustados sem demora".

APETITE DE ENERGIA

O sr. Glenn Seaborg disse, ainda, que uma das grandes preocupações dos pesquisadores nucleares de seu país é o problema do combustivel nuclear "para satisfazer o crescente apetite de energia" e acentuou que a solução para o problema pode ser a criação de reatores conversores, isto é — os que produzem combustivel em quantidades maiores do que as que queimam".

— Esse acontecimento — frisou — é de importancia especial para o Brasil, que possui uma das maiores reservas de torio do mundo, combustivel nuclear cuja utilização eficiente depende do desenvolvimento de tipos especiais de conversores avançados ou reatores reprodutores. Um amplo programa de desenvolvimento da utilização do torio está em execução nos Estados Unidos. Eu faço o mais cordial convite aos cientistas brasileiros para participar diretamente deste programa e compartilhar plenamente de seus resultados".

Publicamos na integra a conferencia do prof. Seaborg, que é um levantamento de toda historia da era nuclear, relacionada com Brasil.

É um grande privilegio para mim estar hoje aqui, a pedido do presidente Johnson, como representante de meu governo e, especialmente, de sua Comissão de Energia Atomica. Há muitos anos tenho profundo interesse pela America Latina. É minha profunda convicção que o sistema de governo compartilhado pelas republicas americanas — tanto do Norte quanto do Sul — traz consigo a melhor esperança de dar a seus cidadãos a vida de liberdade, dignidade e bem-estar que os homens de toda parte procuram.

Há menos de três meses, os presidentes das Americas se reuniram para discutir sobre como as metas que temos em comum podem ser mais rapida e amplamente alcançadas. Eles identificaram muitos pontos importantes e sobre eles concordaram, mas eu creio que talvez nenhum desses pontos provocou reação mais entusiastica e ampla do que a decisão de que a ciencia e a tecnologia devem representar papel importante na realização do progresso. O presidente Costa e Silva assumiu a liderança na acentuação dessa faceta vital do desenvolvimento latino-americano.

A REVOLUÇÃO ATOMICA

Hoje, eu gostaria de concentrar-me numa parte muito importante da revolução cientifica tecnologica que nós do seculo XX estamos tendo o privilegio de verificar — a revolução do atomo. Desejo falar sobre o que foi realizado, sobre o que pode ser feito no futuro e, talvez, até sobre o que não pode ser feito. Desejo tambem falar sobre alguns dos modos como o progresso nesse campo pode ser dividido pelas nações de ambas as Americas por meio de cooperação internacional.

A revolução atomica é ainda jovem. Como muitas revoluções cientificas, ela tambem não conhece fronteiras nacionais, e teve a contribuição de muitas nações. Este ano, estamos comemorando o vigesimo quinto aniversario da primeira reação em cadeia nuclear — um acontecimento empolgante que ocorreu secretamente sob a arquibancada do campo de futebol da Universidade de Chicago, às 15:20 horas do dia 2 de dezembro de 1942. Ali, sob a direção do inesquecivel fisico italiano Enrico Fermi, a prova da exequibilidade de uma reação em cadeia controlada surgiu menos de quatro anos depois da descoberta da propria cisão.

E, um apontamento fascinante para a historia — principalmente para nós do hemisferio ocidental — que a noticia do sucesso da experiencia tenha sido relatada por meio de uma mensagem em codigo previamente combinado: "O navegador italiano acaba de chegar ao novo mundo." O primeiro volume da historia oficial da Comissão de Energia Atomica dos Estados Unidos, publicado em 1962, foi intitulado — por inspiração na impressionante mensagem — "O Novo Mundo". Esses incidentes sublinham o fato de que a revolução atomica, nascida de descobertas do Velho Mundo, mas criada no Novo Mundo, é uma realização realmente internacional. Tem raizes em muitas terras e seus frutos estão certamente à disposição de todos.

O potencial dessa revolução capaz de contribuir para o progresso economico e tecnico da America do Sul foi reconhecido desde cedo por ilustres cientistas de muitas de nossas republicas irmãs. O Brasil, particularmente, teve um vigoroso e imediato começo do desenvolvimento nuclear pacifico. O primeiro reator da America Latina foi posto em funcionamento a 16 de setembro de 1957, no Instituto de Energia atomica de São Paulo, que eu terei o prazer de visitar amanhã. Hoje, o Brasil, com seus três reatores de pesquisas em funcionamento e muitas outras atividades nucleares, está na primeira linha do progresso da energia nuclear no hemisferio ocidental.

Qualquer palestra sobre os beneficios pacificos da energia nuclear tende a começar pela vasta capacidade do atomo de gerar calor para a produção de energia eletrica. Embora eu creia que nossa fascinação por este assunto algumas vezes venha a empanar os empolgantes acontecimentos que estão ocorrendo em outros campos, há boas razões para dar à força nuclear nossa mais alta, senão indivisivel, atenção.

A base para o interesse mundial pela geração nuclear de energia eletrica está em dois fatores fundamentais: primeiro, o impressionante aumento de necessidade de energia eletrica em praticamente todos os cantos do mundo e, segundo, a capacidade potencialmente vasta dos recursos de combustiveis nucleares no mundo para atender essas necessidades de energia de maneira economica. Quando levarmos em conta que a população mundial dobrará no ano 2002, atingindo os 6 bilhões de almas, e o consumo per capita quadruplicará, o consumo de energia eletrica é provavel que aumente pelo menos oito vezes o nivel atual, no ano 2000. Podemos prontamente ver que a questão à longo prazo não é, como às vezes se coloca, de concorrencia entre varias fontes de combustivel, mas sim de uso eficiente e sabia administração de todos os nossos recursos para atender à procura.

Mas, enquanto os que estabelecem a politica e os planejadores podem e devem observar a longo prazo as previsões e recursos energeticos, a fria decisão comercial que se toma cada vez que um novo projeto de energia se destina à construção deve levar em conta outros fatores. Neste nivel de tomada de decisão, a energia nuclear precisa ser economica — tão barata ou mais barata do que sua concorrente — segura e de confiança — para igualar-se e dar sua contribuição ao atendimento da crescente procura de energia nuclear.

A prova que lhes posso trazer hoje demonstra que a energia nuclear está enfrentando hoje esse desafio. Nos Estados Unidos, ela cruzou o limiar da capacidade de concorrencia economica com os combustiveis convencionais — antes do que previmos no principio da decada de 1960. Como resultado, trago algumas estatisticas impressionantes para mostrar-lhes. No ano passado, 29 usinas de energia nuclear, num total de 23.000.000 de kw de capacidade geradora, foram anunciadas por entidades de propriedade privada e publica dos Estados Unidos. Este ano, até agora foram decididas mais 17 usinas, totalizando 13.000.000 de kw adicionais de capacidade, proporção superior à do ano passado. Em ambos os casos, essas cifras representam alguma coisa mais do que a metade do total de nova capacidade geradora termeletrica encomendada pela industria geradora de energia norte-americana.

Essas decisões dos administradores dessa industria de "nuclearizar" foram decisões comerciais, baseadas na conclusão, depois de cuidadoso estudo de cada caso, de que a energia nuclear ofereça os meios mais economicos de atender a nova procura de energia em cada area da companhia ao tempo da seleção.

Em termos concretos, essas decisões significam que grandes usinas de energia nuclear disponiveis em base competitiva de preço fixo nos Estados Unidos podem hoje gerar energia a custos entre 2.5 e 4.5 milesimos de dolar por kwh, dependendo do acordo de financiamento.

Como se conseguiu isso? Interessante, mas não surpreendentemente, não tem havido descoberta ou soluções empolgantes na tecnologia nuclear que tornassem possiveis esses ganhos. Ao contrario, o progresso veio por meio do efeito cumulativo de muitos pequenos melhoramentos chegados passo a passo, os quais, entre outras coisas, tornaram possivel um vasto aumento nas proporções de cada unidade para um nivel de 500.000 a 1.000.000 de kilowatts — em resumo, o progresso veio por meio do processo de evolução tecnologica.

LIMITAÇÕES IMPORTANTES

Impressionantes quanto sejam esses ganhos, há algumas limitações importantes a ter em mente quando se considera a aplicabilidade da energia nuclear às necessidades de hoje. A primeira é que o custo da energia nuclear é especialmente sensivel à dimensão da usina. Todos sabemos que o custo unitario da manufatura, inclusive o de energia eletrica, se torna menor à medida que cresce a escala de operação, mas esse efeito é mais pronunciado nas usinas de força nuclear do que nas usinas a combustiveis convencionais. Assim, a economia favoravel da energia nuclear nos Estados Unidos foi alcançada por meio do desenvolvimento de usinas muito grandes, as quais, como já afirmei, estão no nivel dos 500 a 1.000 mw e às vezes até um pouco mais alto. Muitas nações ainda não têm redes de energia de tamanho suficiente para absorver unidades separadas naquele porte. De modo geral, as entidades não desejam instalar unidades alem de 10 por cento da capacidade total da rede. Outro fator importante ligado é que, para serem economicas, as usinas de energia nuclear precisam funcionar a um alto ritmo de produção — precisam trabalhar a plena capacidade e quase tempo integral. Isto mais uma vez significa que elas precisam ser instaladas numa rede, cuja carga seja de tamanho suficiente para possibilitar à usina nuclear trabalhar dessa maneira.

Mesmo quando as condições que permitem o uso de usina de 500 mw ou maior não existem em um determinado país, o estudo cuidadoso do interesse de usinas [illegible] res de tamanho consideravelmente menor frequentemente se justifica. O tamanho da usina na qual a energia nuclear se torna competitiva com as usinas [illegible] de de muitas condições locais, inclusive, principalmente, as [illegible] de juros e os acordos de financiamento, e o mais util conselho que posso dar é acentuar a importancia do estudo de cada caso com seus meritos proprios.

A região centro-sul do Brasil terá a mais ampla rede eletrica da America Latina. Sua capacidade atual de aproximadamente cinco milhões de quilowatts está crescendo rapidamente e por conseguinte pode aceitar usinas separadas, do nivel de 500.000 kw, onde a energia nuclear mostrou ser a mais economica. Os estudos cuidadosos da viabilidade economica da força nuclear para a região centro-sul do Brasil, que seus engenheiros realizaram, são excelente exemplo da maneira como se deve agir.

O crescimento da força nuclear nos Estados Unidos está tendo paralelos em varios outros paises onde existem condições semelhantes. Varios tipos de reatores capazes de produzir força nuclear competitiva em ampla area de circunstancias estão disponiveis no mercado mundial, frequentemente em base altamente competitiva, se assim combinar o comprador em perspectiva. Ao fazer os estudos a que há pouco me referi, os melhores interesses do comprador são atendidos pela solicitação de orçamentos ou cotações na mais ampla base internacional possivel. Desse modo, quaisquer vantagens ou desvantagens ligadas a um tipo de reator sobre outro podem ser avaliadas com pleno conhecimento de suas consequencias economicas.

REATORES QUE O BRASIL PRECISA

Embora bem sucedidos como temos sido na solução dos problemas de força nuclear economica, ainda completamos apenas uma parte da tarefa de tornar nossos vastos recursos de combustivel nuclear disponiveis para satisfazer nosso crescente apetite de energia. Os reatores comerciais de hoje são conversores. Queimam uma porção de Uranio-235 inicialmente presente no uranio natural, convertendo uma porção do Uranio-238 em plutonio, que pode ser então queimado, no mesmo ou em reatores semelhantes. No melhor das hipoteses esses reatores fazem uso apenas de um por cento mais ou menos da energia total teoricamente disponivel por consumo completo do uranio.

Sabemos construir reatores que podem melhorar o processo de conversão, de modo a que mais material cindivel seja produzido, em alguns casos, ainda mais do que é queimado. O desenvolvimento das versões comercialmente praticas desses reatores, o que chamamos conversores avançados ou reprodutores, é meta de mais alta prioridade nos Estados Unidos e muitos outros paises. Quando conseguirmos tornar esses reatores economicos, estaremos aptos a queimar mais da metade do combustivel nuclear encontrado na natureza e teremos alcançado o objetivo de ampliar os recursos energeticos da humanidade por decadas sem fim.

Esse acontecimento tem importancia especial para o Brasil. O Brasil possui uma das maiores reservas de torio do mundo, um combustivel nuclear cuja utilização eficiente depende do desenvolvimento de tipos especiais de conversores avançados ou reatores reprodutores. Um amplo programa de desenvolvimento da utilização do torio está em execução nos Estados Unidos. Eu faço o mais cordial convite aos cientistas brasileiros para participarem diretamente desse programa e compartilharem plenamente de seus resultados.

Tenho estado a falar de reatores de estação central geradora de energia eletrica, mas há outras aplicações promissoras para a energia dos reatores, algumas das quais poderiam ter importancia para o Brasil. Uma dessas é o uso de reatores para fornecer energia para dessalgar a agua do mar, geralmente em conjunção com o processo de gerar energia eletrica. Construindo essas usinas de dupla finalidade, podemos fazer uso de reatores maiores e assim tirar vantagens das economias de escala de que já falei.

Recentemente, recebemos plena autorização do Congresso dos Estados Unidos para realizar a primeira usina de duplo proposito em grande escala do mundo para dessalgar, uma instalação que, por fim, produzirá 150 milhões de galões de agua fresca por dia e 1.800.000 kw de eletricidade para a area de Los Angeles.

O presidente Johnson, cuja terra natal fica nas regiões aridas do Texas, tem tido por toda a vida profundo interesse nos problemas da agua e assumiu papel pessoal importante para aperfeiçoar o programa norte-americano de desenvolvimento da tecnologia de dessalgação. Em uma das muitas declarações que tem feito para acentuar a grande importancia que atribui ao desenvolvimento de dessalgação nuclear, disse ele: "Está chegando a epoca em que uma unica usina de dessalgação, movida a energia nuclear, produzirá centenas de milhões de galões de agua fresca — e grande quantidade de energia eletrica cada dia. Tal usina pode, previsivelmente, fornecer agua às industrias e cidades sedentas a preços que elas podem pagar, e pode eventualmente beneficiar tambem a agricultura."

Aqui no Brasil, estou informado de que a falta d'agua é um dos fatores que contribuem para os serios problemas economicos de sua região nordeste, e seus engenheiros têm sabiamente estudado a possibilidade de aplicação da dessalgação nessa area. Com a melhoria da economia dos processos de dessalgação, que seguramente melhorará, há uma boa oportunidade para que os senhores achem a dessalgação nuclear uma atraente possibilidade para aquela região.

Outra interessante aplicação de reatores é a geração de energia em blocos relativamente pequenos para localidades isoladas. Referimo-nos a esses reatores, alguns dos quais são desenhados para serem transportaveis, como usinas de "energia empacotada". Desenhos abrangendo uma serie de tamanhos foram construidos e funcionam em locais remotos como a Antartica, as geleiras da Groenlandia e até numa barcaça. A energia desses pequenos reatores é muito custosa não só aos padrões do custo comercial, mas tambem em comparação com o custo de pequenas unidades geradoras diesel. Entretanto, em algumas circunstancias limitadas e especializadas, esses reatores podem ser a fonte mais economica de energia para certos locais muito remotos.

Creio que seria interessante para os senhores considerar de maneira preliminar se esses reatores poderiam representar papel util na conquista do vasto interior do Brasil, uma tarefa que, eu acredito, será uma das mais empolgantes aventuras deste país. As perspectivas, naturalmente, são de longo prazo e incertas, mas, se suas considerações mostrarem que essa possibilidade é de interesse, nós teriamos prazer em lhes fornecer os resultados de nossa experiencia, juntando-nos aos senhores no estudo da exequibilidade.

Volto-me agora para um assunto de maior importancia, sobre o qual há, ocasionalmente, algum mal entendido — a aplicação de explosivos nucleares ao desenvolvimento pacifico. Desde que os explosivos se tornaram conhecidos têm sido usados com propositos construtivos, assim como para a guerra, e é inevitavel e proprio que os mais poderosos explosivos jamais aperfeiçoados — os explosivos nucleares — sejam reconhecidos como possuidores tambem de utilidade construtiva. Mas, há uma imensa brecha entre o reconhecimento da utilidade dos explosivos nucleares e a capacidade tecnica, inclusive artefatos e explosivos adequados, de usá-los para fins pacificos.

A situação hoje é que nos situamos em algum ponto entre esses dois extremos. Possuimos consideráveis informações experimentais sobre o uso de explosivos nucleares em varias aplicações experimentais interessantes, mas nenhuma aplicação especifica foi conduzida à fase de desenvolvimento e demonstração que autorize o seu uso pratico. As dificuldades que enfrentamos são substanciais, mas provavelmente superaveis.

Para entender mais completamente a natureza de alguns de nossos problemas, é provavel que caiba aqui uma palavra de explicação sobre o campo em geral dos explosivos nucleares pacificos. As aplicações de explosivos nucleares dividem-se em duas categorias basicas: aquelas nas quais os efeitos e produtos da explosão são totalmente contidos sob o solo e aquelas em que os efeitos e, por conseguinte, em grau limitado, são visiveis na superficie. Esta ultima categoria constitui o campo da excavação nuclear

PROBLEMAS FORMIDAVEIS

Para realizar projetos de excavação nuclear em escala pratica, é essencial a disponibilidade de explosivos nucleares que tenham libertação extremamente pequena de produtos radioativos da cisão. Os problemas de desenvolvimento de tais explosivos são formidaveis. Depois de mais de vinte anos de intenso desenvolvimento de explosivos nucleares, ainda estamos trabalhando no problema de produzir artefatos explosivos com o necessario poder, tendo tão baixa libertação de produtos de cisão quanto é desejavel para operações de excavação. Tem-se feito progresso nessa tarefa, mas não sei dizer quando se alcançará o sucesso.

As exigencias que esses artefatos têm que atender dependerão, naturalmente, da necessidade de assegurar que nenhum prejuizo à saude se crie com a detonação, e tambem em todas as probabilidades das previsões do tratado limitado de banimento de testes. Segundo nosso atual entendimento, esse tratado cria obstaculos à realização de grandes projetos de excavação nuclear. Do mesmo modo, o tratado tem tambem limitado a taxa de desenvolvimento e teste da tecnologia de excavação nuclear que se pode realizar.

O desenvolvimento da tecnologia para aplicações totalmente contidas não é restringida pelo tratado limitado de banimento de teste, e as proprias exigencias sobre o artefato explosivo do ponto de vista da saude não são geralmente tão estritas. Incluidas nessa categoria de aplicações estão as possibilidades interessantes como o aumento da taxa de fluxo e recuperativi de gás natural dos reservatorios subterraneos, auxilio à recuperação de metais de minerios de baixo teor e esmagamento de argila xistosa subterranea para permitir a recuperação do petroleo sem a despesa de trazer a rocha para a superficie.

Na maioria dessas aplicações a contribuição do custo dos explosivos nucleares comparado ao custo do projeto em geral é relativamente pequeno se deixarmos de lado o custo de seu desenvolvimento. Em outras palavras, esses projetos em geral quer da variedade completamente contida ou a de excavação — são em si mesmo empresas de engenharia importantes e dispendiosas. A importancia desse fato é que a maior porção de um projeto de explosivo nuclear convencional pode ser realizada por engenheiros com a competencia propria de qualquer nação, normalmente da nação na qual o projeto se realiza.

Alem disso esses projetos dependem em cada caso de extenso trabalho posterior para desenvolver a tecnologia de aplicação de artefatos nucleares e dos processos necessarios a alcançar o resultado desejado depois de ocorrer a explosão nuclear. Esse trabalho de desenvolvimento se verifica nos Estados Unidos em proporção realistica. Não só os resultados desse trabalho serão inteiramente postos à disposição de nossos companheiros como os senhores, mas no campo da tecnologia das aplicações, muitas nações podem e devem contribuir. Desejo acentuar que todas as informações sobre o desenvolvimento e as tecnicas para aplicação pacifica de explosivos nucleares aperfeiçoadas pela Comissão de Energia Atomica dos Estados Unidos não são reservadas e estão disponiveis sem despesas para nossos amigos do exterior. Só o desenho do proprio artefato explosivo nuclear é secreto.

Estou ciente da preocupação que se tem expressado no Brasil de que a compra de serviços de explosivos nucleares pacificos de fonte exterior pudesse ter efeito adverso sobre o desenvolvimento economico da nação. Creio ser desnecessaria essa preocupação. Como os senhores sabem, os Estados Unidos indicaram sua capacidade de entrar sem ajustes nacionais para fornecer serviços explosivos nucleares pacificos que podem ser realizados com segurança onde quer que haja artefatos e tecnologia adequados disponiveis. Esses serviços seriam fornecidos em base não discriminatoria em termos atraentes idênticos para os clientes tanto norte-americanos como de alem mar. Além disso, quando esses artefatos e suas aplicações se tornarem exequiveis, não haverá escassez das unidades necessarias e todos os usos prováveis poderiam ser ajustados sem demora.

Nossa crença de que acordos como esses representam a melhor maneira de agir para a provisão de explosivos nucleares pacificos baseia-se no fato de que qualquer artefato nuclear explosivo pode ser usado como arma nuclear. Além disso o desenvolvimento da tecnologia para produção de explosivos nucleares pacificos segue o mesmo caminho do desenvolvimento da tecnologia necessaria à produção de armas. Por esse motivo, temos a profunda convicção de que deter a proliferação de armas nucleares, posição que nossas duas nações apóiam com tanta firmeza, é coisa que não pode ser alcançada se a fabricação de artefatos nucleares explosivos pacificos for realizada por outras nações que não aquelas que possuam programas de armas nucleares antes da data do tratado de não proliferação.

Felizmente esse é um caso em que objetivos politicos essenciais, que acredito compartilhemos, podem ser alcançados sem qualquer sacrificio de vantagens economicas. Posso assegurar-lhes com base em nossa experiencia no desenvolvimento de explosivos nucleares tanto para fins pacificos quanto de defesa, que o desenvolvimento desses artefatos por outra nação exclusivamente para fins pacificos seria proibitivamente mais dispendioso tanto em dinheiro quanto em tempo do que a compra de serviços segundo o tipo de acordo que esbocei.

COOPERAÇÃO NORTE-AMERICANA — OS RADIOISOTOPOS

Nenhum catalogo dos usos pacificos da energia nuclear estaria completo sem a referencia aos heróis tão esquecidos da revolução atomica: os radioisotopos. Esses versateis subprodutos da era nuclear já estão trabalhando na medicina, na agricultura, na industria e na pesquisa. Eles representam possivelmente a mais significativa das novas ferramentas cientificas, desde a invenção do microscopio. Com os radioisotopos nós diagnosticamos e tratamos doenças. Erradicamos pragas de insetos de regiões inteiras, preservamos alimentos, damos energia a satelites, desenvolvemos novos tipos de plantas; controlamos processos industriais e aprendemos novos fatos sobre processos vitais como a fotosintese. Estas são aplicações presentes e não futuras. O futuro está apenas sujeito ao engenho humano. Eu não afasto a possibilidade, no futuro, de corações artificiais movidos por radioisotopos, prolongando de muitos anos a vida dos pacientes cardiacos. Vejo a possibilidade de fontes inteiramente novas de alimentos formados à base da preservação de alimentos pela radiação; de vastas redes de estações meteorologicas movidas por energia nuclear, em zonas remotas, fornecendo informações para centros computorizados de previsão de tempo; de novos plasticos com resistencia singular ao calor e ao atrito.

No Brasil, os radioisotopos já têm larga aplicação, principalmente na medicina e na biologia, campos em que os cientistas brasileiros há muito se distinguem. O rapido crescimento de muitas especies de industrias no Brasil tambem oferece campo fertil para a aplicação de radioisotopos.

O uso de radioisotopos pode avançar efetivamente por meio da cooperação internacional. A Comissão Interamericana de Energia Nuclear já marcou uma conferencia sobre a aplicação da radiação às ciencias agricolas, a ser realizada em Santiago, no fim deste ano. Creio que bem poderia ser considerada pela Comissão Interamericana de Energia Nuclear a convocação de uma conferencia sobre as aplicações industriais dos radioisotopos na America Latina, em futuro proximo. Os Estados Unidos estariam preparados para participar extensamente de tal conferencia. Creio que a Comissão Interamericana de Energia Nuclear deveria intensificar suas atividades nos usos pacificos dos radioisotopos e fazer desse campo um modelo de cooperação tecnica entre os Estados Americanos.

Orgulho-me não só dos Estados Unidos terem representado papel importante nos empolgantes desenvolvimentos que esbocei para os senhores, mas ainda mais de seu papel no estabelecimento do programa, que é hoje mundial na finalidade, pelo qual os beneficios da energia nuclear são compartilhados com praticamente todos os países. Esse programa foi designado desde o inicio "Atomos Para a Paz" e, mais de um decenio depois, seu nome não me parece superado ou excessivamente sentimental. Ele traz em si sucintamente o fato iniludivel de que o atomo pode servir para emprego igualavelmente destrutivo ou construtivo, e traz tambem a idéia de cooperação internacional na ampla realização dos beneficios pacificos do atomo.

Reduzido a seus termos mais simples, o programa Atomos Para a Paz, proposto pelos Estados Unidos em 1953, foi um esforço por parte das nações nucleares mais adiantadas para dividir com outros países o conhecimento nuclear pacifico e o acesso a materiais nucleares importantes, especificamente os combustiveis nucleares e seus produtos terem uso tanto militar quanto civil exigiu o desenvolvimento de um novo tipo de ajuste internacional. Nesses ajustes as garantias de que os materiais nucleares destinados a fins pacificos não se apliquem a usos militares verificam-se por medidas, inclusive inspeções in-loco, executadas cada vez mais por organizações internacionais. Essas medidas de verificação, que receberam o nome de salvaguardas, não se baseiam em falta de confiança entre os fornecedores e recipientes de materiais nucleares. Ao contrario, seu proposito é demonstrar ao mundo em geral que os programas nucleares declarados pacificos realmente o são. Nossos dois governos têm cooperado entre si e com a Agencia Internacional de Energia Atomica, de cuja junta governativa o Brasil é membro regular, no desenvolvimento e demonstração dessas medidas de salvaguarda.

As salvaguardas foram aperfeiçoadas e aplicadas até aqui em grande escala, e programas nucleares realizados por uma nação cooperando com outras. Cada país ficou em liberdade para realizar, por meio de seus proprios recursos, programas nucleares militares, se assim o desejar. O fato de tão poucas nações o terem feito e de tantas terem declarado sua intenção de não fazer representa para mim um dos mais animadores exemplos da aplicação do bom senso das politicas nacional e internacional. Significa que a maioria das nações compreende o fato de que a posse dessas armas mortiferas e dispendiosas de destruição em massa por mais nações aumentaria imensamente os perigos de viver em nosso mundo complexo. É animador tambem que tantas nações vejam a necessidade de traduzir suas politicas de não-aquisição de armas nucleares em formas legais que lhes garanta, e a seus vizinhos, que todos estão seguindo a mesma politica.

Para os países que já reconhecem a logica de não adquirir armas nucleares — e eu creio que eles compreendem hoje a maioria esmagadora de todas as nações — é especialmente util estarem garantidos por um tratado efetivo, segundo o qual as nações com possibilidade de interesses adversos aos seus estejam do mesmo modo comprometidas.

O tratado da zona livre nuclear latino-americana, que o Brasil assinou recentemente, representa uma forma regional dessa obrigação mutua de realizar somente os usos pacificos do atomo. Esperamos que ele sirva de bom exemplo para outras partes do mundo, cujos ocupantes nem sempre mostraram a capacidade de viverem construtiva e pacificamente com seus vizinhos, como por tanto tempo tem sido a regra nas Americas. A conclusão de um tratado mundial de não proliferação nuclear e internacionalmente inspecionado por ajustes de salvaguardas seria um dos passos mais significativos que poderiam ser dados no sentido de uma ordem mundial mais segura.

Vemos, por conseguinte, que já existe um programa de cooperação internacional efetivo e em bases amplas, para o uso pacifico da energia nuclear. Ele abrange tanto ajustes bilaterais como regionais e mundiais. Criou as instituições e sistemas necessarios a assegurar a todos que os programas nucleares pacificos, que são seu proposito, não sejam mal aplicados para fins militares. Esta é uma base boa, mas, sabiamente, nossos presidentes pediram mais cooperação para progresso mais rapido. Os Estados Unidos estão prontos e ansiosos por cumprir sua parte."

July 4, 1967

O ESTADO DE S. PAULO —

Atomo: EUA oferecem colaboração

Da Sucursal do Rio e do serviço local

Em conferencia que pronunciou ontem na Academia Brasileira de Ciencias, o sr. Glenn T. Seaborg, presidente da Comissão de Energia Atomica dos Estados Unidos, disse que seu país está em condições de fornecer "serviços de explosivos nucleares pacificos, que podem ser realizados com segurança, onde quer que haja artefatos e tecnologia adequados disponiveis" e acentuou que esse fornecimento só pode ser feito através de acordos que preservem o segredo do desenho do próprio artefato explosivo; pois esse material pode ser usado como arma nuclear.

Da Sucursal do Rio

O sr. Seaborg fala na Academia de Ciências

Em sua palestra, que teve mais de uma hora de duração, o presidente da CEA dos Estados Unidos apresentou uma relação dos setores da aplicação pacifica da energia nuclear nos quais seu país poderá colaborar, com o Brasil, para a solução de diversos problemas do desenvolvimento economico, especialmente no que se refere á produção de energia eletrica.

ENERGIA MAIS BARATA

Depois de mostrar que a demanda da energia eletrica até o ano 2000, quando a população mundial deverá estar duplicada, só poderá ser resolvida através da utilização dos reatores atomicos, o conferencista disse que a energia nuclear é tão barata ou mais barata que sua concorrente, produzida com os combustiveis tradicionais e citou, para prová-lo, uma serie de dados estatisticos computados em seu país.

"A economia favoravel da energia nuclear nos Estados Unidos — disse — foi alcançada por meio do desenvolvimento de usinas muito grandes, que estão no nivel de 500 mil a um milhão de quilowatts e ás vezes até um pouco mais alto. Muitas nações ainda não têm redes de energia de tamanho suficiente para absorver unidades separadas desse porte. De modo geral, as entidades não desejam instalar unidades além de 10% da capacidade total da rede. Também, para serem economicas, as usinas de energia nuclear precisam funcionar a um alto ritmo de produção. Precisam trabalhar a plena capacidade e quase em tempo integral. O tamanho da usina na qual a energia nuclear se torna competitiva com as usinas convencionais depende de muitas condições locais, inclusive as taxas de juros e os acordos de financiamento, e o mais util conselho que posso dar é acentuar a importancia do estudo de cada caso. A região Centro-Sul do Brasil tem a mais ampla rede eletrica da America Latina. Sua capacidade atual é de aproximadamente 5 milhões de quilowats, está crescendo rapidamente e, por conseguinte, pode aceitar usinas separadas, do nivel de 500 mil kW, onde a energia nucelar mostrou ser mais economica. Os estudos cuidadosos da viabilidade economica da força nuclear para a região Centro-Sul do Brasil que seus engenheiros realizaram, são excelente exemplo da maneira como se deve agir".

TORIO DO BRASIL

Depois de referir-se á necessidade de economizar os combustiveis nucleares, disse o conferencista:

— "Sabemos construir reatores que podem melhorar o processo de conversão de modo a que mais material cindivel seja produzido, em alguns casos ainda mais do que é queimado. O desenvolvimento das versões comercialmente praticas desses reatores, a que chamamos conversores avançados ou reprodutores, é meta da mais alta prioridade nos Estados Unidos e muitos paises. Quando conseguirmos tornar esses reatores economicos, estaremos aptos a queimar mais da metade do combustivel nuclear encontrado na natureza e teremos alcançado o objetivo de ampliar os recursos energeticos da humanidade para decadas sem fim. Esse acontecimento tem importancia especial para o Brasil. O Brasil possui uma das maiores reservas de torio do mundo, um combustivel nuclear cuja utilização eficiente depende do desenvolvimento de tipos especiais de conversores avançados ou reatores reprodutores. Um amplo programa de desenvolvimento da utilização do torio está em execução nos Estados Unidos. Eu faço o mais cordial convite aos cientistas brasileiros para participarem diretamente desse programa e compartilhar plenamente de seus resultados".

REATORES

Em seguida, o conferencista passou a falar de um novo projeto que está sendo realizado em seu país e que consiste na criação de uma usina de duplo objetivo: produção de energia para dessalgar agua do mar e para a produção de energia eletrica.

"Aqui no Brasil — disse — estou informado de que a falta de agua é um dos fatores que contribuem para sérios problemas economicos de uma região no Nordeste e seus engenheiros têm sabiamente estudado a possibilidade de aplicação do dessalgamento nessa area. Com o melhoramento da economia dos processos de dessalgamento, que seguramente melhorará, há uma boa oportunidade para que os senhores achem o dessalgamento nuclear uma atraente possibilidade para aquela região".

"Continuando, disse que outra interessante aplicação de reatores "é a geração de energia em blocos relativamente pequenos para localidades isoladas".

"Referimo-nos a esses reatores, alguns dos quais são desenhados para serem transportaveis, como usinas de "energia empacotada". Desenhos abrangendo uma série de tamanhos foram construidos e funcionam em locais remotos como a Antartida, as geleiras da Groenlandia e até numa barcaça. A energia desses pequenos reatores é muito custosa não só quanto aos padrões de custo comercial da energia, mas também em comparação com o custo de pequenas unidades geradoras Diesel. Entretanto, em algumas circunstancias limitadas e especializadas, esses reatores podem ser a fonte mais economica da energia para certos locais muito remotos. Creio que seria interessante para os senhores considerar de maneira preliminar se esses reatores poderiam representar papel util na conquista do vasto interior do Brasil, uma tarefa que eu acredito será uma das empolgantes aventuras desse País".

"Nenhum catalogo dos usos pacificos da energia nuclear — afirmou — estaria completo sem a referencia aos herois tão esquecidos da revolução atomica: os radioisotopos. Esses versateis subprodutos da era nuclear já estão trabalhando na medicina, na agricultura, na industria e na pesquisa. Eles representam possivelmente a mais significativa das novas ferramentais cientificas, desde a invenção do microscopio. Com os radioisotopos nós diagnosticamos e tratamos doenças; erradicamos pragas de insetos de regiões inteiras; preservamos alimentos; damos energia a satelites; desenvolvemos novos tipos de plantas; controlamos processos industriais, e aprendemos novos fatos sôbre processos vitais como a fotosintese. Estas são aplicações presentes e não futuras.

"O futuro está apenas sujeito ao engenho humano. Eu não afasto a possibilidade, no futuro, de corações artificiais movidos por radioisotopos, estendendo por muitos anos a vida dos pacientes cardiacos. Vejo a possibilidade de fontes inteiramente novas de alimentos construidas com base na preservação de alimentos pela radiação; de vastas rêdes de estações meteorologicas movidas a energia nuclear, em zonas remotas, fornecendo informações para centros de computadores de previsão do tempo; de novos plasticos com resistencia singular ao calor e ao atrito.

CAMPO FERTIL

No Brasil, os radioisotopos já têm larga aplicação, principalmente na Medicina e na Biologia, campos em que os cientistas brasileiros há muito se distinguem. O rapido crescimento de muitas especies de industria no Brasil também oferece campo fertil para a aplicação dos radioisotopos.

"O uso dos radioisotopos — concluiu — pode avançar efetivamente por meio da cooperação internacional. A Comissão Interamericana de Energia Nuclear já marcou uma conferencia sôbre a aplicação da radiação às ciencias agricolas, a ser realizada em Santiago, no fim deste ano. Creio que bem podia ser considerada pela Comissão Interamericana de Energia Nuclear a convocação de uma conferencia sôbre as aplicações industriais dos radioisotopos na America Latina, em futuro proximo".

Declaração

O presidente da Comissão de Energia Atomica dos EUA manteve contacto na manhã de ontem com o presidente da Comissão Nacional de Energia Nuclear, prof. Uriel da Costa Ribeiro, e outras autoridades brasileiras.

Após o encontro, realizado a portas fechadas na sede da CNEN, foi distribuida a seguinte declaração conjunta com o titulo de "Ata das conversações americano-brasileiras sobre cooperação no campo da energia nuclear":

"O presidente Glenn T. Seaborg, o embaixador John W. Tuthill, o sr. Herman Pollack, do Departamento de Estado, o presidente da Comissão Nacional de Energia Nuclear do Brasil (CNEN), professor Uriel da Costa Ribeiro, professor Paulo Ribeiro Arruda, membro do CNEN, o professor Hervasio de Carvalho, diretor do Centro Brasileiro de Pesquisas Fisicas, e o ministro Ovidio Melo, do Ministério das Relações Exteriores participaram na manhã de hoje de conversações na sede da Comissão Nacional de Energia Nuclear.

As conversações concentraram-se sobre a ampliação da cooperação existente entre a Comissão Nacional de Energia Nuclear do Brasil e a Comissão de Energia Atomica dos Estados Unidos. Foram abordados os seguintes pontos:

1) o presidente Seaborg declarou que os Estados Unidos estavam preparados, dependendo de aprovação do Congresso e de verbas orçamentarias a fornecer um numero significativo de bolsas de estagiarios a cientistas brasileiros de categoria para trabalhar em nivel profissional nos laboratorios da Comissão de Energia Atomica e em outras instituições apropriadas nos Estados Unidos.

2) dentro desse programa adicional e considerando tanto o profundo interesse do Brasil em utilizar suas reservas de torio como as pesquisas que somente vêm sendo realizadas nos Estados Unidos em matéria de reatores "breeders" de torio foi decidido que seria de comum interesse que cientistas brasileiros participem do trabalho de pesquisa sobre reatores de torio tipo "Breeders" que se vêm realizando no "Oak Ridge National Laboratory".

3) foram discutidas outras areas adicionais de possivel cooperação, a saber: levantamentos de materias-primas; estudos de viabilidade economica e de outros aspectos de energia nuclear para produção de eletricidade e para desalinização e outros usos; o desenvolvimento de entendimentos "de irmão a irmão entre laboratorios brasileiros e norte-americanos tais como Oak Ridge e Argonne; a utilização por cientistas brasileiros de instalacões nucleares avançadas tais como grandes aceleradores de acôrdo com as normas usuais que governam o acesso a essas instalações e aplicações de tecnicas de irradiação tais como preservação de alimentos e a esterilização de insetos, equipamentos e suprimentos medicos.

4) houve uma troca preliminar de impressões sobre a execução das decisões e propostas feitas na Reunião de Chefes de Estados Americanos em Punta del Este, relacionadas com o desenvolvimento regional da ciencia e da tecnologia inclusive a energia nuclear a qual pode desempenhar um papel decisivo na integração da America Latina. Além das atividades de significação regional já em andamento o presidente Costa Ribeiro manifestou que o Brasil poderia fazer uma contribuição especial para expandir a facilidade de treinamento em fisica, engenharia nuclear e instrumentação. Foi também mencionada como de possivel interesse e uso a preparação de catalogo regional de disponibilidades de radioisotopos e o intercambio de informação sobre a fabricação de equipamento nuclear.

5) em resposta a uma indagação do presidente Costa Ribeiro o dr. Seaborg informou a intenção da Comissão de Energia Atomica dos Estados Unidos de designar um representante junto á Embaixada no Rio de Janeiro".

Salvaguarda

Os Estados Unidos condicionarão o fornecimento ou a venda de explosivos nucleares para fins pacificos á garantia de um tratado de não proliferação das armas nucleares pelos demais paises, afirmou em entrevista coletiva na Embaixada norte-americana o presidente da Comissão de Energia Atomica dos Estados Unidos, sr. Glenn Seaborg.

Justificando a politica a ser adotada pelo seu País, no momento em que dispuser de tais explosivos, disse o sr. Glenn Seaborg que é imprescindivel a salvaguarda, "pois não há diferença entre os tipos de explosivos nucleares, podendo o mesmo elemento abrir uma escavação ou destruir uma cidade".

RESULTADOS PRATICOS

Anunciou o sr. Glenn Seaborg que ainda este mês os Estados Unidos conseguirão os primeiros resultados praticos com explosivos para fins pacificos, empregando-os na lavra de petroleo e na exploração de minerios de baixo teor no subsolo. "Dentro de cinco a dez anos será certamente possivel utilizar os explosivos pacificos, cujo emprego supõe antes a explosão nuclear limpa. Segundo o sr. Seaborg os Estados Unidos vêm pesquisando nesse campo há cerca de 20 anos e nos seus estudos já gastaram bilhões de dolares, "que não serão incluidos no fornecimento ou na venda dos explosivos pacificos aos paises que por ele se interessarem".

"Cobraremos apenas o preço de custo e o preço de fabricação dos explosivos — acrescentou — poupando, assim, aos paises que os comprarem dos Estados Unidos recursos fabulosos que teriam de gastar caso quisessem chegar sozinhos ao mesmo resultado".

O presidente da Comissão de Energia Atômica negou que os Estados Unidos já tenham incluido num plano o emprégo de explosivos nucleares pacificos para abertura de portos no Alasca, pesquisas de petróleo no Interior do País e abertura de novo canal no Panamá, além de abolição das compostas do atual, salientando que os estudos estão ainda em fase de pesquisa e experiência.

POTENCIAL BRASILEIRO

Referindo-se á cooperação entre os Estados Unidos e o Brasil no campo da energia nuclear, disse o sr. Gleenn Seaborg que nos contactos mantidos com autoridades brasileiras, tratou da possibilidade de cientistas norte-americanos colaborarem com o Brasil nos estudos sôbre a energia a ser empregada aqui no futuro.

"O Brasil é um País que dispõe de imenso potencial para produção de energia hidroelétrica, de modo que, provavelmente, continuará usando em grande escala esta energia ao lado da energia nuclear. Certamente, não necessitará de recorrer a outras fontes de energia, como a que emprega combustíveis de petróleo ou carvão". Quanto ás reservas de tório no Brasil, disse o presidente da CEA dos Estados Unidos que num futuro mais distante, talvez na década de 80, elas serão de grande importancia para a produção de energia nuclear.

"Como, porém, o tório não tem isótopos fissiveis — observou — o Brasil necessitará de utilizar reatores próprios para o tório e, no momento, os Estados Unidos são o unico País que desenvolve estudos dêsse tipo de reator. Utilizamosk, também, reatores rápidos para neutrons, uranios e plutônios, com sódio derretido e creio que o programa nuclear brasileiro terá de passar antes por êsses outros tipos de reatores, antes de usar o tório com uranio enriquecido".

INTERCAMBIO

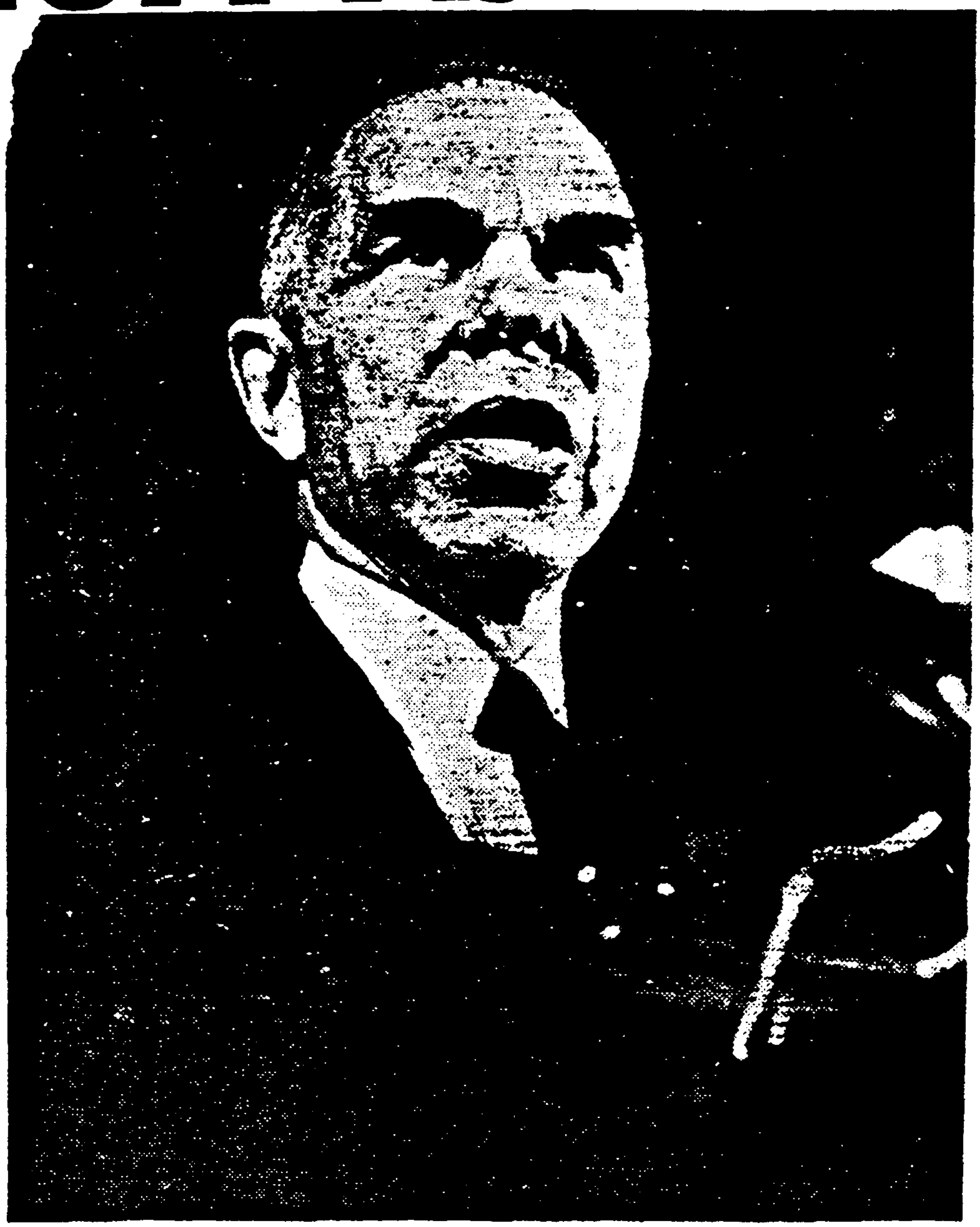
Pelo fornecimento de materias-primas nucleares por parte do Brasil ou de qualquer outro País, os Estados Unidos nada pedem em troca, a não ser o intercambio cientifico, conforme afirmou o sr. Gleenn Seaborg, que salientou, nesse ponto a contribuição de cientistas brasileiros para o progresso nuclear dos Estados Unidos.

S. Paulo

Hoje, o dr. Gleenn T. Seaborg seguirá para São Paulo, onde chegará ás 9 horas, desembarcando em Congonhas. Do aeroporto, o dr. Seaborg irá visitar a Administraão da Produção de Monazita, na av. Santo Amaro, e ás 11 e 45 concederá entrevista coletiva á imprensa no Hotel Jaraguá. A' tarde visitará o Instituto de Energia Atomica na Cidade Universitaria. Está prevista também conferência do prof. Seaborg no IEA sobre "Elementos transuranicos".

Folha de S. Paulo la., São Paulo, July 4, 1967

SEM A BOMBA, EUA AJUDAM



Seaborg enumera uma serie de ajudas que seu país poderá conceder ao Brasil no campo da aplicação pacifica da energia nuclear

O presidente da Comissão de Energia Atomica dos Estados Unidos, Glenn T. Seaborg, disse ontem no Rio que o principal objetivo de sua missão junto ao governo brasileiro é o de propor cooperação nas pesquisas para fins pacificos, "dando continuidade ao que ficou estabelecido na conferencia de Punta del Este".

Disse que os Estados Unidos estão dispostos a fornecer ao Brasil artefatos atomicos para fins pacificos "desde que fique assegurado que o governo brasileiro cumprirá as clausulas do Tratado de Não Proliferação de Armas Atomicas".

O sr. Glenn Seaborg, que hoje estará em São Paulo, adiantou que o governo norte-americano não está cogitando de policiar a America Latina. "Queremos apenas salvaguardar o disposto no Tratado de Não Proliferação de Armas Atomicas", disse.

A explosão pacifica

O sr. Seaborg afirmou que os Estados Unidos ainda não chegaram a fazer uma explosão atomica para fins pacificos e que estão apenas dando prosseguimento às pesquisas. Reconheceu, porem, que num futuro proximo cogita-se de empregar artefatos explosivos atomicos no Alasca e na construção de um novo Canal do Panamá.

Disse que o Brasil só poderá construir seu primeiro artefato por volta de 1980. Lembrou, porem, que o governo brasileiro deverá cumprir a exigencia do Tratado de Não Proliferação de Armas Atomicas.

— Nossa missão aqui não é desencorajar o Brasil com a não proliferação de armas atomicas, pois viemos discutir bases para uma cooperação de pesquisas de energia atomica para fins pacificos. Já estamos utilizando com exito a energia atomica para a dessalização da agua, para combustiveis na produção agricola e futuramente até na elaboração de um coração artificial.

Torio do Brasil

O sr. Seaborg citou como exemplo de cooperação uma pesquisa de utilização pacifica do torio, que existe no Brasil em quantidade razoavel.

Disse que somente os Estados Unidos possuem um reator capaz de transformar o torio comum em torio reprodutor. O Brasil — segundo o sr. Seaborg — deverá começar utilizando uranio enriquecido para depois entrar na era do torio.

Bases de cooperação

Apontou como bases para um acordo de mutua cooperação o oferecimento de bolsas para que cientistas brasileiros possam trabalhar em nivel profissional na Comissão de Energia Nuclear dos EUA.

O sr. Seaborg disse que os Estados Unidos estão dispostos a oferecer ao Brasil todo o equipamento necessario para uma evolução da energia nuclear para fins pacificos, cobrando o preço de uma maquina pronta "e não os milhões de dolares que ela possa nos ter custado".

Em reunião realizada no Itamarati, disse o sr. Seaborg que seu pais está disposto a fornecer "um significativo numero de bolsas de estagiarios" a cientistas brasileiros para trabalhar em nivel profissional em laboratorios da Comissão e em outras instituições apropriadas.

Cientistas brasileiros participarão de pesquisas sobre reatores de torio, tipo Breeder, que vêm sendo realizadas no Oak Ridge National Laboratory, uma vez que os orgãos cientificos brasileiros manifestaram interesse em utilizar as reservas nacionais de torio dentro do programa atualmente desenvolvido nos EUA em materia de reatores Breeder.

Em São Paulo

O cientista Glenn Seaborg desembarcará às 9h20 de hoje em Congonhas, procedente do Rio, a fim de cumprir intenso programa: visita às instalações da Administração da Produção da Monazita; entrevista à imprensa; visita à Cidade Universitaria e conferencia sobre Pesquisas Recentes sobre Elementos de Transuranio. Seaborg viajará amanhã de manhã para Buenos Aires.

Atom Commission Chairman Offers International Cooperation

RIO DE JANEIRO — The United States stand ready to furnish peaceful nuclear explosive services to appropriate international organizations which would be supplied on attractive terms identical for both U.S. and overseas customers, Dr. Glenn T. Seaborg, chairman of the U.S. Atomic Energy Commission, said in a speech yesterday at the Brazilian Academy of Sciences.

Dr. Seaborg, who arrived in Rio de Janeiro late Saturday, is on a six-nation tour of South America. He and his party of six will leave for São Paulo today and travel to Buenos Aires the following day.

In discussing the need for the services the United States is prepared to make available to international organizations, Dr. Seaborg, said, "Our belief that arrangements such as these represent the best approach to the provision of peaceful nuclear explosives is based on the fact that any nuclear explosive device is capable of use as a nuclear weapon. Because of this fact, it is our profound convicition that halting the spread of nuclear weapons could not be achieved if the manufacture of peaceful nuclear explosive devices were to be undertaken by nations in addition to those having nuclear weapons programs before the cut-off date of the non-proliferation treaty."

Dr. Seaborg also discussed the costs of developing nuclear explosives and said, "I can assure you, on the basis of our experience, that the development of these devices by another nation exclusively for peaceful purposes would be prohibitively more costly both in money and in time than the procurement of services under the type of arrangement I have outlined."

Dr. Seaborg also pointed out that to undertake nuclear excavation projects on a practical scale it is essential that nuclear explosives having an extremely small release of radioactive fission products be available. However, Dr. Seaborg said, "The problems of developing such explosives are formidable. After more than twenty years of intensive nuclear development, we are still working on the problem of producing explosive devices with the necessary power, having as low a fission product release as is desirable for excavation operations. Progress has been made in this task, but I cannot say when success will be achieved."

Dr. Seaborg also devoted much of his speech to ways in which nuclear energy might be effectively used in Brazil, particularly for electrical programs. He praised the economic feasibility programs Brazil's engineers have undertaken in the central-south region of the country and said they are an excellent example of the approach which should be taken.

The Nobel prize winner concluded his speech saying, "Wisely, our presidents have called for more cooperation for faster progress in the nuclear field. The United States is ready and eager to do its share."

Yesterday Dr. Seaborg also met with Professor Uriel da Costa Ribeiro, president of the Brazilian Nuclear Energy Commission, (CNEN) and its staff. He was the guest of honor at a luncheon at Itamarati and met with Foreign Minister Magalhães Pinto. The Chairman of the AEC also gave a press conference at the American Embassy and attended a reception offered by Ambassador John Wills Tuthill.

Dr. Seaborg and his party are scheduled to leave for São Paulo at 8:30 this morning. They will visit the Monazite Production Administration and at 11:30 Dr. Seaborg will give a press conference at the Hotel Jaraguá. That afternoon he will visit the Atomic Energy Institute where he will lecture at 5 p.m. on "Recent Research in Transuranium Elements. That night he will be the guest of honor at a dinner offered by the Director of the Atomic Energy Institute. The party will depart for Buenos Aires early tomorrow.

Folha de S. Paulo 1a, São Paulo, July 4, 1967

Glenn Seaborg e o mundo novo que ele devassou

J. Reis

Até o segundo quartel deste seculo, o uranio era o elemento mais pesado que se conhecia. Depois que se descobriu a radiatividade e a emissão de particulas alfa pelo uranio, acreditaram os cientistas, naturalmente, na impossibilidade de existirem no mundo nucleos mais pesados que o desse elemento. Tais nucleos, mais pesados e com maior carga positiva que o do uranio, seriam tão instaveis que não poderiam existir. Na realidade, não se encontraram na natureza elementos mais pesados que o uranio.

Artilharia nuclear

Teria a tabela periodica dos elementos chegado realmente ao fim? Ou haveria meios de produzir no laboratorio novos elementos, mais pesados que o uranio, mediante o bombardeio dos nucleos de determinados atomos com as particulas que os fisicos usam para atingi-los?

A segunda hipotese é que se revelou verdadeira. Os cientistas conseguiram, com sua meticulosa artilharia nuclear, produzir elementos novos, mais pesados que o uranio.

A primeira façanha desse tipo foi realizada por E. M. McMillan e P. H. Abelson em 1940, no Radiation (hoje, Lawrence) Laboratory da Universidade da California, em Berkeley. Conseguiram eles descobrir e identificar o netunio, primeiro elemento transuranico que se conheceu, e parcialmente identificar o plutonio, cuja descoberta plena é atribuida a Seaborg e seus colaboradores.

Edwin McMillan nasceu em 1907 na California, estudou no California Institute of Technology, aperfeiçoou-se em Princeton e desenvolveu suas pesquisas sobre radiações de alta energia em Berkeley. Seus estudos contribuiram para aperfeiçoar as maquinas aceleradoras de particulas de alta energia, de modo que se pôde passar do ciclotron de antes da guerra, que emitia particulas de 100 mil eletron-volts, ao bevatron planejado para produzir energias de mais de 6 bilhões de eletron-volts.

No laboratorio de Berkeley, em colaboração com Abelson, McMillan demonstrou que os nucleos dos atomos do uranio comum, irradiado por neutrons, absorvia estas particulas devidamente aceleradas, um neutron para cada nucleo. Esse uranio irradiado produzia atomos de uma outra especie de uranio (um isotopo) que durava muito pouco e logo se decompunha. Dessa decomposição surgia um elemento que antes nunca tinha sido registrado, o netunio. A carga eletrica positiva do uranio original, ou seu numero atomico, era 92. O novo elemento que surgia tinha carga 93. Por sua vez, o netunio se desintegrava, produzindo um outro elemento, de numero atomico 94, o plutonio.

Falar é facil

As coisas ditas assim parecem muito simples, mas na verdade são complicadissimas. A experiencia é precedida de estudos teoricos muito profundos e a interpretação dos resultados obtidos é igualmente complexa, pois tudo isso está nos dominios do imponderavel.

McMillan, que deixou a pesquisa nuclear em que estava mergulhado para dedicar-se aos estudos relativos ao sonar e ao radar, no Massachusetts Institute of Technology, de 1940 a 1945, desenvolveu apesar disso trabalhos basicos para a fabricação do sincroton e do sincrociclotron, que permitiram multiplicar ainda mais a energia das particulas artificialmente aceleradas, levando-a a niveis muito altos. Em 1946, voltou a Berkeley como professor de Fisica.

Glenn Seaborg nasceu em Ishpeming, Michigan, formando-se na Universidade da California em 1937, e seguiu a carreira da fisica nuclear, continuando e desenvolvendo os trabalhos fundamentais de McMillan. Este havia revelado, no curso das experiencias de bombardeio do uranio, como dissemos, a produção de um elemento novo, que veio a denominar-se neptunio, e tambem de um segundo elemento, que veio a chamar-se plutonio. Mas este aparecia sob forma de dois isotopos, isto é, plutonio formado de atomos de duas especies, sempre com carga eletrica 94, porem uns com peso 238 e outros com peso 239, dependendo a diferença de peso (como ocorre nos isotopos em geral) do numero de neutrons existentes no nucleo (os neutrons não têm carga eletrica, de modo que sua presença em maior numero dentro de um nucleo aumenta o peso do atomo, mas não a carga eletrica do nucleo).

Depois de identificado rigorosamente o plutonio, Seaborg com seus colaboradores conseguiram produzir, no laboratorio metalurgico da Universidade de Chicago, mais dois elementos transuranicos, o americio (numero 95), o curio (96). Depois produziu o berguelio (97) e o californio (98). Os elementos 99 e 100 formaram-se na explosão termonuclear Mike, realizada no Pacifico, em 1952, sendo identificados pelos cientistas do Radiation Laboratory, do Laboratorio Nacional de Argonne e do Laboratorio de Los Alamos.

Mais elementos

Mais tarde, foi produzido e identificado o mendelevio (101), por uma equipe integrada tambem por Seaborg. O elemento 102 tem paternidade discutida, pois foi anunciado por equipe mista na Suecia, contestado pelos norte-americanos do Lawrence Laboratory e finalmente descrito pelo grupo de Seaborg, que impugnou a denominação de nobelio (afinal aceita) dada ao elemento. Em 1961, anunciou-se o elemento 103, no mesmo laboratorio. O elemento recebeu o nome de lawrencio.

Não adianta mencionar aqui como foi produzido cada um dos diversos elementos acima citados. Resultaram todos do trabalho de bombardeio de determinados nucleos com particulas elementares aceleradas. As propriedades dos elementos transuranicos são muito semelhantes, dando origem a ions trivalentes eletropositivos que, por sua vez, permitem a obtenção de compostos inorganicos e organicos. O caminho aberto não se encerrou. Muito pelo contrario, o veio continua a prometer novos elementos na serie transuranica.

Depois da guerra, Seaborg voltou a Berkeley como professor de Quimica e, mais tarde, assumiu o cargo de presidente da Comissão de Energia Atomica dos Estados Unidos. Em 1951, ele e McMillan receberam o Premio Nobel de Quimica «por suas descobertas na quimica dos elementos transuranicos». Essas descobertas tiveram realmente enorme repercussão teorica e pratica. Foram feitas a partir de uma serie de investigações que anteriormente haviam consagrado nada menos de 25 outros Premios Nobel o que mostra que os dois norte-americanos lavraram terreno intensamente trabalhado, seja antes deles, seja ao mesmo tempo que eles.

terminado elemento por outro. Mas, em relação aos elementos que se seguiram, especialmente os 95 e 96, Seaborg teve de introduzir substancial modificação na maneira de interpretar a tabela periodica dos elementos, de Mendeleiev, tal como era aceita naquela epoca. O «parentesco» que essa tabela indica entre grupos de elementos, permitira a outros, anteriormente, prever as propriedades de elementos novos e por esse caminho chegar à descoberta deles.

Esse conhecimento do parentesco era uma boa inspiração para os quimicos, quando partiam em suas caçadas de elementos novos. Pensava-se que os elementos 95 e 96 deveriam ser parecidos com o uranio, o netunio e o plutonio, que eram considerados assim como «primos» na tabela periodica. As propriedades quimicas dos elementos 95 e 96, ainda não conhecidos, deveriam ser parecidissimas com as daqueles «primos» que integravam o grupo dos uranidas.

Seaborg viu que esse caminho estava errado.

Havia alguma coisa que falhava na «arvore genealogica» da quimica, a respeito daquela suposta familia. Ocorreu-lhe então que os elementos mais pesados que o actinio deveriam estar mal colocados na tabela periodica. Eles deveriam constituir, assim imaginava Seaborg, uma serie parecida com a formada pelas chamadas «terras raras», a serie dos lantanidas. Estes são muito parecidos entre si e em geral são colocados como uma fileira separada, fora do corpo principal da tabela periodica, ligada a ela por uma linha pontilhada que chega até à casa em que se encontra o lantanio.

Todos os elementos mais pesados que estavam sendo descobertos deveriam pertencer, segundo pensou Seaborg, a uma fileira semelhante à dos lantanidas, porem ligada ao actinio, que vem logo depois do radio. Elaborou ele assim uma nova tabela periodica, em que os elementos mais pesados entravam numa fileira abaixo da serie lantanida (fora, as duas, do corpo da tabela); e os elementos da serie actinida eram emparelhados com os da serie lantanida, um a um. Isso permitiu a Seaborg prever as qualidades que deveriam ter os novos elementos 95 e 96, antes de descobertos. Preparadas as experiencias de acordo com esse raciocinio basico, conseguiu Seaborg descobrir os dois elementos.

Plutonio

Deixando de lado os aspectos puramente cientificos das descobertas referidas, que modificaram a tabela de Mendeleiv e abriram um novo filão para descoberta de elementos "sinteticos" (feitos no laboratorio e inexistentes na natureza), nunca será demais realçar a capital importancia do elemento plutonio, cujo nucleo se presta, como o uranio-235, à obtenção de enormes quantidades de energia atomica. E' que o plutonio, elemento relativamente estavel, quando bombardeado com neutrons sofre o processo da fissão, como o uranio, e produz mais neutrons que, por sua vez, provocam a fissão de novos atomos de plutonio e vão assim entretanto uma reação em cadeia. Para os fisicos e quimicos que trabalhavam aceleradamente na busca de meios praticos de produzir energia atomica, o plutonio apresentava grandes vantagens sobre o uranio. As pesquisas revelaram que no processo comum de produção da energia a partir da fissão do uranio nas pilhas atomicas, a concentração de neutrons, que naturalmente ocorre, provoca a formação de plutonio em grande quantidade na propria pilha. E esse plutonio pode ser considerado, afinal, como a principal fonte da energia nuclear, uma vez que é mais facil separá-lo do que separar uns dos outros os proprios isotopos do uranio.

E assim um elemento novo, não existente na natureza a não ser em quantidades minimissimas, pode ser abundantemente usado nas pilhas que produzem energia atomica, porque por elas mesmas fabricado. Ainda aí, é preciso lembrar que as coisas, na realidade, são muito mais dificeis do que quando contadas. Especialmente no que respeita à separação dos elementos radiativos fundamentais às reações em cadeia, que se aproveitam nas pilhas e nas bombas atomicas, e na identificação dos elementos novos, a qual importou trabalhos semelhantes aos dos microbiologistas, pois o reconhecimento de muitos compostos obtidos em minimas quantidades era feito por meio do microscopio.

Para encerrar, McMillan e Seaborg, juntamente com seus varios colaboradores, podem ser encarados como desvendadores de um mundo todo novo e inesperado, entre os elementos quimicos. Pois isso na realidade são os elementos transuranicos.

O leitor que desejar maiores esclarecimentos sobre o assunto, poderá consultar o livro «Os Elementos Quimicos», de Helen Miles Davis, que foi aliás revisto pelo proprio Seaborg. Este eminente pesquisador é ainda ativo divulgador da ciencia. Como presidente da Comissão de Energia Atomica, são numerosos os seus pronunciamentos, em conferencias e outras manifestações, sobre os problemas da ciencia e da formação cientifica. E tambem tem procurado atingir maiores audiencias, como atesta o livro que publicou em colaboração com Evans G. Valens, «Elements of the Universe», magnifica introdução à quimica, em que a tabela periodica dos elementos serve de tema unificador. Esse livro, que é dos mais recomendaveis, é desenvolvimento de um programa constante de filmes de meia hora, dez ao todo, que foram preparados para a televisão.

Coração atomico para cardiacos

"Não afasto a possibilidade, no futuro, de corações artificiais movidos por radioisotopos, prolongando por muitos anos a vida dos pacientes cardiacos" — disse, ontem, no Rio, o sr. Glenn T. Seaborg, presidente da Comissão de Energia Atomica dos Estados Unidos. O cientista, premio Nobel de Quimica, chegará hoje, a São Paulo, para cumprir a segunda e ultima parte de seu programa no Brasil. Veio a convite do governo brasileiro e em cumprimento à missão que lhe confiou o presidente Johnson — a de verificar as possibilidades de ajuda norte-americana para utilização pacifica da energia nuclear. Cientistas e administradores da CEA acompanham o sr. Seaborg.

PUNTA DEL ESTE

A missão do sr. Seaborg é decorrencia da conferencia dos presidentes americanos, realizada em abril, em Punta del Este, onde o Brasil levantou a tese de maior utilização da energia nuclear para acelerar o desenvolvimento dos paises latino-americanos.

Em São Paulo, o sr. Seaborg visitará as instalações da Administração da Produção Monazita, concederá entrevista coletiva à imprensa, às 11,15 horas, no Hotel Jaraguá, e pronunciará palestra no Instituto de Energia Atomica, sobre o tema "Pesquisas recentes sobre elementos de transuranio".

Além de autor de varios livros sobre quimica, o sr. Glenn Seaborg é conhecido como o pai da "teoria dos actinios". Em 1951 ganhou o Premio Nobel com seu colega da Universidade da California, E. M. McMillan. Em 1961 foi nomeado presidente da Comissão de Energia Atomica, e em 1963 designado para dirigir o orgão por mais cinco anos.

BRASIL NA VANGUARDA

Na palestra que fez no Rio, o sr. Seaborg falou sôbre a grande revolução do seculo XX — a revolução do átomo, e afirmou que o Brasil, "com seus três reatores de pesquisas em funcionamento e muitas outras atividades nucleares, está na primeira linha do progresso nuclear do hemisferio ocidental". Lembrou que este ano comemora-se o 25.o aniversario da primeira reação em cadeia nuclear, acontecimento que se registrou secretamente, na Universidade de Chicago, sob a direção do grande fisico italiano Enrico Fermi. Isso ocorreu no dia 2 de dezembro de 1942, e o fato foi comunicado ao govêrno por uma mensagem em codigo previamente combinada, a que hoje é um apontamento fascinante para a historia: "O navegador italiano acaba de chegar ao novo mundo".

ENERGIA

O sr. Seaborg aponta as possibilidades do aproveitamento da energia nuclear para produção de energia elétrica, cujo consumo deverá aumentar oito vezes no ano 2.000. "Nos Estados Unidos — disse — a produção de energia elétrica, utilizando energia nuclear, já cruzou o limiar da concorrencia com os combustiveis convencionais. No ano passado, 29 usinas com capacidade total de 23 milhões de quilowatts foram anunciadas por entidades publicas e particulares. Até agora já foram instaladas 17 usinas, totalizando 13 milhões de quilowatts". Esclareceu depois que a produção, por êsse meio, só é economica quando a usina é dimensionada para um minimo de 500 a 1.000 megawatts (500 mil a um milhão de quilowatts), e quando ela funciona a plena capacidade e quase em tempo integral. O Brasil, em sua região centro-sul, pode aceitar usinas com essa capacidade, o que torna econômico o emprego do átomo para produção da energia elétrica.

RESERVAS DO BRASIL

O sr. Seaborg explicou que os reatores comerciais de hoje trabalham à base da conversão do uranio-235, inicialmente presente no uranio natural, convertendo uma porção do U-238 em plutonio, que pode ser então queimado no reator que fez a transformação, ou em outros semelhantes.

O conhecimento cientifico atual, permitindo melhorar o processo de conversão, abre grandes possibilidades do Brasil que "possui uma das maiores reservas de torio do mundo, um combustivel nuclear cuja utilização eficiente depende do desenvolvimento de tipos especiais de conversores avançados ou reatores reprodutores".

AGUA SALGADA EM DOCE

Outra grande aplicação da energia atomica, disse o sr. Seaborg, é a de dessalgar a água do mar, produzindo ao mesmo tempo energia elétrica. O Congresso americano aprovou plano para construção de uma instalação que produzirá 600 milhões de litros de agua doce por dia e 1,8 milhões de quilovates, na região de Los Angeles.

"Com a melhoria econômica dos processos de dessalgação, existe a possibilidade de se aplicar, no Nordeste do Brasil, uma usina capaz de fornecer milhões de litros de água às industrias e às cidades, a preços acessiveis, além de energia elétrica. Pode, eventualmente, beneficiar também a agricultura".

USINAS PORTATEIS

Outra possibilidade do atomo: geradores portateis de energia elétrica ("energia empacotada"), como tem ocorrido na Antartida. A energia desses pequenos reatores é muito custosa, mas em determinadas circunstancias o investimento compensa. Reatores desse tipo poderiam prestar bons serviços no interior do Brasil.

Os explosivos nucleares também podem ser aplicados para fins pacificos, mas até agora nenhuma aplicação especifica foi conduzida à fase do desenvolvimento e demonstração que autorize o seu uso prático. Para realizar projetos de excavação nuclear é preciso encontrar explosivos com baixa libertação de produtos de cisão. Nesse sentido já se fez algum progresso.

"Todas as informações — disse o sr. Seaborg — sôbre o desenvolvimento e a técnica para aplicação pacifica de explosivos nucleares aperfeiçoados pela CEA dos EUA não são reservadas e estão disponiveis, sem despesas, para nossos amigos do exterior. Só o projeto do proprio artefato explosivo nuclear é secreto".

RADIOISOTOPOS

O sr. Seaborg aponta as vantagens dos radioisotopos, "versateis subprodutos da era nuclear que já estão trabalhando na medicina, na agricultura, na industria e na pesquisa. Com eles diagnosticamos e tratamos doenças, erradicamos pragas de insetos de regiões inteiras, preservamos alimentos. Estas são aplicações presentes e não futuras. Eu não afasto a possibilidade, no futuro, de corações artificiais movidos por radioisotopos, prolongando de muitos anos a vida dos pacientes cardiacos".

DIARIO POPULAR • 4 - 7 - 1967 São Paulo

G enn: Brasil na vanguarda atômica no hemisfério

RIO, 3 (DP) — O prof. Glenn T. Seaberg, presidente da Comissão de Energia Atômica dos EUA, falando ontem na Academia Brasileira de Ciências, rememorou a decisão tomada, há menos de três meses, na reunião de presidentes das repúblicas americanas, segundo a qual a ciência e a tecnologia devem representar papel importante na realização do progresso. "O presidente Costa e Silva — disse — assumiu a liderança na acentuação dessa faceta vital do desenvolvimento latino-americano".

REVOLUÇÃO ATÔMICA

Colocando as pesquisas em tôrno do átomo como parte das mais importantes na revolução científico-tecnológica, salientou que êsse episódio — a revolução atômica — é ainda jovem, não conhece fronteiras nacionais e teve a participação de muitos países. O potencial dessa revolução, capaz de contribuir para o progresso econômico e técnico na América do Sul, foi reconhecido desde cedo por ilustres cientistas de muitas repúblicas irmãs. E frisou: "O Brasil, particularmente, teve um vigoroso e imediato comêço do desenvolvimento nuclear pacífico. O primeiro reator da América Latina foi pôsto em funcionamento a 16 de setembro de 1957, no Instituto de Energia Atômica de São Paulo, que eu terei o prazer de visitar amanhã. Hoje, o Brasil, com seus três reatores de pesquisas em funcionamento e muitas outras atividades nucleares, está na primeira linha do progresso de energia nuclear no hemisfério ocidental".

ENERGIA ELETRICA

Depois de enumerar os benefícios pacíficos da energia nuclear, que começam pela vasta capacidade do átomo em gerar calor para a produção de energia elétrica, afirmou que a região centro-sul do Brasil tem a mais ampla rêde elétrica da América Latina. Sua capacidade atual, de aproximadamente 5 milhões de kw, está crescendo ràpidamente. Os estudos cuidadosos da viabilidade econômica da fôrça nuclear para a região centro-sul do Brasil, que seus engenheiros realizaram, são excelente exemplo da maneira como se deve agir.

MAIS REATORES

Aludindo à construção de reatores, disse que o Brasil possui uma das maiores reservas de tório do mundo, um combustível nuclear cuja utilização eficiente depende do desenvolvimento de tipos especiais de conversores avançados ou reatores reprodutores. E explicou: "Aqui no Brasil, estou informado de que a falta d'água é um dos fatores que contribuem para os sérios problemas econômicos de sua região nordeste e seus engenheiros têm sabiamente estudado a possibilidade de aplicação da dessalgação nossa da nossa área. Com a melhoria da economia dos processos de dessalgação, que seguramente melhorará, há uma boa oportunidade para que os senhores achem a dessalgação nuclear uma excelente possibilidade para aquela região".

EXPLOSIVOS NUCLEARES

Desfazendo mal-entendidos sôbre aplicação de explosivos nucleares no desenvolvimento pacífico, o prof. Glenn T. Seaberg acentuou que, desde o conhecimento dêsses explosivos, foram êles utilizados com propósitos construtivos, assim como para a guerra. E' inevitável e próprio que os mais poderosos explosivos jamais aperfeiçoados — os explosivos nucleares — sejam reconhecidos como possuidores também de utilidade construtiva. Mas, há uma imensa brecha entre o reconhecimento da utilidade dos explosivos nucleares e a capacidade técnica, inclusive artefatos e explosivos adequados, de usá-los para fins pacíficos. A situação hoje é que nos situamos em algum ponto entre êsses dois extremos. Possuímos consideráveis informações experimentais sôbre o uso de explosivos nucleares, em várias aplicações experimentais interessantes, mas nenhuma aplicação específica foi conduzida à fase do desenvolvimento e demonstração que autorize o seu uso prático. As dificuldades que enfrentamos são substanciais, mas pròvàvelmente superáveis.

ÁTOMOS PARA A PAZ

Prosseguindo, esclareceu o cientista que "reduzido a seus termos mais simples, o programa Átomo Para a Paz, proposto pelos EUA, em 1953, foi um esfôrço por parte das nações nucleares mais adiantadas para dividir com outros países o conhecimento nuclear pacífico e o acesso a materiais nucleares importantes, especificamente os combustíveis nucleares, e seus produtos terem uso tanto militar quanto civil".

Declarou mais que o concêrto de um tratado mundial para impedir a proliferação das armas nucleares — com garantias vigiadas internacionalmente — seria um dos passos mais importantes que se poderia dar para o estabelecimento de uma ordem mundial mais segura.

MISSÃO ATÔMICA

O sr. Glenn Seaberg chefia uma delegação de cinco peritos norte-americanos em questões de energia atômica, que realizam uma visita a seis países latino-americanos: Argentina, Brasil, Colômbia, Chile, Peru e Venezuela. O grupo faz a excursão em cumprimento à promessa do presidente Johnson, na reunião de cúpula de Punta del Este, em abril último, no sentido de que os cientistas dos Estados Unidos trabalhassem estreitamente com os latino-americanos, para fomentar o crescimento científico do hemisfério.

HOJE EM SP

O sr. Glenn T. Seaberg chega hoje a São Paulo, onde cumprirá a segunda e última parte do seu programa em nosso País.

Viajam em companhia do sr. Seaberg destacados nomes relacionados com a energia nuclear, tais como: Robert E. Hellingsworth, administrador da Comissão de Energia Atômica dos EUA; Arnold P. Fritsch, assistente do sr. Seaberg; Myron B. Kratzer, administrador adjunto a cargo das atividades internacionais da CEA; Allan T. Dalton, chefe da Divisão Asiática, Africana e Latino-Americana do Departamento de Assuntos Internacionais da CEA; Herman Pollack, diretor interino da Divisão de Assuntos Internacionais, Científicas e Tecnológicas do Departamento de Estado; e Donovan Q. Zeck, diretor da Divisão de Assuntos de Energia Atômica do Departamento de Estado.

PROGRAMA

Nesta Capital, o sr. Seaberg cumprirá o seguinte programa: 9h20, chegada a Congonhas em avião "Jetstar"; 9h50, visita às instalações da Administração da Produção da Monazita (ex-Orquima), onde será recebido pelo general Geraldo da Rocha Lima, presidente da APM; 11h15, entrevista coletiva no jardim-de-inverno do Hotel Jaraguá (9.º andar); 15 hs., visita ao reitor da USP e cientistas do Instituto de Energia Atômica; e 15h30, palestra, no IEA, sôbre o tema "Pesquisas Recentes sôbre Elementos de Transuranio".

Quarta-feira, às 8 horas, o dr. Seaberg e comitiva embarcarão em Congonhas para Buenos Aires.

O Estado de S. Paulo, São Paulo, July 5, 1967

Glenn Seaborg, durante a visita ao Butantã, segura na mão uma cobra

Seaborg: não há restrição

"Nossa ajuda ao Brasil não é condicional", disse o dr. Glenn T. Seaborg, presidente da Comissão de Energia Atomica dos Estados Unidos, que chegou ontem a São Paulo. A afirmação foi feita durante entrevista à imprensa, quando lhe foi perguntado se os norte-americanos continuariam fornecendo combustiveis atomicos ao Brasil, mesmo no caso de que o País adote uma posição contraria, e queira produzir seus proprios artefatos nucleares.

Bras[illegible] [illegible]ejei[illegible]a o contrôle nuclear

O Estado de S. Paulo, July 5, 19[illegible] (Continued)

[D]as agências UPI, AP, AFP e ANSA

O embaixador Azeredo Silveira, chefe da delegação brasileira à Conferência do Desarmamento, declarou ontem em Genebra que o Brasil recusa a proposta dos Estados Unidos, segundo a qual uma nação necessitada de recursos técnicos nucleares para fins pacíficos só possa obtê-los por intermédio das chamadas "potências nucleares".

Acrescentou que "é inaceitável que se queira impedir ou reduzir a liberdade de ampla investigação científica em determinado setor do conhecimento humano". Assim, o Brasil "não renunciará ao direito de fabricar engenhos atômicos para fins pacíficos — a menos que todas as nações renunciem à fabricação de explosivos nucleares de qualquer tipo: com fins bélicos ou pacíficos".

A posição brasileira

"O desejo do Brásil — declarou o embaixador Azeredo Silveira — é que se chegue a um acôrdo de não proliferação das armas nucleares, mediante um equilíbrio adequado de mútuas obrigações e responsabilidades".

Segundo o representante brasileiro, qualquer tratado contra a proliferação, para ser eficiente, deve conter três elementos essenciais: um compromisso juridico de não utilização da técnica nuclear para fins bélicos; a verificação efetiva do cumprimento do referido compromisso, mediante um sistema de contrôle e inspeção internacional; e, por fim, garantias mínimas de paz regional e global que possam fortalecer os propósitos pacíficos que serão o compromisso básico de cada parte contratante.

"A renúncia à tecnologia nuclear pacífica — frisou — significa, portanto, a redução drástica das possibilidades de progresso em muitos setores estreitamente relacionados e representaria o mesmo que a aceitação, num futuro próximo e para sempre, de um "status" irreversível de inferioridade e dependência, impossível de ser compensado".

Desenvolvimento

Para o representante brasileiro, "as nações que não dispuserem de um instrumento tão poderoso para o desenvolvimento e o progresso — verdadeiro fator econômico multiplicador — estar-se-ão colocando na posição não invejável de dependência completa da vontade unilateral das potências nucleares".

Assinalou ainda o embaixador que o Brasil está "profundamente empenhado numa luta pelo desenvolvimento, uma batalha sem descanso, combatendo em muitas frentes com coragem e tenacidade".

Proposta

O embaixador Azeredo Silveira conclamou as potências nucleares a que se abstenham de fabricar artefatos bélicos nucleares e propôs a criação de uma única organização internacional de contrôle, com autoridade exclusiva para produzir explosivos nucleares, "de modo que nenhuma nação tenha capacidade legal e material para produzi-los".

Nações não-nucleares

"Como podem conformar-se as nações não-nucleares com vagas seguranças de que seus interesses de progresso ou de segurança serão atendidos depois pelas nações nucleares, em troca de compromissos de renunciar — para sempre — à utilização total da energia atômica para seus povos, especialmente quando são ou podem ser objeto de uma ameaça crônica por parte dos países possuidores de armamento nuclear"? — perguntou o embaixador.

Diário de São Paulo, São Paulo, July 5, 1967

Estados Unidos e Brasil coesos pró energia nuclear com fins pacificos

No intenso programa organizado para a visita a São Paulo, do prof. Glenn T. Seaborg, presidente da Comissão de Energia Atomica dos Estados Unidos, ontem efetuada, constava uma entrevista coletiva à imprensa, no Hotel Jaraguá. Teve inicio por volta das 11,30. O prof. Seaborg estava acompanhado pelos membros de sua comitiva, personalidades de relevo na ciencia nuclear e os srs. Robert E. Hollingswort, administrador da Comissão de Energia Atomica dos EUA; Arnold Fritsch, assistente especial do prof. Seaborg; Myron B. Kratzer, administrador adjunto a cargo das atividades internacionais da CEA; Allan T. Dalton, chefe da Divisão Asiática, Africana e Latino-Americana do Departamento de Assuntos Internacionais da CEA; Herman Pollack, diretor interino da Divisão de Assuntos Internacionais, Cientificos e Tecnológicos do Departamento de Estado; e Donovan Q. Zook, diretor da Divisão de Assuntos de Energia Atomica do Departamento de Estado.

OBJETIVOS DA VISITA

A finalidade da visita do prof. Glenn Seaborg ao Brasil — esta é a primeira vez que vem à America Latina — é incrementar as relações técnico-cientificas com as autoridades brasileiras ligadas ao campo da energia nuclear, visando ampliar a cooperação já existente entre as comissões de energia nuclear dos dois paises. Dá-se, assim, continuidade — como afirmou o entrevistado — ao que ficou estabelecido na conferencia de Punta Del Este. Nesta capital o visitante esteve, ontem, percorrendo as instalações da Administração da Produção da Monazita (ex-Orquima), recebendo-o o general Geraldo da Rocha Lima, presidente da APM. À tarde, após avistar-se com o reitor da USP, prof. Mario G. Ferri, e cientistas do Instituto de Energia Atomica, proferiu, ali, palestra sôbre o tema "Pesquisas Recentes sôbre Elementos de Transuranio".

Hoje, pela manhã, a comitiva seguiu para Buenos Aires.

UTILIZAÇÃO PACIFICA

Começou o entrevistado esclarecendo que era a primeira vez que vinha ao Brasil, tendo desenvolvido intenso programa nos dias 2 e 3 dêste, no Rio de Janeiro, semelhante ao que lhe haviam traçado em São Paulo. Viera atendendo a convite do governo brasileiro através do prof. Uriel da Costa Ribeiro, presidente da Comissão Nacional de Energia Nuclear, bem como no sentido de dar cumprimento à missão que lhe confiou o presidente Johnson, a fim de verificar os meios pelos quais os Estados Unidos possam ajudar os brasileiros a incrementar a utilização pacifica da energia nuclear. Levantada pelo Brasil, em Punta Del Este, por ocasião da conferencia dos presidentes americanos em abril, a tese da maior utilização pacifica da energia atomica para acelerar o desenvolvimento economico dos paises latino-americanos, foi imediatamente apoiada pelo presidente dos EUA que, na oportunidade, colocou os conhecimentos e os progressos alcançados por seu pais à disposição das nações sul e centro-americanas.

O prof. Seaborg fez importantes declarações, das quais se destacam os seguintes itens 1 — Os Estados Unidos estão preparados, desde que haja dotação pelo Congresso, para fornecer quantidade significativa de bolsas do tipo "Cientistas Residentes", dando oportunidade a cientistas brasileiros de trabalhar em nivel profissional nos laboratorios nacionais da Comissão de Energia Atomica e outras instalações pertinentes. 2 — Dentro dêsse programa adicional e considerando o profundo interesse do Brasil em utilizar seus recursos de tório e as pesquisas que são feitas apenas nos Estados Unidos em reatores reprodutores de tório, concordou-se que seria de interêsse comum aos cientistas brasileiros participarem das atividades que nesse sentido se realizam no Laboratório de Oak Ridge, dos EUA".

Declarou, ainda, que outros setores de cooperação possivel, que foram debatidos, incluem levantamentos de materia-prima estudos da exequibilidade economica e outros aspectos da utilização da energia nuclear para produção de eletricidade, para dessalgação da água do mar e demais usos; a criação de acordos "fraternais" entre laboratorios brasileiros e os dos EUA; aplicação das tecnicas de radiação em campos como a conservação de alimentos e a esterilização de insetos; aquipamentos cirurgicos e abastecimentos medicinais.

Reafirmando essas disposições disse: "o que fôr dado a tais trabalhos se refletirá sensivelmente no campo cientifico e economico, salientando-se o papel que desempenhará na maior integração da America Latina".

E, finalmente ,confirmou os planos da Comissão de Energia Atomica do seu pais, no sentido de designar um seu representante da CEA à Missão Diplomática dos EUA, no Rio de Janeiro.

BILIÕES DE DOLARES PARA FINS PACIFICOS

Notava-se que o cientista timbrava em acentuar o desejo dos Estados Unidos na utilização da energia nuclear para fins pacificos e de inestimavel valor ao bem-estar e progresso da humanidade. Disse que o seu pais já despendera biliões de dolares nesse sentido. E que para cooperar com outros paises que pensassem de igual maneira, tal como o Brasil, estavam prontos a proporcionar, a baixo custo, o material necessário para seus experimentos e tambem das formas que, mutuamente, fossem consideradas necessárias.

A uma outra pergunta disse que acredita que o Brasil, se iniciar logo os trabalhos nesse sentido, levará cerca de 7 anos para produzir energia nuclear destinada a fins de utilidade publica e nacional.

Referindo-se à ajuda proposta declarou que os EUA encaram seriamente suas propostas e pretendem levá-las a cabo.

Quanto às armas nucleares, explicou que o presidente Johnson já propos o congelamento da manufatura de material bélico desse genero bem como impedir o seu transito a qualquer ponto do globo. E, taxativamente, afirmou: "Estados Unidos serão o primeiro país a suspender as experiencias com armas nucleares. E' nosso programa prioritário: limitação de armas nucleares. Apoiaremos o Brasil, desde que não se cuide, aqui, da produção dessas armas".

NOVOS ELEMENTOS TRASURANICOS

Esclarecendo outra pergunta disse o entrevistado que faria, na conferencia aos cientistas do IEA, declarações sobre novos elementos trasuranicos mais pesados, salientando algumas de suas propriedades no terreno atômico e quimico. Acredita que do mais intimo contacto entre os cientistas resultem melhores entendimentos entre as nações.

Perguntado sobre o uso da bomba de hidrogénio, respondeu: "Não devemos utilizá-la. Do contrario, se aumentasse sempre o numero de paises que a tivessem, seria uma calamidade mundial outro choque, como o de há pouco, entre a RAU e Israel, que poderiam utilizá-la destruindo-se e ao nosso planeta.

A derradeira pergunta era sobre as quantidades de tório existentes no Brasil, que o prof. Seaborg declara ser muito grandes. Ele pediu que, em seu nome, respondesse o prof. Hervasio de Carvalho, assessor da Comissão Nacional de Energia Nuclear. Explicou-se, então, que o Brasil é o segundo país no mundo em reservas de tório. E' encontrado ao longo das praias, nas areias monaziticas; em Poços de Caldas, no Morro do Ferro; em Araxá, principalmente, e em outros pontos. Entretanto, para seu emprego não prescinde da utilização do uranio. O tório é gasto em pequeníssima quantidade.

PREMIO NOBEL

Pelos seus trabalhos e descobertas no campo da Quimica e da Energia Nuclear o prof. Glenn T. Seaborg, que conta 55 anos de idade e é mundialmente conhecido, conquistou, ao lado do prof. E. M. MacMillan, em 1951, o prêmio Nobel de Quimica. E' natural de Ishpeming, Michigan. Formou-se, com distinção, em 1934 pela Universidade de California de Los Angeles. Doutorou-se, em Quimica, na Universidade da California de Berkeley. E, ali, prestou valiosos serviços como pesquisador, professor e presidente das diversas instituições que integram esse centro de estudos. E' autor de várias obras sobre Quimica e pelos seus trabalhos tornou-se mundialmente conhecido como o "pai da Teoria dos Actinios" que representa a ordenação dos elementos chamados pesados no sistema periódico dos elementos. Atualmente é presidente da Comissão de Energia Atômica dos EUA. E, tambem, membro do Conselho Nacional de Aeronautica e Espaço, do Conselho Federal para a Ciencia e a Tecnologia, do Conselho Federal sobre Radiação, da Comissão Presidencial sobre Recursos Humanos e do Conselho Nacional para Recursos Marinhos e Desenvolvimento de Engenharia.

Na entrevista coletiva à imprensa, o sr. Glenn Seaberg, ladeado pelo consul George L. Gaddie, diretor de divulgação do USIS de São Paulo (à esquerda), e pelo adido de imprensa da Embaixada dos EUA, Jack Wyant.

Gazeta

São Paulo, July 5, 1967

BRASIL QUER BOMBA PARA A PAZ

Brasil longe da bomba e no caminho efetivo do uso pacifico da energia nuclear são os mais ardentes desejos do sr. Glenn Seaborg, presidente da Comissão de Energia Atomica dos Estados Unidos, ontem expressados em entrevista coletiva à imprensa de São Paulo. O cientista norte-americano garantiu que seu país fornecerá "know how" e equipamento necessário à pesquisa, sem que isso implique em acordos secretos de qualquer especie, muito menos promessa de fornecimento permanente de torio e monazita. Asseverou que existem pequenas diferenças entre as duas nações no campo do desenvolvimento da energia nuclear, mas nenhuma irremovivel, pois os governos concordam em que é necessário deter a louca corrida armamentista. "Atomos apenas para a paz", asseverou.

Enquanto isso, em Genebra, o delegado brasileiro à Conferencia de Desarmamento, sr. Azeredo da Silveira, anunciou ao mundo e, particularmente, aos Estados Unidos e URSS, que o Brasil não renuncia ao seu direito de produzir artefatos nucleares, pois considera isso indispensavel para a sua segurança e sua sede de desenvolvimento economico. "Se o caminho do progresso — disse — passa por explosões nucleares, meu país não hesitará em realizá-las, garantindo, entretanto, que só o fará para fins pacificos. A renuncia unilateral a armas e tecnologia nucleares coloca os países inteiramente ao dispor das potencias atomicas".

Bombas só para uso pacífico

"Estamos de pleno acordo com o Brasil quanto à importancia de terem todos os paises inteiro acesso aos beneficios dos explosivos nucleares para fins pacificos. Concordamos que esses beneficios só poderão ser obtidos em alguma data futura, se fôr completado e quando fôr completado com sucesso o necessario e dificil avanço tecnologico", disse ontem o dr. Glenn T. Seaborg, presidente da Comissão de Energia Atomica dos Estados Unidos, pouco depois de sua chegada a São Paulo.

O visitante reconheceu, entretanto, que existem algumas diferenças de pontos de vista entre o Brasil e os Estados Unidos no que respeita à energia nuclear, afirmando que seu país não deseja o aumento do numero de potencias que contam com artefatos nucleares, já que o mesmo artefato capaz de abrir um canal pode destruir uma cidade, se usado como arma bélica.

Disse ainda que, como exemplo, se na recente crise do Oriente Médio arabes e israelenses contassem com bombas de hidrogenio — e as usassem — poderia o mundo não mais existir. Por isso, seu país é contra a disseminação de artefatos nucleares.

EXPLORAÇÃO DA MONAZITA

O dr. Seaborg chegou a São Paulo na manhã de ontem, desembarcando em Congonhas, acompanhado de elementos da embaixada norte-americana, do sr. Robert E. Hollingsworth, administrador da Comissão de Energia Atomica dos Estados Unidos; do dr. Arnold R. Fritsch, assistente especial da mesma comissão; do sr. Myron B. Kratzer, adjunto para atividades internacionais do organismo; do sr. Allan T. Dolt, chefe da Divisão Asiatica, Africana e Latino-Americana do Departamento de Assuntos Internacionais da Comissão; do sr. Herman Pollack, diretor da Divisão de Assuntos Internacionais, Cientificos e Tecnologicos do Departamento do Estado, e do sr. Donovan Q. Zook, diretor de Assuntos de Energia Atomica no Departamento do Estado.

Do aeroporto, os visitantes seguiram para a av. Santo Amaro, 4.693, onde funciona a Administração da Produção da Monazita, subordinada à Comissão Nacional de Energia Nuclear.

USINA PILOTO

Na fabrica, o dr. Seaborg ouviu uma explanação sobre os trabalhos realizados, na sala em frente à usina piloto de refinação de uranio e tório, que será inaugurada hoje.

A explanação foi feita em inglês, pelo general Geraldo da Rocha Lima, ficando o visitante sentado a uma mesa onde, em vidros, estavam amostras de 22 produtos feitos na industria. Disse o general que a industria está trabalhando com monazita trazida das minas de Barra de Itabapoana, no Rio, de Cumuruxatiba, na Bahia, e de Guarapari, no Espirito Santo.

A areia monazitica contém a monazita, a zirconita, ilmenita, rutilo e silica. Ainda na mina, por um processo especial, são separadas as frações leves — que voltam ao mar — das pesadas. Em seguida, há outros processos que purificam mais o minerio, que depois é encaminhado à industria, em São Paulo.

NA FABRICA

Chegando à industria, o minerio extraido da areia volta a passar por todos os processos, para ser mais apurado, e no final se consegue extrair monazita com teor de 99% de pureza, zirconita com de 98% a 99,5%, ilmenita com de 96% a 98%, e rutilo, com de 92% a 98%.

Esses produtos passam por novos processos de purificação, resultando em outros produtos que, por sua vez, podem ser empregados por outras industrias e, finalmente, numa televisão a cores, numa pedra de isqueiro, num adubo, numa maquina fotografica ou num soldador eletrico quase sempre existe algum produto retirado da areia monazitica brasileira.

Os produtos da fabrica são vendidos no Brasil e também para o Japão, Austria, Estados Unidos, Inglaterra e para outros paises, e isso rende de 60 a 90 mil cruzeiros novos por mês.

Depois da explanação, que foi ouvida atentamente pelo dr. Seaborg, foi servido um coquetel, e feito um brinde ao "Independence Day", que se comemorava ontem. Em seguida, a comitiva visitou as instalações da industria, durante quase uma hora. Em todo o trajeto, os norte-americanos ouviram explicações dos cientistas brasileiros e em particular do prof. Humbold, responsavel direto pela parte tecnica da fabrica.

ATOMOBRAS

O deputado Marcos Ketzmann, da ARENA paulista, disse ontem que vem-se robustecendo nos meios tecnicos e entre os militares a opinião de que a politica nuclear brasileira só poderá ser concretizada através de um organismo estatal, em carater de monopolio, para dirigir pesquisas, supervisionar trabalhos e explorar as reservas de minerios estrategicos.

O parlamentar, que manteve diversos contatos com cientistas do Rio e de São Paulo disse que essa opinião demonstra uma afinidade dêsses meios com a criação da Atombrás, cujo projeto foi por ele apresentado recentemente na Camara Federal e cuja votação será procedida nos proximos meses.

EUA dão apoio incondicional

Durante entrevista que concedeu na manhã de ontem à imprensa, no Hotel Jaraguá, o dr. Glenn T. Seaborg disse que a ajuda dos Estados Unidos ao Brasil não é condicional. Referia-se êle à possibilidade de que nosso País procurasse fabricar artefatos nucleares, ao contrário do que desejam os norte-americanos.

Disse o dr. Seaborg que o presidente Johnson propos recentemente o congelamento da manufatura de materiais nucleares e pretende sustar a fabricação de foguetes para carregar tais artefatos. Entende êle, por isso, que os Estados Unidos, estando dispostos a darem o primeiro passo para a limitação do armamento nuclear, desde que os outros países adotem posição idêntica, devem trabalhar no sentido de que cesse a proliferação de tais armamentos e que outros países não venham a contar com êles.

Lembrou ainda que, paralelamente a essa campanha, seu país está empenhado em outra, que objetiva a limitação das armas entre as potências atuais.

Quanto ao fornecimento de combustíveis nucleares, disse que os Estados Unidos estão empenhados em transferir todos seus programas de auxílio para uma agência internacional e que, através dela, continuarão à disposição dos países amigos, ajudando-os a se desenvolverem no campo da energia atômica.

EM GENEBRA

A resposta do dr. Seaborg foi motivada por pergunta de um jornalista, que afirmou ter o representante brasileiro em Genebra declarado ontem que o Brasil não abrirá mão do direito de desenvolver explosivos nucleares, a não ser que os países do "clube atômico" desistam dêles. Perguntou o jornalista se, diante disso, os Estados Unidos estariam dispostos a sustar o desenvolvimento de suas armas nucleares e também se forneceriam combustíveis atômicos a países que adotassem posições opostas à sua.

COLABORAÇÃO

Disse ainda o entrevistado que os Estados Unidos gastaram vários bilhões de dólares e muitos anos — e continuam gastando — para desenvolver seus conhecimentos sôbre energia nuclear e que o Brasil, se quiser trabalhar nêsse campo, gastará o mesmo tempo e a mesma soma. Por isso, afirmou, os norte-americanos estão dispostos a colaborar com o Brasil e mesmo a cederem artefatos nucleares para fins pacíficos e específicos, a preço de custo, não entrando nêsse custo a amortização dos gastos com pesquisas.

Segundo o dr. Seaborg, qualquer artefato nuclear capaz de abrir um canal, portanto, útil para fim pacífico, pode também destruir uma cidade.

O visitante norte-americano fez ainda uma breve alocução, falando do programa "atomos para a paz", mostrando-se surprêso com nosso desenvolvimento e fez um resumo das conversações que manteve recentemente com os membros do Conselho Nacional de Energia Nuclear.

Durante a tarde, o dr. Seaborg e sua comitiva estiveram na Cidade Universitária, onde se entrevistaram com o reitor e posteriormente, no Instituto de Energia Atômica, o visitante, que é também detentor de um prêmio Nobel de Química, pronunciou uma palestra, em inglês, sob o título: "Pesquisas Recentes sôbre Elementos Transuranicos". A' noite, o cientista jantou na residência do professor Romulo Pieroni e hoje, às 8 horas, embarca para Buenos Aires.

O Estado de S. Paulo, 7/5/67 (Cont.)

Seaborg ouve explicações sôbre a Usina

NEW YORK POST JULY 6, 1967

AEC Chief Spells Out Nuclear Aid to Latins

By FRANCIS B. KENT
Special to The Post

Rio de Janiero—Fulfilling a promise made by President Johnson at Punta del Este in April, the U.S. is embarking on a widespread program of co-operation in nuclear research with Latin America.

Glenn T. Seaborg, chairman of the U.S. Atomic Energy Commission, spelled out the details Monday in talks with Brazilian scientists. He has had similar discussions in Venezuela and will carry his message from here to Argentina, Chile, Peru and Colombia.

While offering to share the fruits of U.S. research, Seaborg is also impressing on the Latins the enormous expense involved and encouraging them to turn their efforts from explosives toward less dramatic projects.

His public statements were carefully worded, but another U.S. official, speaking privately, put it bluntly.

Aim of Project

"As long as the U.S. is contributing substantial funds to the economic development of Latin America," he said, "we don't want to see these governments spending huge amounts of money on research that is essentially military in character."

Seaborg, speaking before Brazil's Academy of Sciences and later at a press conference, referred specifically to the development of nuclear explosives for use in dredging and earth-moving projects.

"The problems of developing such explosives are formidable," he said. "After more than 20 years of intensive nuclear explosive development, we are still working on the problem of producing explosive devices with the necessary power, having as low a fission product release as is desirable for excavation operations."

When such a device has been perfected, he said, the U.S. will make it available to other nations, under safeguards, at the cost of materials and fabrication.

He added that the cost of development, "many billions of dollars," will not be reckoned in furnishing these explosives for peaceful purposes.

Meanwhile, Seaborg suggested, nations with limited resources for nuclear research would benefit from work on such projects as food preservation, insect eradication and the diagnosis and treatment of diseases.

These are the areas currently being explored through nuclear research in Brazil, which 10 years ago inaugurated Latin America's first reactor and now has three in operation.

Seaborg said:

¶Subject to Congressional appropriation, the U.S. is prepared to provide "a significant number of grants" to enable senior Brazilian scientists to work in AEC facilities in the U.S.

¶Brazilian scientists will be permitted to take part in research work on thorium breeder reactors at the Oak Ridge national laboratory. Thorium is abundant in Brazil and work on such reactors is being carried out exclusively in the U.S.

¶The U.S. will assist Brazil in raw material surveys and feasibility in connection with using nuclear power for generating electricity and desalting sea water.

¶The U.S. will assign an AEC representative to the U.S. diplomatic mission in Rio, presumably to correlate U.S. and Brazilian efforts.

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PROVIDENCE JOURNAL • JULY 10, 1967

The Providence Journal

Atom Cooperation 7/10/67

Glenn T. Seaborg, chairman of the Atomic Energy Commission, has offered excellent advice for nuclear research in Latin lands where leaders have yet to commit themselves fully to the atom's peaceful or wartime application. Briefly, Mr. Seaborg warned Latin American scientists that developing nuclear explosives for military purposes is hugely expensive in material and human resources.

No South American government nor concert of governments now has the instruments of capital, the technology, and the management skills to launch with any reasonable hope for success a program of nuclear weapons development. But the more industrially advanced nations—Brazil, Argentina and Venezuela—do possess the scientific potential to embark on nuclear research projects on a cooperative basis with strong leadership from the U.S.

Mr. Seaborg suggests that nations with the scientific talent and limited resources work collectively in nuclear research projects involving medicine and public health. Progress in these areas reasonably can be expected to lead to opportunities for nuclear power application to help to transform the Latin continent's central wilderness and mineral-rich river basins, into regions considered proper and attractive for human habitation.

Mr. Seaborg's prescription for nuclear power development in Latin America is a clear reminder of the extraordinary efficiency and the formidable technology developed in the U.S. since the 19th Century for resources exploration and for putting these resources to socially constructive uses.

It scarcely exaggerates to say that the U.S. has the key to opening the immense resources of Latin lands. We can and must provide the crucial initiatives for guiding Latin scientists and military leaders who control national treasuries toward peaceful development of nuclear energy. Surely, Mr. Seaborg, after conferring with Latin American scientists, will have proposals deserving of careful White House attention for proving the U.S. commitment to peaceful development of the atom in South America.

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LONG BEACH, CALIFORNIA, MONDAY, AUGUST 14, 1967 Page B-2

Long View By a Man Of Science

FOR SHEER optimism, Dr. Glenn T. Seaborg deserves some new award equivalent to the Nobel Prize he won in 1951 for his discovery of plutonium.

As chairman of the Atomic Energy Commission he sits at the head of a nerve-wracking table. He might be forgiven if apprehension prevailed in his view of the future.

Instead, he sees ahead a "quantum jump in the extension of man." This immeasurable gain, he believes, will come about from cybernation — the complete adaptation of computer-like equipment to industrial, economic and social activity.

While many regard even mild automation as a threat to human employment and others consider it the path to an impersonalized society deprived of ambition, Dr. Seaborg writes in The Saturday Review:

"I don't believe this will happen at all. New incentives will arise as man moves up to higher levels of needs. The quest for new knowledge will always grow. The domain of science is practically boundless. We are only beginning our adventures in space, and we still have a long way to go in understanding many things about this planet and the life on it. . . .

"I can see a new and better relationship arising among men. . . . When we are less likely to be in competition with one another, much of the hypocrisy of society will vanish and more honest relationships will be formed.

"And finally, when we can walk down the street — anywhere in the world — in a community free from want, where every human being has a sense of dignity not gained at the expense of others, we might not only walk free from fear but with a great feeling of exaltation!"

Such is the long view of a man with high credentials for looking beyond the present.

We recommed Dr. Seaborg as an antidote for much of what we all see and read and hear. He gives us new hope when we desperately need it.

SAN JOSE MERCURY SEPT. 9, 1967

San Jose Mercury

Sept. 9, 1967

SAN JOSE MERCURY

Lawrence Lab Finds Heavy Atom

LIVERMORE — Discovery of the heaviest atom ever definitely observed was announced Friday by Dr. Glenn T. Seaborg, chairman of the U.S. Atomic Energy Commission.

The atom is an isotope of element 101 mendelevium with 258 mass units. Isotopes of an element differ only in the number of neutrons in their nuclei.

The heaviest atom previously observed with certainty is an isotope of element 100 (fermium) with 257 mass units.

The new heavy atom was a product of bombardment of the element einsteinium with helium ions in the Heavy Ion Linear Accelerator of the Lawrence Radiation Laboratory, Berkeley, Seaborg said.

The research was done by University of California Lawrence Rad Lab scientists Kenneth Hulet, R. W. Lougheed, J. E. Evans, J. D. Brady, R. E. Stone, B. J. Qualheim and R. R. W. Hoff, all of Livermore, and Albert Ghiorso of Berkeley.

Dr. Seaborg made his announcement in a ceremony marking the 15th anniversary of the laboratory at the Livermore location at which a new radiochemistry building was dedicated.

He delivered a message from President Johnson congratulating the director and staff of the laboratory for "making an outstanding contribution to our national security and defense" by work "carried on in strict secrecy and unheralded by the American public."

"Your work has been essential to maintaining world peace as well as to advancing man's knowledge about the atom and its ever-growing potential for progress as well as security," Seaborg quoted the President.

Stanford Praised On Accelerator

STANFORD — Stanford's two-mile linear accelerator — an "incredible result of modern science and engineering" — was dedicated Saturday with speeches by scientists, politicians and a representative of President Johnson.

Chairman Glenn T. Seaborg of the U.S. Atomic Energy Commission said the accelerator center was a tribute to its creators:

"Within this two-mile-long building is housed the world's longest research instrument," he said. "And certainly (it is) one of the most complex and precise machines ever built by man.

Seaborg said that Stanford was recognized as one of the nation's great centers for excellence before it was chosen the site of the accelator.

"But I think that the center and the people who come here to work with it will bring added vigor and stimulation to Stanford," he said.

Seaborg characterized the center as an incredible result of modern science and engineering.

Rep. Chet Holifield, D-Calif., vice chairman of the Joint Congressional Committee on Atomic Energy, urged research scientists to rededicate themselves to inspiring scientific interest among high school and college undergraduates.

"I fear that in furthering important and needed graduate education, our institutions have been getting further away from a dedication to basic education," he said.

He told the scientists that professors' "responsibilities for education are not and should not be only to the graduate student."

Holifield also called for "balance" in the allocation of federal funds between sophisticated devices such as the accelerator and basic education.

Dr. Donald Hornig, special assistant for science and technology to President Johnson, elaborated upon Holifield's remarks when the dedication ceremonies moved to a banquet in the Stanford Faculty Club.

He said that the cooperation of government and universities has made American science the envy of the world.

"In contrast to the often-expressed fear that the strings attached to federal money would distort or dominate university policies, I think it fair to say that the strings are generally no more severe and in many cases less severe than those attached by private donors.

"I think it up to the universities to be critical of the strings in both cases and to consider them before accepting funds.

He said that the cooperation of universities and the Federal Government were one of the world's "great success stories."

Earlier Saturday, many of the same dignitaries attended the dedication of a $5.9 million Lawrence Radiation Laboratory in Livermore.

At the dedication, Seaborg announced discovery of the heaviest atom ever discovered by science. The atom is an isotope of element 101 (mendelevium) and it has 258 mass units. The atom was discovered at Lawrence Radiation Laboratory.

AEC Chief Dedicates New Rad Lab Facility

LIVERMORE — The chemistry department's radiochemistry division at Lawrence Radiation Laboratory in Livermore dedicated a new home yesterday to house ultra-modern equipment for its research in radiochemical measurements and the Plowshare program.

Dr. Glenn T. Seaborg, chairman of the U.S. Atomic Energy Commission, delivered the dedication address for the $3,550,000 building. Financed by the commission, the two-story structure contains 87,000 square feet of modern laboratories, elaborate equipment and small offices.

s The radiochemistry division is engaged in the study of heavy elements, participating in the recent discovery of the heaviest atom ever observed, which Seaborg announced Saturday. The atom is an isotope of element 101, mendelevium, with 258 mass units.

The radiochemistry division is engaged in the study of chemical measurements on all nuclear tests conducted by the Lawrence lab. One recent outcome of its research is an airborne radar system which can detect and delineate clouds at ranges up to 200 miles.

The division contains more than 60 professional scientists, mostly nuclear chemists, half of whom hold doctorates in chemistry or physics. They will move into laboratory facilities for the study of mass spectroscopy, gas analysis, computer controls and data reduction, gamma spectroscopy and chemistry.

Visitors to the new facility were given guided tours Saturday through those five laboratories.

HERALD & NEWS, LIVERMORE SEPT. 11, 1967

Herald & News Photo by

AEC CHAIRMAN GLENN SEABORG DEDICATES NEW CHEMISTRY LAB
Sandia Engineer Charles Seaborg, Right, Tours Facility With Cousin

U. of C. Plutonium Lab Made Landmark

A tiny laboratory at the University of Chicago, about the size of a large clothes closet, became a national historical landmark yesterday.

It was in these close quarters, room 405 of Jones laboratory, 5747 Ellis av., that the first tiny sample of the man-made element plutonium was weighed on Sept. 10, 1942. The sample was so minute that the smallest breeze could have blown it into obscurity.

Mark 25th Anniversary

At ceremonies commemorating the 25th anniversary of the event, held in Kent Chemical theater in the chemistry building, Walter Pozen, assistant to the secretary of the interior, presented a certificate to Dr. George W. Beadle, president of the university, and Dr. Norman Nachtrieb, chairman of the chemistry department, designating the room as a landmark.

Pozen, a former student in the university, spoke of the problems of air and water pollution currently facing the nation, and said that "society is at fault for not anticipating the technological gains of this century." He estimated that 400 billion dollars would be spent to fight air and water pollution in the next 100 years.

Approximately 150 scientists and technicians who took part in the early period of plutonium research attended the celebration, including Dr. Glenn T. Seaborg, chairman of the Atomic Energy commission, who was co-developer of plutonium with Dr. Arthur C. Wahl and the late Dr. Joseph W. Kennedy.

Supervises the Project

Seaborg supervised the weighing project at the university, which was to become a significant step in the road towards ultra-micro-chemistry.

He and his associates on the project reminisced about the top-secret wartime venture, the brilliant efforts of some of the nation's top scientists at that time, and the strict security under which they worked.

The sample of plutonium weighed only about one-millionth the weight of a dime. The scientists weighed the speck by placing it in a tiny dish suspended at the end of a thin quartz fiber, smaller in diameter than a fine human hair. By measuring the degree of bending of the fiber, they were able to accurately determine the weight.

Soon the element was produced in sufficient amounts to make atom bombs, and may in time become a limitless source of energy for the world. Plutonium now can be made in great quantities and has fueled nuclear reactors experimentally since 1946.

The small laboratory is the fourth national landmark on the university's campus. The others are Stagg field, where the first self-sustaining nuclear reaction took place in 1942; Robie House, 5757 Woodlawn av., designed by Frank Lloyd Wright; and the Midway studios of the late sculptor, Lorado Taft, at 6010 Ingleside av.

[Tribune Staff Photo]

Mrs. Arthur Compton, widow of the atomic scientist; George W. Beadle [center], president of the University of Chicago; and Walter Pozen, assistant to the secretary of the interior, gazing at plaque at the University of Chicago marking the first weighing of plutonium 25 years ago yesterday.

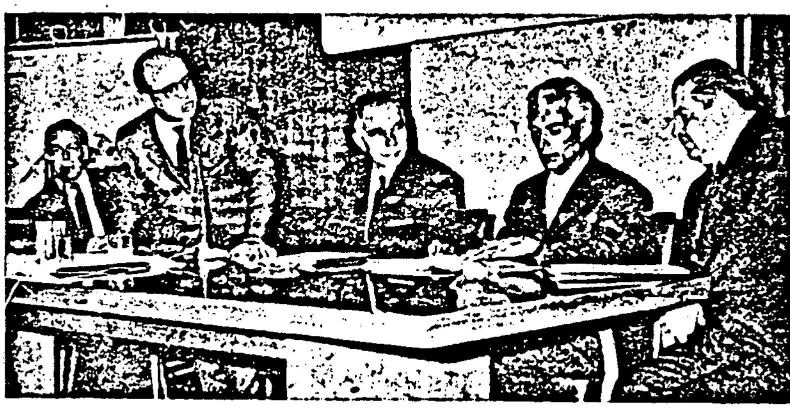
ATOMO E INDUSTRIA (Italy)

15 Ottobre 1967

La visita e la conferenza del dr. Seaborg al Centro Studi Nucleari della Casaccia del CNEN

Discusse le manifestazioni che avranno luogo negli Stati Uniti e in Italia per celebrare il 25° anniversario della reazione a catena di Enrico Fermi

Il 2 ottobre, come annunciato (AeI, 15 settembre 1967), il Presidente dell'USAEC, dr. Glenn T. Seaborg, Premio Nobel per la chimica, ha visitato il Centro Studi Nucleari della Casaccia del CNEN, dove ha tenuto una conferenza sul tema « Transuranium Elements ». Il dr. Seaborg era accompagnato dall'Ambasciatore degli Stati Uniti presso il Quirinale, Mr. G. Frederick Reinhardt, con l'Addetto Scientifico, dr. Walter G.C. Ramberg. Da parte italiana, erano a ricevere l'ospite il Vice Presidente del CNEN, prof. Carlo Salvetti, il Membro della Commissione Direttiva, M. Alberto Rollier, Direttore del Laboratorio di Radiochimica dell'Istituto di Chimica Generale della Università di Pavia, dal prof. Sebastiano Sciuti, Direttore del Settore Fisica Nucleare del CNEN e dal prof. Raffaele Chelini, Vice Presidente dell'Oak Ridge Atom Industries Italia. Ha avuto quindi luogo una visita ai vari laboratori, con particolare riguardo a quelli di radiobiologia, di fisica nucleare, alla hall esperienze tecnologiche, ai laboratori geominerari e a quelli del plutonio, attualmente in costruzione. Nel corso della visita, il dr. Seaborg ha anche parlato con il



Il prof. Salvetti saluta il dr. Seaborg al Centro della Casaccia. Sono con il Presidente dell'USAEC l'Ambasciatore degli Stati Uniti Reinhardt, il Direttore del Centro Ing. Franco ed il prof. Angelini, Membro della Commissione Direttiva del CNEN e Direttore Generale dell'ENEL

prof. ing. Arnaldo Maria Angelini, Direttore Generale dell'ENEL, e il Direttore del Centro, dr. ing. Gianfranco Franco, oltre a numerosi rappresentanti della scienza e dell'industria. Il FIEN era rappresentato dal Vice Presidente, prof. ing. Carlo Matteini con il Segretario Generale, avv. Pietro Bullio.

La conferenza del dr. Seaborg, preceduta da un saluto del prof. Salvetti, è stata seguita con vivo interesse dal folto numero dei presenti. Ha quindi avuto luogo una breve discussione e domande sono state rivolte all'oratore dal prof. Salvetti e con l'avv. Bullio delle manifestazioni che sono in via di organizzazione negli Stati Uniti e in Italia, per celebrare il 2 dicembre prossimo, il XXV anniversario della prima reazione nucleare a catena controllata, realizzata da Enrico Fermi e dai suoi collaboratori a Chicago, il 2 dicembre 1942.

Al termine della visita, l'illustre ospite ha reso all'Agenzia ANSA e ad «Atomo e Industria», le seguenti dichiarazioni:

« Esprimo il mio apprezzamento per l'efficienza con la quale si è svolta la mia visita, organizzata in modo da vedere il massimo di attività nel breve tempo disponibile.

« Avevo discusso la visita col professor Salvetti a Vienna durante la Conferenza Generale della IAEA, e ciò ha aumentato l'efficienza della visita.

« Ho visitato numerosi dipartimenti tra i quali quello di radiobiologia, delle ricerche di fisica nucleare, di tecnologia dei reattori nucleari, di trasferimento del calore e degli elementi di combustibile. Ho trovato il lavoro molto interessante e ho avuto l'impressione che vi è grande competenza in tutti i laboratori.

« Ho discusso col prof. Salvetti i possibili accordi per una celebrazione simultanea e in collaborazione a Chicago e Roma per il 25° anniversario della prima reazione nucleare realizzata a Chicago dal grande fisico italiano Enrico Fermi nel dicembre di 25 anni fa.

« Questa data storica sarà ricordata nelle due città. Cercheremo di coordinare le celebrazioni e forse ci scambieremo messaggi l'uno con l'altro attraverso l'Oceano in quel momento ».

SPEAKS AT TRI-STATE

Double Need For Scientists By '75 Seen By AEC Chief

ANGOLA — The national need for chemists, physicists, life scientists and mathematicians will double by 1975, Atomic Energy Commission Chairman Glenn T. Seaborg predicted here Sunday.

Seaborg spoke at dedication ceremonies for Tri-State College's new John G. Best Hall of Science, and receive one of three honorary doctor of science degrees also conferred upon John A. Hannah, president of Michigan State University; and Frederick L. Hovde, president of Purdue University.

The new $2.5 million scince building was named for Dr. and Mrs. John G. Best of Elkhart. It was formally presented to Richard M. Bateman, Tri-State College president, by Fred Zollner of Fort Wayne, chairman of the Tri-State board of trustees.

In his dedication address, Seaborg also forecast that the need for the total number of employed engineers in the U.S. will increase two-thirds by 1975. He said the threatened shortage of persons with scientific and engineering abilities demands increased efforts to interest young people in such fields.

The AEC chairman also posed the possibility that humanity, attempting to realize the fullest benefits from science and technology, might face the danger of "paying an exorbitant cost in the form of new problems and adverse side effects." He stressed the importance of exerting sound direction over the changes of the scientific age through education of students to past and future problems in such a way that their sense of professional service and responsibility is deepened.

At the same time, he said, there is "the necessity for people who are not scientists to know more about science.

"One of the problems that have grown out of the rapid expansion of science and technology is that public understanding has lagged further and further behind the dynamic advances and new discoveries and new applications, and the significance of these events for man's problems and aspirations," he said.

He predicted closer ties betwen institutions at the local, state and national levels.

Plutonium Site in Jones Lab Designated a National Landmark

On September 10, 1942, scientists in the closet-sized Room 405 of George Herbert Jones Chemical Laboratory excitedly performed what is normally a humdrum chore—the weighing of a chemical compound. But the compound in this case was the first pure sample of plutonium dioxide, a chemical form of the world's first synthetically produced element.

The measured sample was the realization of man's age-old dream of transmutation. The ancient alchemists had hoped to make gold out of lead, but the new element, plutonium 239, was far more valuable to mankind. Like uranium 235, it could be used to make a bomb of terrible power, but it also could be used in pollution-free production of the electrical energy that the world must continue to have when its supply of fossil fuels—coal, oil, and gas—is exhausted.

On September 10, 1967, the University celebrated the twenty-fifth anniversary of the weighing in a day-long program that brought to the campus many of the scientists connected with the original event. President George W. Beadle welcomed the nearly 200 scientists and guests. Glenn T. Seaborg, head of the plutonium project at Chicago and now Chairman of the U. S. Atomic Energy Commission, served as master of ceremonies and gave an informal after-dinner address. Walter L Pozen, AB '53, JD'56, Assistant to the Secretary of the Interior, dedicated Room 405 of Jones Laboratory as a Registered National Historic Landmark. A bronze commemorative plaque has been affixed to the wall beside Room 405, where there is a display of equipment and photographs of the plutonium project.

Norman H. Nachtrieb, Professor and Chairman of the Department of Chemistry, planned and coordinated the anniversary observance.

At the afternoon session of the anniversary celebration, nine members of the original scientific team each made a few remarks about their role in the project. The nine were George Boyd, SB'33, PhD '37, Milton Burton, Michael Cefola, Charles Coryell, Burris B. Cunningham, Arthur Jaffey, SB'36, PhD'41, Isadore Perlman, Louis Werner, and John A. Willard. Their retrospective anecdotes more

Glenn T. Seaborg, head of the plutonium project at Chicago in 1942 and now Chairman of the U. S. Atomic Energy Commission, holds one of the plaques for Jones 405.

often than not were given in a spirit frequently observed in men of high discipline and achievement—a spirit of dryly humorous self-effacement. One speaker recalled the anxious moments when a laboratory beaker was accidentally broken and the world's supply of plutonium, in solution, was unceremoniously spilled. Fortunately, the beaker had been sitting on a Sunday edition of the *Chicago Tribune,* which promptly soaked up the solution. It was necessary to digest the newspaper with a strong acid in order to recover the plutonium. The speaker observed that he was probably the only person of strong liberal persuasions who had completely digested a Sunday edition of the conservative *Tribune.*

The possible synthesis of plutonium had been theoretically predicted for many years and the element was discovered at the University of California at Berkeley eighteen months before its isolation at Chicago. The plutonium used by the Chicago team had been produced at Berkeley and at Washington University in St. Louis.

Plutonium 239 is made by bombarding uranium 238 with deuterons in an accelerator—as was done in 1942—or by the capture of neutrons by uranium 238 in a chain-reacting pile

The amount of plutonium dioxide produced at Chicago weighed only 2.77 micrograms (millionths of a gram). The sample was weighed on an extremely sensitive but simply-constructed "scale which was invented for the occasion (but later found also to have been invented elsewhere). Another significant achievement connected with the plutonium project was the development of the then fledgling science of ultramicrochemistry, which deals with chemical compounds and reactions on the microgram level.

In the early stages of plutonium research, element 94 had not been named and had to be discussed confidentially because of its connection with the super-secret Manhattan Project. The Chicago scientists called the new element by the code name "copper," until real copper had to be used in the experiments. Then a distinction had to be made between the code name and "honest-to-God copper."

the San Juan Star
A SUBSIDIARY OF COWLES COMMUNICATIONS, INC.
Member of the Audit Bureau of Circulations
San Juan, Puerto Rico, Tuesday, October 31, 1967.

Nuclear Energy Role Is Outlined

By JAMES McDONOUGH
Of The STAR Staff

Dr. Glenn Seaborg, chairman of the Atomic Energy Commission, said Monday night that he believes nuclear energy "will soon play a major role in Latin America."

The chairman delivered the key-note speech at the symposium on Nuclear Energy and Latin American Development at the San Jeronimo Hilton Hotel. The symposium is commemorating the 10th anniversary of the Puerto Rican Nuclear Center.

Seaborg said that Latin America in the near future will receive benefits from radio isotopes and nuclear power plants.

In 1972 Argentina expects to have its first nuclear power plant in operation, Seaborg said.

Brazil is studying the feasibility of a reactor plant in the Sao Paolo area. One study is considering the use of thorium, which is found abundantly in Brazil.

In a speech prepared for delivery Seaborg noted with enthusiasm a joint study now being conducted by the United States and Mexico into construction of a nuclear desalting plant. The plant, if approved, would supply water for the Mexican states of Sonora and Baja California, and California and Arizona.

On the question of food and radiation, he cited an Argentina study on the use of a portable food irradiator to sterilize cow's blood as a possible protein source for man.

However, Seaborg said, large amounts of money and a pool of well-trained scientists and technicians will be necessary. He commended the Puerto Rican Nuclear Center for fulfilling some of these manpower needs.

Earlier in the day, AEC member James T. Ramey suggested the possibility of a dual-purpose nuclear energy center on Puerto Rico's south coast.

The "energy center" as visualized by Ramey would utilize a nuclear reactor to supply electrical power for an industrial complex and, by sea water desalinization, fresh water for agriculture.

Rafael Urrutia, head of the Water Resources Authority, said he and other high government officials will meet with Ramey on Tuesday to discuss the idea.

The nuclear "energy centers," Ramey said, represent a possible breakthrough in the development of agricultural areas around the world.

As now conceived, Ramey told the scientists, the most advanced center would cost almost $1 billion, but would supply two million kilowatts of power and 500 million gallons of fresh water daily.

For Puerto Rico, the commissioner suggested a one-million kilowatt reactor capable of producing 500 kilowatts of electrical power for an aluminum or magnesium plant and a caustic chlorine plant.

In addition, the reactor would be capable of converting 25 million gallons of sea water daily.

The plant would also produce a surplus of 230 megawatts of electricity for island use and an ammonium industry built around hydrogen, one of the plant's byproducts.

Although money was not mentioned, Ramey did say before the luncheon that such a plant could produce fresh water at 30 to 40 cents per 1,000 gallons.

Such a price is considered economically viable by industry.

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Horizons stretch for tiny atom

The Atomic Age dawned in the United States 25 years ago when Dr. Enrico Fermi achieved the first nuclear chain reaction. Now, as the anniversary of this historic event approaches, Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission, looks ahead to new achievements.

By Neal Stanford

Staff correspondent of The Christian Science Monitor

Washington

DR. GLENN T. SEABORG, CHAIRMAN of the Atomic Energy Commission (AEC), is to many the Ben Franklin of this age: scientist, government official, diplomat, administrator, author, public speaker.

He is not only codiscoverer of the element plutonium but of several other transuranium elements. He has dozens of awards and honors in chemistry, physics, engineering — including a Nobel Prize.

He has honorary degrees from more than 20 universities; for a time he was chancellor of the University of California at Berkeley; he represents the United States at Geneva meetings of the International Atomic Energy Agency; he is a prolific author on scientific matters; he is one of the country's most popular public speakers — limiting himself now to a speech a week. His interests, enthusiasms, and energy are practically boundless.

The following interview was given exclusively to The Christian Science Monitor in connection with the 25th anniversary of the dawn of the Atomic Age, Dec. 2, 1942. Then, under wartime security, Enrico Fermi accomplished the world's first nuclear chain reaction under the football stadium stands at the University of Chicago. Now, Dr. Seaborg looks ahead to new achievements.

* * *

Q. What are the prospects of controlling thermonuclear hydrogen fusion reactions to make electric power? Are we close to a breakthrough?

A. There are numerous advances that come out of our various laboratories that could be referred to as breakthroughs. We have four major laboratories working on controlled thermonuclear reactions: the Los Alamos Scientific Laboratory; the Livermore Lawrence Radiation Laboratory at Livermore, Calif.; the Oak Ridge National Laboratory in Tennessee; the Plasma Physics Laboratory at Princeton.

There are advances at these laboratories periodically that have to do with increasing the time of containment of plasma, increasing the temperature of the plasma, progress in the confinement and the stability of the plasma [plasma is a gas made up of positively and negatively charged particles]. However, the translation of these individual advances into a practical machine that will deliver on balance net energy from a controlled thermonuclear process is a very difficult matter. I think that most of us predict that it will be a number of decades before we have such a practical machine.

* * *

Q. Can you explain fairly simply the difference between controlling fission and controlling fusion?

A. In fission you have a heavy nucleus, like uranium 235 or plutonium that splits in half with the release of energy, formation of radioactive fission products, and the production of additional neutrons. It is the neutrons that cause the fission reaction. The neutrons that are released in a fission reaction go on and produce additional fission reaction, the release of more energy. This then multiplies in a chain-reaction perpetuating mechanism.

Q. Do you feel that the nuclear test-ban treaty would prevent using nuclear power to dig a sea-level isthmian canal across Central America?

A. In my opinion the treaty would need to be modified in order to carry out as large a project as digging a canal across the American isthmus.

Q. Do you feel it will be difficult to get the treaty amended?

A. This will be a matter of demonstrating to other countries that the process is safe and that there are many advantages in the use of nuclear explosives in these various ways. . . . It will be to their advantage as well as ours to ratify the treaty to make this peaceful application of nuclear energy possible.

Q. How does the Atomic Energy Commission's budget divide as between civilian and military programs?

A. The budget now is about 50 percent for peaceful use of atomic energy or a little bit more. As recently as six years ago when I first came to Washington the budget was about 75 percent devoted to military and about 25 percent to peaceful uses.

Q. Can you tell us anything about the Pentagon's stockpile of nuclear weapons? The fact that a smaller percentage of AEC money is going into weapons suggests they now are mostly replacing or improving them.

A. The explanation is somewhat complicated, but this is one of the factors. It is no longer necessary to acquire the raw material—natural uranium—at the rate it was in the past, and it is no longer necessary to produce from this the fissionable materials — enriched uranium 235—at the rate we had to do in the past. Therefore a good part of the military budget now is devoted to improving the sophistication of the nuclear weapons and changing over to more sophisticated types by reworking the weapons in our stockpile.

Also the amount of effort that is going into research and development of nuclear power and the field of radioactive isotopes and all the peaceful uses of nuclear energy is being increased year by year.

Q. Do you see any benefit militarily to putting nuclear weapons in earth orbit?

A. It is my understanding that that does not lead to the accuracy in delivering weapons that is available through the use of ICBMs.

Q. Do you have any reason to doubt that the laws that control nature here on earth apply throughout all space—are applicable no matter how far out you go?

A. This is my feeling. I don't believe there are any different basic laws of nature out beyond this universe. There are possibly such things as a universe consisting of antimatter. But this would come within the framework of basic laws of our universe.

Q. An antimatter universe would come within the framework of our present laws of nature?

A. The basic laws governing antimatter would come within the framework of the physical laws governing our universe. It would be a different kind of universe and would be inconsistent with ours, because antimatter when it comes in contact with our kind of matter annihilates it. They annihilate each other. The mass turns into radiation.

Q. Can you picture what such a universe would be like—an antimatter universe?

A. I don't know whether it's possible to conclude that things and people would look just the same, but antimatter just reverses the electric charges in atoms so that you have a negative charge in the nucleus and a positive charge in the orbital electrons revolving around the nucleus. We have positive charges on the nuclei in our universe, negative electrons revolving in orbit around the nuclei. To the people or things, if there are such, in the other universe, they might regard us as "anti" and they the regular type of matter.

Q. Some years back I believe you received a Nobel Prize for your part in discovering plutonium, Element 94. Since then you have discovered several other elements. My question is, is there any limit to the number of elements that can be discovered—and if so, what is that limit?

A. I certainly tended to underestimate in my own field of transuranium elements the progress we would make. We are up to elements as high as atomic numbers 103 and 104 which are 11 or 12 elements beyond uranium. Yes, there certainly is a limit.

Recent theoretical indications suggest that we should be able to go higher than we thought even 5 or 10 years ago. There is now some indication on the basis of theoretical considerations concerning the stability of heavy nuclei, that we might be able to produce and identify nuclei as high as those with atomic numbers like 126, which would be reaching an astonishingly high atomic number indeed.

LOS ANGELES TIMES
NOVEMBER 21, 1967

Los Angeles Times 11/21/67

U.S. Signs Contracts for Atom Power Plant

Federal agencies signed contracts Monday to pay $72.2 million toward construction and maintenance of a $444 milllion nuclear power and desalting plant to supply much of the Southland with electricity and water.

Stewart L. Udall, secretary of the interior, and Glenn T. Seaborg, atomic energy commission chairman, completed the papers at the Newporter Inn, Newport Beach.

All but $11.2 million of the federal funds will be for construction purposes. Utility companies will raise the remaining $383 million required to build the facility on Bolsa Island, two-thirds of a mile off the Orange County coast between Huntington Beach and Seal Beach. All funds had been pledged previously.

The plant, to be constructed on a 43-acre man-made island, will be completed in 1972. It will be in partial operation by 1973.

It will produce 150 million gallons of fresh water daily, or enough to supply 750,000 persons.

Electrical output will total 1.8 million kilowatts of electricity, or .3 million kilowatts more than Hoover Dam, and enough for the needs of 2 million persons, utility company officials said.

Fermi's Atomic Feat Commemorated Here

WASH STAR 11-30-67

By WILLIAM HINES

Star Staff Writer

An event described as "one of the most important in the history of mankind and the outstanding scientific development of the 20th century" was commemorated here last night.

The occasion was the 25th anniversary of atomic energy, which actually occurred Dec. 2, 1942, when Italian-born physicist Enrico Fermi brought to life a uranium-graphite "pile" in which the first nuclear chain reaction was sustained.

Fermi's experiment was noted and honored at the Smithsonian Institution's Museum of History and Technology. A special exhibition of machinery and documents was opened in the museum's Hall of Nuclear Physics on the Constitution Avenue side of the building which stretches from 12th to 14th streets.

Dr. Glenn T. Seaborg, Nobel-prize winning chairman of the Atomic Energy Commission, did the honors at an invitational affair marking the first quarter-century of the Atomic Era. The evaluation of the 1942 event, cited in the first paragraph of this story, was Seaborg's.

He Missed It

Although he is a ground-floor veteran of the atomic years and the discoverer of more "new" chemical elements than any man alive, Seaborg was not one of the select few who saw history made at the Stagg Field squash courts in Chicago 25 years ago. He took note of this fact last night.

Recalls Code News

Seaborg, principal speaker at the ceremony by virtue of his position as No. 1 atomic spokesman for the U.S. government, recalled the guarded wartime code-language in which news of the atomic achievement was imparted from Chicago to the East Coast at the end of 1942.

Dr. Arthur Compton, head of the atomic project, notified Dr. James Bryant Conant of Harvard, a top presidential adviser, of success in the experiment by saying that "the Italian navigator has landed in the New World." This was a reference to Fermi's Italian origin and the importance of the discovery.

"One of my great regrets," Seaborg said, "was that I wasn't in the room when the experiment happened. A 30-year-old chemist did not rank very high in those days among all those august physicists."

Seaborg explained that he was "just outside" the closely guarded room where Fermi demonstrated the harnessing of atomic fission.

Inside that door were 50 persons, 42 of whom still are alive. A quorum was mustered last night when 22 men answered "here" to a rollcall by a Smithsonian official. The one woman present at the birth of the atomic age, Dr. Leona Woods Marshall Libby, was not here last night.

Italy's Ambassador Egidio Ortona was on hand last night to represent both Italian navigators — Fermi and Christopher Columbus.

Seaborg indulged in a numerical play on words by remarking on the coincidence of dates in the two "navigators'" discoveries.

"The first Italian navigator made his discovery in Fourteen-Ninety-two and the second Italian navigator made his in Nineteen-Forty-two," he said.

This latter date, Seaborg added, "is as good a date as we can pick for the opening of the 'age of scientific revolution.'"

General benefits from Fermi's experiment are only now beginning to be felt by ordinary citizens, Seaborg said. He mentioned the growth of atom-generated electric power and the use of radioactive chemicals in medicine and industry as present-day examples.

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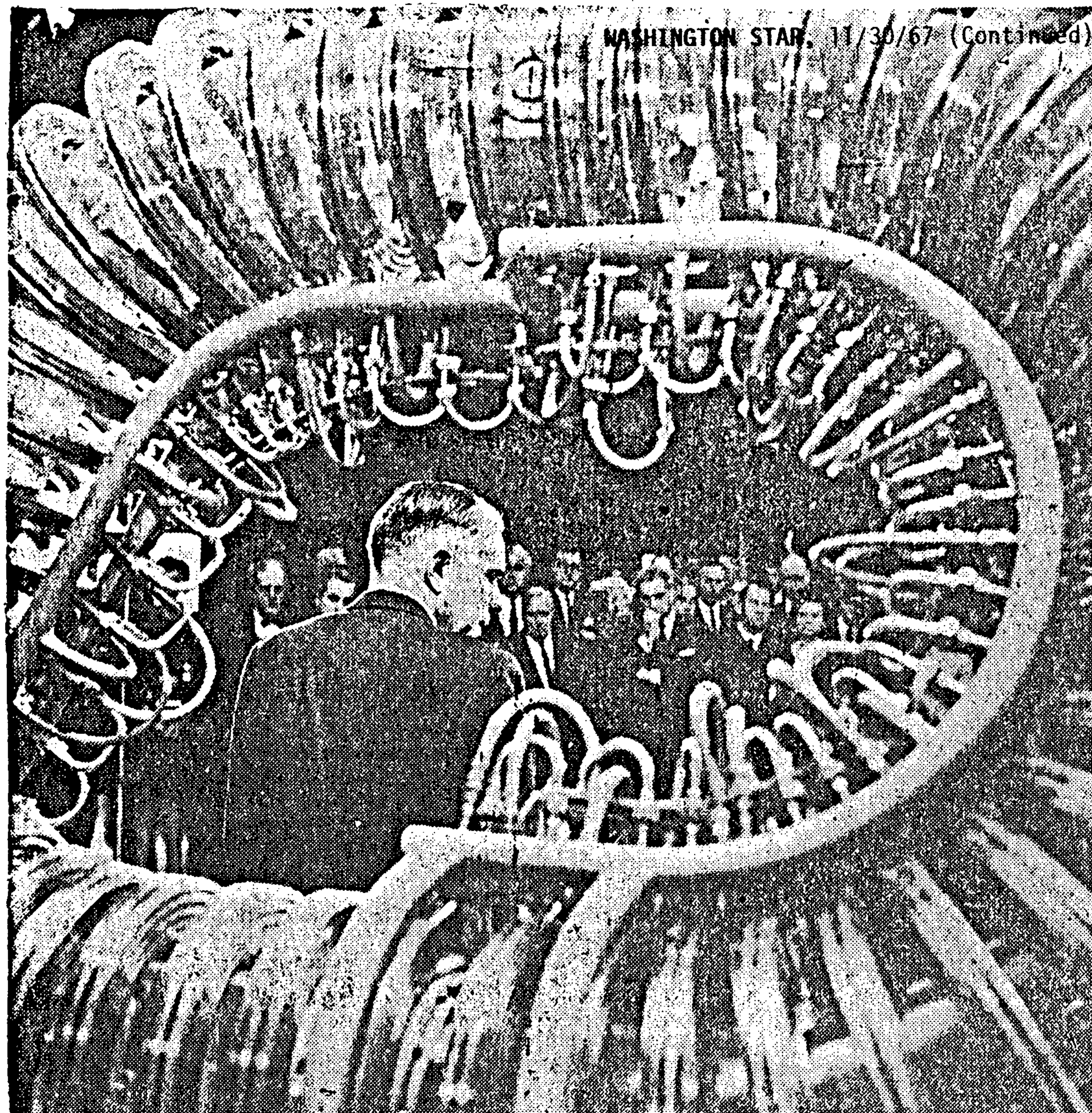

Star Photographer Walter Oates

Dr. Glenn T. Seaborg, framed by parts of a "stellaraton," addresses guests at a celebration last night at the Smithsonian Institution marking the 25th anniversary of atomic energy.

Twenty graying scientists met at the Smithsonian Institution last night to recall the day 25 years ago when they opened the atomic age.

The 20 are the survivors of the 41-man team under Enrico Fermi that created the first controlled nuclear chain reaction in Chicago on Dec. 2, 1942.

Atomic Energy Commissioner Glenn T. Seaborg told the scientists that the date "was as good as any you could pick for the opening of the scientific revolution and commemorated one of the most momentous events in the history of mankind."

In his brief talk, Seaborg emphasized the peaceful possibilities of what he and others achieved. From the original Fermi reactor, he said, are coming newer more powerful reactors that will desalt water and produce "great food factories of the future."

He predicted the use of nuclear rockets, the use of nuclear power for excavation and applications of reactor-made isotopes in medicine, agriculture and other areas "that I sincerely feel will affect the lives of every one of us to a greater extent than we ever perceived or do perceive now"

The scientists brought memories. Seaborg himself recalled having had to wait outside the door where the reaction occurred and greeting the scientists when they came out. Walter Zinn remembered holding the safety rope that would have stopped the reaction.

And everybody remembered Albert Wattenberg, who is credited with saving the bottle of Chianti with which the scientists toasted their achievements 25 years ago.

Dec. 3, 1967 The New York Times

ATOM SHOTS: Most nuclear blasts, from the first at Alamogordo, N. M., on July 16, 1945, have been concerned with weaponry. Of the U.S. tests, however, 17 at the Nevada Test Site and one at Carlsbad, N. M., were related to peaceful uses of atomic energy. Four others in Nevada, Mississippi and at Amchitka Island were related to nuclear detection and three in the South Atlantic mainly to scientific research.

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Chicago's AMERICAN

Always On Top Of The News

Vol. 68, No. 130 Two Sections, Section 1 SATURDAY, DECEMBER 2, 1967 5 7 CENTS Phone: 222-4321

World Must Halt A-Bomb Spread, AEC Chief Says

See editorial, page 8

BY EFFIE ALLEY
[Science Writer]

The chairman of the Atomic Energy commission today termed a treaty prohibiting spread of nuclear weapons to other nations "an imperative requirement" for further peaceful development of atomic energy.

"Without such a nonproliferation agreement between nations the world's rapidly growing number of nuclear power plants would have a "massive potential for evil," said Glenn T. Seaborg, the chairman.

Yet hopes for such a treaty are currently so dim that it would take "nothing short of a miracle" to realize them any time soon, according to Sigvard Eklund, director general of the International Atomic Agency.

GLENN T. SEABORG
"Potential for Evil"

U. of C. Commemoration

Both men addressed 250 leading scientists gathered at the University of Chicago to commemorate the world's first atomic chain reaction on the U. of C. campus 25 years ago today.

Both stressed the precarious equilibrium in which the world exists. It is poised, they indicated, between the threat of an atomic armaments race and the promise of converting the energy in the heart of the atom into a source of abundance for all peoples.

President Johnson was to speak via closed-circuit television, the White House said. Johnson had been extended an invitation to attend the campus activities earlier this week, but was unable to do so. President Giuseppe Saragat of Italy also was to speak via satellite and closed-circuit TV.

Must be Protected

Declaring that the world must be protected against unauthorized use of nuclear energy for the production of weapons, Seaborg said:

"A nonproliferation treaty and effective safeguards are essential if programs for expanding the peaceful applications of nuclear energy are to be pursued with maximum effectiveness in an atmosphere of mutual trust and confidence where nations can feel assured that other nations are not engaged in nuclear developments that could threaten their security.

"Projections indicate that by 1980 there will be enough plutonium produced thruout the world per day to furnish fuel for more than 100,000,000 kilowatt days of electric power—or alternatively, to furnish the explosive ingredient for tons of nuclear weapons."

Bond or Repellant

Elklund pointed out that atoms can act as a bond between nations or as a repellant and said:

"An agreement on a nonproliferation treaty will be a proof of atoms acting like a bond between nations facilitating international understanding in a rapidly shrinking world. A failure to sign a treaty may bring the atoms as a repellant to force and initiate an atomic armaments race.

"Our world will not become a safer place to live in thru such action, but may be brought much closer to that holocaust everyone of us wants to avoid."

Referring to difficulties that developed at the meeting of the 18-Nation Disarmament Committee in Geneva, he said:

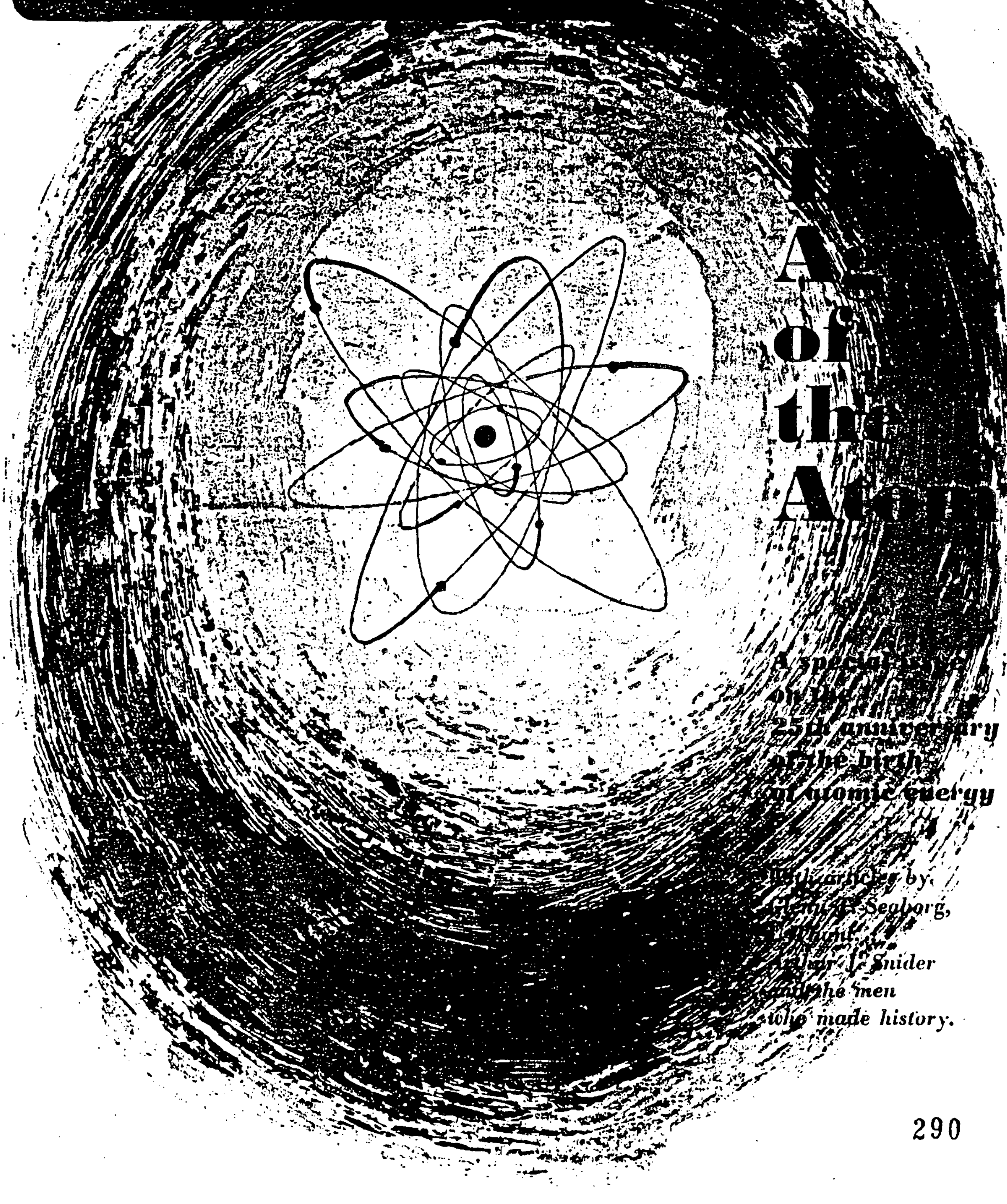
"I suppose, in the absence of any other information, that nothing but a miracle can advance negotiations so that this year's General Assembly [of the United Nations] can discuss a nonproliferation treaty.

"I am convinced that unless we see a complete draft treaty in the middle of next year, the momentum generated for this issue will be lost and the prospects for an agreement will be nullified."

CHICAGO DAILY NEWS

DECEMBER 2, 1967

Panorama



anniversary
of the birth
of atomic energy

by
Seaborg,
Snider
the men
who made history.

We face the future

By Glenn T. Seaborg

IN ITS SCOPE of intellectual endeavor, its physical frontiers and its social implications, there has never been an age of man to match the scientific and technological era in which we are now living.

In no other period in man's history has he acquired so much knowledge, put it to use so rapidly, or moved so swiftly in his ability to produce goods, to change his environment, and to destroy himself.

In past eras, it was anywhere from 200 to 2,000 years between the time a principle or theory was demonstrated and when it was actually applied to some productive end. In contrast, it was less than six years from the first demonstration of nuclear-generated electricity until nuclear energy was producing electricity for commercial use.

Consider, too, for a moment some of the multitude of ideas and items which are part of 1967 but did not exist 25 years ago in 1942: polio and measles vaccines, high energy physics, radiation therapy, hovercraft, helicopters, latex paints, instant photography, transistors, jet aircraft, wash and wear fabrics, home permanents, hair sprays and electronic computers. Whole new industries, such as plastics, are based on knowledge that was largely unknown in 1942.

WHILE SCIENCE and technology have brought us great benefits, they have also created new problems and magnified old ones. In their wake have come problems in international peace and security, population growth, technological unemployment, urban congestion, and pollution of air and water. The fact is, and it is one of the most significant facts of our time, that man's ability at technical innovation has far outstripped his ability at social innovation.

For some, the answer to these new problems has been a cry to cancel out the technical and scientific advances of the last 25 years, or, at least, to call a halt to them until society adjusts.

Such yearnings are neither possible nor practical. Like it or not, we are living in the 20th Century. Our country and the world are undergoing a period of change in which the influence of science reaches throughout the fabric of society. We cannot ignore it. To be fully alive today is to be a conscious participant in forwarding the creative evolution brought about by man's increasing knowledge of his environment.

I believe we must use all the technology at hand, and then some, to correct past errors, reverse harmful trends, to anticipate and fulfill future needs. Perhaps most importantly, we must coordinate all these things to limit the number and scope of any future blunders.

In many cases, we are already in a position to apply what Dr. Alvin Weinberg of the Oak Ridge National Laboratory has called a "technological fix," that is, a technical correction to the symptoms of a basic human social problem.

SOME EXAMPLES of the "technological fix" at work might be in the methods we are using to close the food versus population gap. On the one side are tremendous advances in birth control techniques which can be used to limit our population, now expected to reach six billion by the year 2000. On the other hand, we are already studying the possibility of brand new "foods factories" in arid regions, new agricultural-industrial complexes, powered by nuclear energy, which can desalt water for irrigation and manufacturing, make fertilizer and produce electricity for highly efficient and automated farming.

Like most of our mid-20th century problems, the population-food problem is extremely complex. In fact, an illustration of this complexity can be seen in the recent White House report called "The World Food Problem." Reading this massive study on what probably will be one of man's most pressing problems, one becomes enmeshed in a web of technical and social endeavors that seems to involve almost every facet of human activity. We see the food supply problem in terms of population growth, family health and planning, urban effects, water resources, and cultures and customs among others.

The remarkable thing is that experts believe they have at hand, or see in the near future, solutions to almost all of the individual technical problems involved.

It is frustrating, however, to also find that while science and technology have reached the stage where they can give us almost anything we want, there is little common agreement on the kind of world we want.

What is needed now, along with the science and technology being developed today, is a comparable, perhaps even greater, drive to organize and activate the social forces necessary to put our knowledge and resources to work.

CHICAGO DAILY NEWS
December 2, 1967 (Continued)

Glenn T. Seaborg, president of the Atomic Energy Commission

It is imperative that in the decades ahead, scientists and technicians work hand-in-hand with educators, social scientists and political leaders so that technical innovation is fostered more rapidly to support social gain. What must evolve from this relationship is a body of technical and humanistic wisdom, a single discipline we might call "Techumology."

Perhaps the next 25 years will see an explosion of technology greater even than the explosion of science and technology we have witnessed in the last 25 years. It seems an appropriate time and place to start that new era, here in Chicago, in the midst of a gathering of international scientists, and on the 25th birthday of nuclear energy.

NEW YORK TIMES DECEMBER 7, 1967

TECHNOLOGY HELD A FRIEND AND FOE

Times

Scientists Differ on Atom as Key to Golden Age

12-7-67

By WALTER SULLIVAN

Is technology going to destroy our independence, our creativity or our environment? Several of the nation's scientific and intellectual leaders addressed themselves to this question yesterday and came up with some contradictory answers.

On the final day of a two-day meeting marking the 150th anniversary of the New York Academy of Sciences Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission, depicted abundant nuclear energy as ultimately bringing about a golden age. But his view was challenged.

Dr. René Dubos of Rockefeller University said that "energy, as presently used, adds to the devastation and makes the environment increasingly unfit for human life."

Dr. Simon Ramo, a pioneer in the aerospace industry, discussed the possibility that ours would evolve into a "robot society" in which all initiative was delegated to machines.

He believes mankind can avert such a fate—that a robot society could evolve only "by default."

'We Cannot Wait'

Dr. Margaret Mead, the anthropologist, attributed youth's discontent to the rapidly increasing pace of developments. In the past, she said, society adjusted to change because new generations matured and led it in new directions.

"Today we cannot wait," she said. "The young realize that things will not be corrected in time."

In her prepared text she gave as examples "the cry of the citizen against a war for which he did not vote, the cry of the student against a curriculum in which he has no hand in shaping, the cry of the young country against a system of world trade within which his country is getting poorer instead of richer."

The cries of discontent could, in fact, be heard outside the Waldorf-Astoria Hotel, where the meeting was held. Pickets were demonstrating against Secretary of State Dean Rusk, who was addressing the National Association of Manufacturers elsewhere in the hotel.

Dr. Ramo, who heads the policy committee of TRW, Inc., formerly Thompson Ramo Wooldridge, did not agree with Dr. Seaborg that abundant energy would be the key development of the next century. Rather, he said, the key will be the growing role of machines in taking over tasks of the human mind. It is this prospect that threatens the world with a robot society, he added.

Ramo Is Hopeful

Nevertheless, he was optimistic. Technology, he said, could even provide us with "instant democracy," where every home had an electronic voting machine, enabling all to participate in day-to-day decisions.

In this way, he went on, "you can have more democracy than we can stand."

Early Soviet efforts at all-inclusive planning failed, Dr. Ramo said, because they were made before the Russians "had the tools to do it." Also, he said, the leaders tried to impose the plans from on top.

It is a mark of our failure to control our technology, he said, that we have developed a system that can provide pure air to an astronaut on the moon, yet we cannot do so for the citizens of our cities.

Dr. Dubos renewed his appeal for the elevation of ecology to a position of leadership among sciences. Ecology is the study of the dependence of various life forms on one another and on the elements of their environment. Technology, unless scientifically controlled, threatens more and more to make our environment unlivable, Dr. Dubos said.

Dr. Seaborg described the "nuplexes" that he and his colleagues have been discussing for the last year—futuristic nuclear complexes using abundant power to produce fertilizer, fresh water from the sea, and new products from reprocessed refuse.

N.Y.

DAILY NEWS, MONDAY, DECEMBER 11, 1967

ONLY HUMAN

By Sidney Fields

The Atom and Mr. Seaborg

Glenn Theodore Seaborg, son of a machinist, oversees the application of America's vast nuclear power, a task both frightening and fruitful. He's chairman of the Atomic Energy Commission.

The overactive atom is producing an increasing arsenal of terrifying weapons, cheap electricity and a host of isotopes for medicine and industry. Isotopes now measure the age of whisky, rocks, fossils, pottery, paintings, and one in a gold detection device is of deep interest to prospectors, miners, customs agents and smugglers. Ask Seaborg if there's anything the atom can't do and he answers:

"Practically everything, except reproduce other atoms."

It has also given the world the fearful choice of a more abundant life or quick annihilation. Five

AEC's Glenn Seaborg and daughter Dianne at 2 —a more abundant life or . . .

countries now have nuclear weapons. Seven others can make them. Russia is trying to overtake America's 3-to-1 lead. Red China is a dark threat to members and non-members of the nuclear club.

'There's No Choice'

Members are sharpening the sophistication of their weapons: greater penetrability, more bang per weight, warheads in clusters and better anti-ballistic systems to destroy them all.

"It doesn't stand still," Seaborg sighed. "I certainly deplore it and hope it can be stopped. But there's no choice except to stay ahead."

He's 55, lean and long, 6'3", with quiet demeanor and four sons and two daughters, from 8 to 21. When they were babies, it was not unusual for him to give them their bottles. His son, David, now 18, started arriving before the doctor. So Seaborg delivered the baby.

"Later, I read the obstetrics books and discovered it was a normal delivery," he said. "If it wasn't, we'd have all been in trouble."

Ph.D. at Cal

He was born in Ishpeming, Mich., was a Phi Beta Kappa man at the University of California at L.A., while working as an apricot picker, stevedore, gardener and lab assistant. He took his Ph.D. in chemistry at Berkeley, worked in its labs, taught and eventually became its chancellor.

In 1940, Seaborg and Edward McMillan identified plutonium, which opened the door to atomic fission and led him into the Manhattan Project under Enrico Fermi. In 1951, Seaborg and McMillan shared the Nobel Prize for chemistry. He's discovered and co-discovered about a dozen new elements and identified about 100 isotopes. President Kennedy appointed him to the Atomic Energy Commission in 1961 and President Johnson continued him in the office. How far can the atom go? The answers would fill a volume. Here are just a few Seaborg outlined:

By 1980, nuclear reactors will produce ⅓ of the 500 million kilowatts of electricity Americans use and eventually all of it—without polluting the air.

"The same power plants can desalt seawater," Seaborg said. "We're building one near Los Angeles. Such plants could become a Nuplex, a highly automated agro-industrial center that would also produce food, fertilizer, chemicals, metals, alloys, insecticides and break down scrap, sewage and waste into raw materials for reuse."

The Oak Ridge National labs have studied the feasibility of the Nuplex and the results will soon be published.

What Isotopes Can Do

Some 10,000 doctors are now using radioactive isotopes to diagnose and treat cancer and liver, kidney, thyroid and circulatory disorders. An artificial heart powered by an isotope is now being developed.

"There are indications that Cobalt 60 can suppress the rejection process when a human heart is transplanted," Seaborg said. "They're now using it to radiate the transplanted heart of that South African grocer."

An X-ray isotope carried in a small bucket will be a portable X-ray unit easily carted to inaccessible areas. Others preserve food and eliminate parasite diseases. One eradicated the screwworm that took a terrific toll of Florida and Texas cattle. Still others are being studied to attack sleeping sickness, malaria, hookworm and tapeworm.

Small reactors, called Snap Devices, now furnish auxiliary power in space capsules. Soon the AEC will supply a biochemical package to determine if any form of life exists on Mars. Bigger reactors are being developed to thrust manned and unmanned shots to far-distant planets.

More Powerful Than Hoover Dam

"We're now working on a reactor for space propulsion no bigger than an office desk," Seaborg said. "It will have more power than Hoover Dam."

Under AEC's "Plowshare Program," underground nuclear blasts will create in minutes new lakes, harbors, canals, mountain passes and free trapped riches from the earth and oceans. Before the new year, a 26 kiloton blast 4,000 feet under New Mexico will attempt to free natural gas. If successful, the AEC will try six more to get oil from shale and copper from deep rock.

All of this boggles the imagination.

"All of us feel we haven't been imaginative enough," Seaborg said. "We do know the atom can create a future beyond anything we dare to imagine today."

If that mushroom cloud doesn't appear first.

WALL ST. JOURNAL 1/9/68

Man-Made Atoms

New Artificial Elements May Bring Advances In Medicine and Space

Radiation Produces Electricity For Satellites, May Power 'Pacemakers' for Hearts

Californium and Einsteinium

By JONATHAN SPIVAK
Staff Reporter of THE WALL STREET JOURNAL

OAK RIDGE, Tenn.—Nuclear scientists here are practicing a peculiar kind of alchemy.

Unlike the ancient exponents of the art, they are not vainly seeking to convert base metals into gold. Instead, relying on sophisticated tools of modern technology—huge atomic accelerators and immense nuclear reactors—they are successfully creating a family of new substances. These are man-made atoms of "transuranium" elements—artificial elements that are heavier than uranium, the heaviest of the 92 elements that occur naturally. They're created by crowding additional particles into the nuclei of existing atoms. The artificial elements bear such names as Einsteinium (for Albert Einstein) and Fermium (for nuclear pioneer Enrico Fermi); scientists are hoping to lengthen the list.

The man-made atoms, though available so far only in small quantities, are already helping to provide new clues for understanding the nature of the universe. They also are serving important practical needs in the exploration of space, and they may offer lifesaving help for heart patients here on earth.

These atoms, emitting a stream of radioactive particles, are providing power for space satellites. Their radiation also is helping to determine the chemical composition of the moon. Surveyor space vehicles recently landed samples of artificially created Curium on the moon's surface. The radiation of high-energy Curium particles showed that lunar rocks resembled basalt, a crystallized volcanic lava found on earth; when the particles bounded off the rocks, a telltale pattern showed on an electronic detector. This experiment will be repeated on another part of the lunar landscape if a Surveyor craft launched Sunday lands successfully on the moon today.

A Better "Pacemaker"

Earthly assignments are coming. Under a $750,000 Government contract, Nuclear Materials & Engineering Corp. of Apollo, Pa., is fabricating a "pacemaker," or electrical heart stimulator, powered by artificial atoms of plutonium, the key material of atomic bombs. The device will soon be tested in animals and eventually will be implanted in the bodies of ailing human volunteers, probably at Beth Israel Hospital in Newark. It's expected to last at least 10 times as long as existing battery-powered versions, which function for less than two years, and avoid the need for dangerous surgery for repeated implantation. "If everyone who could use one got one, the market would be for 10,000 a year or more," predicts an Atomic Energy Commission expert.

Other industrial firms, including Westinghouse Electric Corp. and Aerojet-General Corp. (a subsidiary of General Tire & Rubber Co.), are working on use of larger amounts of artificial plutonium atoms to power entire mechanical hearts. Most experts figure transuranium elements are the only logical, lightweight source of dependable, long-lasting power for such an artificial organ. The AEC and the Government's National Institutes of Health intend to invest up to $40 million in development of a mechanical heart.

The key to most applications of the transuranium elements lies in their spontaneous output of electrons, which can be converted into electricity or put to other uses. But when the man-made atoms eventually change into lighter, stable elements, some of the substances, particularly one called Californium, also emit a steady stream of penetrating neutrons; these lack an electrical charge but are valuable in the treatment of cancer. Some specialists theorize that a few thousandths of a gram of Californium on the point of a needle could be inserted deep in malignant tumors to destroy such growths far more effectively and safely than current X-ray techniques.

A Limitless Field

The modern-day alchemists are working their miracles at AEC installations at Aiken, S.C., and Berkeley, Calif., as well as at the AEC's Oak Ridge National Laboratory here. At Oak Ridge, a newly opened transuranium research lab is investigating a variety of potential uses—medical and otherwise—for the man-made atoms.

Partly because of the intense personal interest of Chairman Glenn Seaborg, himself a co-discoverer of some transuranium elements, the AEC has embarked on a major effort to increase production and utilization of artificial elements. The commission, now spending $11 million a year on this endeavor, aims to increase its outlays in the future.

Until recently, artificial elements were generally considered abstruse laboratory oddities of interest only to nuclear researchers; the one exception was the bomb component plutonium. But now Mr. Seaborg notes other "quite exciting applications have come along" and says the future of the field appears limitless.

Scientists believe study of transuranium substances could reveal some of the mysteries of the atom, the basic building block of the universe. Formation of the artificial elements in the laboratory promises to help show how the natural elements were originally produced in stellar explosions billions of years ago. The spontaneous split-up of the heavyweight substances into lighter elements will shed light on the still poorly understood process of nuclear fission, which underlies all uses of atomic energy in peace and war.

At the Oak Ridge transuranium lab, experiments are under way seeking to reveal for the first time what actually happens within the nucleus of a splitting atom before it flies apart into dozens of smaller fragments; measurements must be made within a few billionths of a second. "This is one of the few remaining frontiers in chemistry and physics," declares laboratory director O. Lewis Keller Jr.

Heated U.S.-Soviet competition to create

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new transuranium elements has become a significant testing ground of the scientific capabilities of the two nations—as important, some scientists argue, as the race to the moon. So far, nuclear experts at the University of California, supported by large-scale AEC grants, have scored most of the victories. They have manufactured elements numbered 93 to 103, giving them such names as Americium, Berkelium and Californium; each new element's number represents the number of protons, or positively charged particles, in the nucleus of its atom. Creation of each successively heavier artificial element poses a tougher technical task.

In recent months, Soviet physicists working at a research institute near Moscow may have moved to the fore, perhaps because the Russians are investing more manpower and money in the quest. The Soviets claim they have created element 104, named Kurchatovium (after the "father" of their atomic bomb) and have hinted at production of element 105.

Some U.S. specialists are frankly skeptical of the Russians' talk. "They are making a claim with almost no evidence; it's kind of dirty pool," complains one University of California man. But if the Soviets can back up their statements, it will be a setback to the U.S. "It will be a really hard blow if some other country makes all the advances," declares Daniel Miller, deputy director of AEC's research division. "It's a measure of the scientific sophistication of a country."

To outdo the Soviets in creating new artificial elements, the commission wants new and extra-powerful equipment. In particular, AEC experts are eager to build a $27 million machine called an Omnitron; by permitting heavier atomic bombardment of target elements, it could enable the U.S. to jump ahead and create element 126, according to AEC scientists.

To grasp some of the difficulties such efforts face, a smattering of nuclear knowledge is necessary. While the new elements are created by crowding additional atomic particles into the nuclei of existing atoms, the tremendous electrical forces that bind atoms together tend to repel such invasions. Even if this resistance is overcome, the new element may fly apart so rapidly, within a few thousandths of a second, that scientists cannot prove it ever existed.

Trapping Atoms in Gold

One approach is to bombard a target of one very heavy element, such as uranium, with a lighter projectile, such as carbon; a machine known as an atomic accelerator can speed the projectile to almost the velocity of light. It may require hours of bombardment to produce just a single atom of a new element. (Several billion atoms are required to constitute a speck the size of a grain of sand.) Complicated techniques, such as trapping atoms between layers of gold foil, are needed to verify the existence of newly created elements.

Creation of super-heavy artificial elements demands more powerful accelerators, able to hurl heavier atomic projectiles, including uranium itself, at target elements. The AEC's proposed Omnitron would achieve this objective by whirling projectile atoms in circular orbits and giving them extra boosts with electrical impulses to attain higher velocities. But considering the AEC's current budget restrictions, the machine may not be operating until the mid-1970s.

Meanwhile, High Voltage Engineering Corp. of Burlington, Mass., is building a $4.2 million accelerator for commercial sale, and the company claims this machine could significantly enhance the artificial atom effort. High Voltage is seeking $2.2 million from the AEC or other Federal sources to modify the machine for research purposes and $1.3 million a year to operate it. Scientists at Massachusetts Institute of Technology, the University of Rochester, Yale University, Rensselaer Polytechnic Institute and elsewhere have formed an organization to work on artificial elements with this accelerator, which could be operating by 1970.

Using Nuclear Blasts

This machine might help physicists create elements 114 or 126, which they rate a high-priority goal. Scientists theorize that these elements, whose nuclei contain 114 or 126 protons (and 184 neutrons), will be particularly long-lasting and permit sustained study.

An even more exciting approach to the manufacture of artificial elements is through nuclear test explosions. These blasts produce a stream of high-energy particles that can transmute atoms of uranium and plutonium into heavier elements. Einsteinium (number 99) and Fermium (number 100) were first found in the debris of a hydrogen weapons test in the Pacific.

So far, the experts have created atoms of every artificial element up to Fermium, in more than half a dozen underground explosions. But the experiments are expensive, costing $300,000 to $600,000 each if part of a weapons test and $1 million to $2 million if conducted independently. Tons of material must be excavated from depths of hundreds of feet to obtain minute amounts of trans-uranium elements. Nonetheless, the AEC intends to attempt more such experiments.

WASHINGTON POST JANUARY 31, 1968

U.S. to Step Up Underground Atomic Tests

By Thomas O'Toole
Washington Post Staff Writer

The United States is about to step up both the number and size of its underground atomic weapons tests.

In the next year, it is understood, between 40 and 50 atomic weapons will be exploded by the United States at undergound test sites in Nevada and Alaska.

Last year, the United States conducted 25 "announced" underground atomic weapons tests and as many as 10 or more that went unannounced.

Just how big the weapons will be in the upcoming tests is anybody's guess, but one informed source said they would be "several times" larger than what the Atomic Energy Commission calls "intermediate" atomic blasts—packing the wallop of 200,000 tons to 1 million tons of TNT.

Officially, the only inkling of their size came yesterday from AEC Chairman Glenn T. Seaborg, who told the Joint Committee on Atomic Energy that the intermediate tests conducted last year on the Nevada Test Range were "considerably" smaller than those the AEC wants to test in the near future.

Asks Spending Stepup

Dr. Seaborg was on Capitol Hill to ask Congress to stepup spending for the Sentinel anti-ballistic-missile system authorized by Congress last September. Operating costs alone this year for the weapons program will be $840.8 million, Dr. Seaborg said, an increase of $118.3 million over what they were a year ago.

The increase, Dr. Seaborg said, provides for $40 million to go on developing two new test sites at Hot Creek Valley in central Nevada and on Amchitka Island, an uninhabited member of the Alaskan Aleutians about 500 miles east of Siberia.

The AEC conducted a "calibration" atomic shot at Hot Creek two weeks ago to check out the seismic properties of the underground rock.

Not only is the Hot Creek region farther from civilization than Yucca Flats and Pahute Mesa, where most of the underground tests have been conducted in the past, but its underground terrain is better able to "contain" the larger atomic blasts that will be needed to test out anti-ballistic weapon concepts.

Probable Site

Amchitka Island will probably be the site of the biggest underground tests, if for no other reason than it is so far removed from civilization. It is understood there are eight site holes being drilled on Amchitka Island, two of which will be 6200 feet deep and five of which are to be more than 8000 feet deep.

The first of the "big shots" to come will take place at Hot Creek Valley, it is understood, probably inside of a month. It will be detonated in a hole more than 5000 feet below ground.

Despite its distance from cities like Las Vegas, the Hot Creek Valley site may prove troublesome to the AEC.

Like Earthquake

The calibration shot at Hot Creek Valley two weeks ago—which was much smaller than the weapons tests contemplated for the site—registered as a strong earthquake on seismographs and shook buildings and broke windows as far away as northern California.

The main trouble with the Amchitka Island site is that it lies on ground operated as an animal sanctuary by the Interior Department, which is right now studying ways and means of either getting the seals and sea otters that roam the region away from the site or of making the site livable for them during testing.

The Peaceful Atom's Advantages Stressed

Rocky Mountain News Washington Correspondent

WASHINGTON, Feb. 6—Three officials with a wide range of expertise in nuclear power declared Tuesday reactors used to generate electricity offer three undeniable advantages:

Safety, economy and freedom from pollutants.

Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission (AEC), termed electric power production "perhaps the most significant attribute of the peaceful atom."

In remarks prepared for delivery Wednesday to the Governor's Industrial Safety Conference at San Francisco, Dr. Seaborg declared, "Today, unfortunately, some groups opposed to nuclear power try to make the public believe that nuclear power plants are unsafe. But the truth of the matter is, nuclear power plants have a remarkable record of safety.

"They are designed to be safe," he said. "They are constructed to be safe. They are licensed and regulated to be safe. And they are operated to be safe."

He noted that in the more than 20 years such plants have been operating in the U.S., "no member of the public has been killed or injured by an accident at a central station nuclear power plant."

Hurting Coal Industry

Rep. Craig Hosmer (R-Calif), a member of the Joint Atomic Energy Committee, charged that a campaign by some coal miner union officials to block commercial applications of atomic energy "is helping no one and hurting only the coal industry and its customers."

Hosmer warned the anti-nuclear campaign of United Mine Workers of America President W. A. (Tony) Boyle is liable to catch the nation's electric utilities in a "cross-fire" between coal and nuclear advocates, and "either way they are going to get hurt."

He said the utilities are among the biggest customers of the coal industry and, "If I were in the coal business, I wouldn't want to get my best customers mad at me."

Hosmer noted two nuclear-powered generating plants are being built within eight miles of his home at Bolsa Island, Calif.

Comply With Boiler Code

"Worried about the safety factor? Heck, I'm delighted," Hosmer declared. "Using nuclear reactors will eliminate the necessity of building more air-polluting oil-fired plants. We don't use coal out there.

"I don't know of anything with more prior checkouts for cleanliness and safety than a nuclear plant," he said. "But with the conventional oil- or coal-fired plants about all they have to do is comply with the boiler code and that's it."

Edward Bauser, deputy director of the Joint Atomic Committee, stressed that exhausts and pollutants coming from a reactor can be very closely controlled.

"You can make it zero if you want. Practically nothing comes out."

Before retiring from the Navy, Bauser, who has a master of science degree from M.I.T., worked with Admiral Hyman Rickover in developing the first nuclear-power submarine.

"There's a very, very small amount of ventilation (exhaust)," he explained. "The very low level of waste of a radioactive nature is way below any hazard level."

Bauser sharply disputed a claim by Sen. Edmund Muskie (D-Maine) that nuclear power plants discharge damaging hot water from their cooling systems. Muskie suggested federal controls might be in order to limit temperature variations to keep from killing algae, for instance, which is essential to fish life.

"There's been a lot of mis-information on this," Bauser declared. "The variation in water temperature is only a couple of degrees and in some ways is advantageous."

Plants Now in Operation

Dr. Seaborg noted more than 85 nuclear power plants with a combined capacity of more than 60 million kilowatts are now in operation, under construction or planned.

This would include Public Service Co. of Colorado's St. Vrain Plant near Platteville which is scheduled to begin producing electricity in early 1972.

"Nuclear energy opens up vast new resources at a time when the World's demand for energy is rapidly expanding," Seaborg said. "Nuclear power's timeliness is also important in relation to our current concern over environmental pollution, as nuclear power plants do not add to the burden of air pollution."

Hosmer urged the coal unions to take a more far-range view before opposing nuclear fuel as an energy source.

"Just look at the projections for this country's need for electricity," he said. "They (the coal unions) certainly don't take into account any realistic projections for the future."

Coal Would Be Needed

Bauser said coal still would be needed—and in larger and larger amounts.

"They produced about 250 million tons of coal for generating in 1966. Even with a 50-50 split—half of the electricity produced with coal, half with nuclear fuel—as predicted in the year 2000, we'll need some 750 million tons of coal for generating."

Seaborg praised the nuclear industry's safety record.

"The year 1967," he said, "proved to be the safest in AEC's 21-year history with an injury frequency rate (number of disabling injuries per 1 million man-hours worked) of about 1.42 for AEC and its contractors. This surpasses the all-time previous record of 1.54 established in 1966 and can be compared to an overall industry average for 1966 of 6.91.

"Statistically speaking," Seaborg concluded, "it can be shown that you are far safer living next to a nuclear power plant than you are driving to and from work every day in your own car."

Oakland Tribune, February 8, 1968

PAIR OF LEADERS AT GOVERNOR'S CONFERENCE
Longshoremen's Harry Bridges, AEC's Glenn Seaborg

THE NEW MEXICAN, Santa Fe, N.M., Friday, February 16, 1968

Snow moved the groundbreaking for the Los Alamos Meson Physics Facility indoors but gold-plated shovels wielded by U.S. Sen. Clinton P. Anderson, The New Mexican (continued) 2/16/68

Seaborg's Prediction for LA: Regional Center of Excellence

LOS ALAMOS — The chairman of the U. S. Atomic Energy Commission last night said Los Alamos helps keep world peace by its weapons development and will become an academic "center of excellence for the entire Rocky Mountain region."

Dr. Glenn T. Seaborg spoke to 300 people in the Civic Auditorium and on local radio on "Los Alamos: 25 Years in the Service of Science and the Nation."

In a carefully - prepared speech that covered 18 typewritten, single - spaced pages, Seaborg detailed much of the history of Los Alamos Scientific Laboratory, its present research projects and its future role.

Besides a distinguished career of government service, Seaborg is famed as an educator (former president of the University of California) and as a scientist (co-discoverer of plutonium).

He said the major role of LASL will continue to be that for which it was founded 25 years ago: nuclear weapons development.

Los Alamos plays a vital part, he added, in designing atomic weapons that make up the nuclear deterrent that "buys us precious time to settle differences that could lead to a worldwide conflagration."

"We decry 'the balance of terror,' the uneasy peace under which the world lives because of the existence of nuclear weapons," Seaborg said. "However, history may show that it was in part our maintaining that balance that forced men and nations to a new level of rationality which is our only hope for a true and lasting peace on earth."

But he noted that Los Alamos Scientific Laboratory is applying more than 40 per cent of its resources to such peaceful uses as space applications, reactor programs biology and medicine and academic research and training.

Seaborg said he could see LASL and the 17-member Associated Western Universities "working in close harmony to advance education in the Rocky Mountain area to the point where it will be someday on a par with the very best the nation has to offer in higher education and graduate training."

He said all regions of the country should have their centers of excellence. He urged that Los Alamos, in its role as a national scientific facility, expand its cooperative efforts with universities "in fostering the nation's well-being."

Seaborg noted that Los Alamos' research to develop a nuclear rocket (Project Rover) is a vital part of the nation's long-range space plans. He said nuclear rockets will be essential in logistic supply to support extensive manned operations on the moon and to carry out manned missions to the planets.

He said several new and promising materials are in early stages of investigation and development at LASL. These include composites of metal carbides and graphite and solid solutions of metal carbides with uranium carbides. These materials are the highest melting-point materials known.

Seaborg predicted that study at Los Alamos can be expected to turn increasingly to astrophysical and geophysical problems and the earth sciences. Such research will be tied to earthquake prediction, meteorology and air pollution.

LASL, he concluded, "can celebrate the past with pride and look to the future with hope. You have earned the right to do both."

After the ceremony, Sen. Anderson, chairman of the Joint Committee on Atomic Energy, talks with Dr. Seaborg in a corridor of the LASL administration building

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THE NEW MEXICAN, Santa Fe, N.M., Friday, February 16, 1968

Snow moved the groundbreaking for the Los Alamos Meson Physics Facility indoors but gold-plated shovels wielded by U.S. Sen. Clinton P. Anderson, left, Dr. Glenn Seaborg and Dr. Louis Rosen made the start official

The New Mexican (continued) 2/16/68

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BALTIMORE SUN FEBRUARY 27, 1968

Balt Sun 2-27-68

U.S., Japan Sign Uranium, Plutonium Pact

AP Wirephoto

Takeso Shimoda, Japanese Ambassador, and Dean Rusk, United States Secretary of State, sign atomic energy pact

Washington, Feb. 26 (AP)—The United States and Japan signed 30-year agreement today under which the United States will provide enriched uranium and plutonium to Japan for nuclear power reactors and research facilities. Under the agreement 355,000 pounds of enriched uranium 235 will be supplied to fuel 13 large power reactors to be built in Japan.

The agreement also authorizes the United States Atomic Energy Commission to transfer up to 805 pounds of plutonium for use in Japanese research and development programs.

Dean Rusk, Secretary of State, noted that Japan is one of the most advanced countries in the field of nuclear physics for peaceful uses. He said the fact that this was the largest amount of enriched uranium to be supplied to any country was an indication of Japan's growth and technical capacity.

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CHICAGO AMERICAN MARCH 5, 1968

Working Girl's Notebook

Women Find Niche in Science World

By Marion Odmark

Chicago's American 3/5/68

"THERE ARE unbounded opportunities for women in science if they could only forget they're women," says Dr. Dora Hayes, research biochemist with the United States department of agriculture.

MARION ODMARK

"Women sometimes tend to trade on their femininity. They ask to have things done for them, things that they ought to do themselves. If you want to be treated as a man's professional equal, obviously that's not the way to go about it," adds the 36-year-old scientist from Kindred, N. Dak., now working on a new way to eradicate agricultural pest insects.

ONE IN 12 scientists now in the United States is a woman. But Dr. Hayes cautions, "There's a lot of drudgery in science." It's not lolling about a lab. It's hard work. In fact, all success stories simmer down to just one factor—hard work.

The link between science and hard work is also emphasized by Dr. Glenn T. Seaborg, chairman of the United States atomic energy commission. Environment is not enough. "Not even the most wonderful environment will produce a scientists from a man or woman who is fundamentally allergic to hard work." But there are compensations, he states:

"Hard work can be the most exciting kind of experience if it absorbs your interests so completely that you almost forget when mealtime comes. Or it can be boring and distasteful if the chore is one which you would never have undertaken voluntarily. The need for hard work as a basis for achievement is no less now than it ever was—and only the rarest genius will reach the highest goals in science without expending his utmost effort."

AS IN ALL other professions, there are wide differences in individual scientists' approaches to their jobs. Some women are creative, imaginative and adventurous. To them, science can be a voyage of discovery. Others simply hold jobs. But all of them find there is no short cut, no easy way up, no getting around hard work.

Berkeley Gazette 3/25/68

Key Rad Lab Figure Here—

AEC's Citation to Dr. Donald Cooksey

Dr. Glenn T. Seaborg, Chairman of the Atomic Energy Commission, has announced that Dr. Donald Cooksey, formerly associate director of Lawrence Radiation Laboratory here, has been named to receive the Atomic Energy Commission Citation.

Dr. Cooksey was a key member of the laboratory staff for 23 years, 16 as associate director, before his retirement in 1959. During most of these years he served as principal assistant to the late Dr. Ernest O. Lawrence, who founded the Radiation Laboratory at the University of California and for whom the laboratory was named.

The Atomic Energy Commission Citation is presented to private individuals and employees of AEC contractors who have made especially meritorious contributions to or have been clearly outstanding in the nuclear energy program. Individuals in other Federal agencies or departments, including the military forces, and in industrial, educational and research institutions are also eligible to receive the award.

Commissioner James T. Ramey will present the Citation, accompanied by a medallion, to Dr. Cooksey on May 20 at the University of California-Berkeley.

A NATIVE of Irvington-on-Hudson, New York, Dr. Cooksey received both his undergraduate and graduate training at Yale University, where he took his Ph.D. in physics in 1932. While a research fellow at Yale he became a close friend of Ernest O. Lawrence, then a young physics professor on the New Haven campus. After Lawrence went to the University of California in 1928, the two men maintained contact and Dr. Cooksey frequently spent his summers at Lawrence's laboratory.

For three years after completing his graduate work Dr. Cooksey remained at Yale as curator of precision instruments at the Sloan Physics Laboratory and as a consultant in apparatus design. During this period he published scientific papers on the fine structure of X-rays and the use of Geiger-Muller tubes.

With a growing interest in Lawrence's rapid development of the cyclotron as a research instrument, Dr. Cooksey left Yale to join Lawrence at Berkeley in 1936. With his expert knowledge of scientific instruments, Dr. Cooksey quickly became a valuable member of Lawrence's cyclotron team.

WHEN LAWRENCE established the Radiation Laboratory in 1936, he asked Dr. Cooksey to take the position of assistant director. Realizing the great potential of Lawrence's work, Dr. Cooksey was willing to sacrifice his own career as a research scientist in order to give his maximum support to the new laboratory. As a central figure in the development of the 37-inch cyclotron at Berkeley, Dr. Cooksey was instrumental in establishing entirely new levels of performance for such machines.

DR. DONALD COOKSEY

... Receives AEC Citation ...

In the years before World War II, Dr. Cooksey shouldered responsibility for the technical administration of an expanding research institution, which was already establishing the pattern of the modern, large, interdisciplinary laboratory.

THE COMING of World War II brought a new chapter in the history of the Radiation Laboratory and in Dr. Cooksey's career. Setting aside plans for constructing the giant 184-inch cyclotron at Berkeley, Professor Lawrence embarked on an emergency effort to develop the electromagnetic process for the production of uranium 235 for atomic weapons.

As associate director of the laboratory, Dr. Cooksey became Lawrence's chief deputy in directing the many aspects of the wartime project at Berkeley, Pittsburgh, and Oak Ridge.

AFTER THE war, Dr. Cooksey had a major role in building at Berkeley a new type of research institution spanning a wide range of scientific disciplines. The standards of excellence which he established helped to determine the character of both the Berkeley and the new Livermore laboratories. After assisting in the transition of leadership in the laboratory following the untimely death of Professor Lawrence in 1958 and the assumption of the directorship by Dr. Edwin M. McMillan, Dr. Cooksey retired in 1959.

Dr. Cooksey served with the Ordnance Department, U.S. Army, during World War I. He is a member of the American Association for the Advancement of Science and a fellow of the Physical Society. He married the former Milicent Sperry in 1942, and they have two children. Dr. and Mrs. Cooksey live at 585 Santa Rosa Ave. here.

SAN FRANCISCO EXAMINER, April 1, 1968

$35 Million a Year, Isotope Electricity Research

The Atomic Energy Commission is spending about $35 million a year developing several methods of converting trans-uranium radioactive isotypes into electricity, AEC Chairman Glenn T. Seaborg said here today.

So far the applications for this research are limited and unusual, Dr. Seaborg conceded, but new capacity to produce isotopes in relatively large quantities gives the development future significance.

ELEMENTS

Dr. Seaborg addressed a special symposium of the American Chemical Society here on the "actinides" — the 14 elements beginning with thorium (No. 90) and extending through lawrencium (No. 103).

The actinides include all of the trans-uranium man-made elements: neptunium, plutonium, americium, curium, berkelium, californium, einsteinium, fermium, endelevium, nobelium and lawrencium.

Most of these were first produced at the University of California at Berkeley during and after World War II, at the height of Berkeley's dominance of accelerator technology. Dr. Seaborg himself participated in the discovery and study of several of them.

He recalled today that at the onset of the actinide age, these isotopes, previously unknown to man, were produced "an atom at a time".

BY THE TONS

Chemical studies were done with tiny amounts, so small that they required devising new methods of micro-chemistry.

But that changed rapidly, Dr. Seaborg said. Today nuclear reactors across the nation are producing plutonium "by the ton"; curium can be produced by the hundreds of pounds.

Americium, berkelium and californium can now be produced in the hundreds of grams, Dr. Seaborg reported.

On the same program with Dr. Seaborg, an international team of physicists, chemists, and engineers working at Berkeley's Radiation Laboratory, reported the production of "large" quantities of nobelium (102) and lawrencium (103).

"Large," in this context, means about 10,000 atoms. Nobelium, for example, has a half-life of three minutes — meaning that in three minutes half of it has decayed into an isotope lower on the scale. The half-life of lawrencium is 35 seconds.

FAST LOOK

It is not only difficult to produce these isotopes; they must then be studied at what Dr. Seaborg, in his speech today, called "incredible speed."

The "large" scale production of these isotopes was performed by Jaromi Mraly of the Institute of Nuclaer Research, Prague; Torbjorn Sikkeland, Robert Silva, Albert Chorso and Matti Nurmia, Dr. Maly has returned home but the other scientists are still working at the Rad Lab.

What are the actinides good for? Dr. Seaborg discussed two uses: As sources of heat and as sources of electrical power.

They produce very large amounts of heat in proportion to their mass: A gram of plutonium, for example, will produce as much heat as 3800 grams of butane combining with 12,000 grams of oxygen.

SLOW BURN

There is a catch, of course: plutonium's 42,000 watt hours of heat is produced over a period of 10 years. Butane will produce its heat in seconds, minutes, or hours; depending on what is needed.

Nevertheless, the very small mass and utterly dependable rate of heat production of actinide isotopes makes them useful in some odd warming applications:

Warming electronics gear on the moon's dark side to efficient operating temperatures.

AUGUSTA HERALD
SECOND FRONT
Page 2-A Tuesday, April 16, 1968

Herald-Breault's Newsfoto, Mancriof

NUCLEAR COUNCIL OFFICIALS GREET DR. GLENN SEABORG (C)
With Him Are J. D. McNair of Aiken (L) and Sherman Drawdy

By SALLY RIOLS
Herald Staff Writer

Artificial hearts powered by nuclear energy, cardiac pacemakers kept going by isotopic batteries, and neutron therapy for cancer patients could result from research being done in a "very inventive and imaginative" program at the Savannah River Plant, according to the chairman of the U.S. Atomic Energy Commission.

Dr. Glenn T. Seaborg told of these possible medical breakthroughs while in Augusta Monday to address more than 300 people at a meeting of the South Carolina-Georgia Nuclear Council and the Joint Council of Engineering and Scientific Societies of the Central Savannah River Area at the Augusta Town House.

At a press conference earlier in the day, Seaborg said possibly within 10 years it will be possible for an artificial heart, made of synthetic material, powered by Plutonium-238, to completely replace a worn out human heart.

Research on the subject is currently being conducted at the SRP Laboratory in cooperation with the National Heart Institute.

Plutonium is a manmade element produced at the CSRA nuclear energy facility.

The AEC chairman who was awarded a Nobel Peace Prize for his work in discovering nine elements, said Californium-252 was "perhaps the most exciting of all."

He told newsmen that because it is highly concentrated source of neutrons, it can be valuable in the treatment of cancer patients.

Dr. Seaborg said 1-30 of a millionth of one ounce could be injected in a cancer patient to provide neutron theraphy.

The Savannah River Plant Laboratory is the center of activity in cancer research in cooperation with the Medical College of Georgia, according to the visiting scientist.

He said Californium could also be used to detect impurities in mineral explorations, as well as in analysis of art masterpieces.

"Requests for Californium come from all over the country," he said. "But we don't have enough to give. It's very hard to make."

Asked of the possibility of a Cente of Advanced Studies being established at the SRP Laboratory, Seaborg said a great deal of interest has been shown locally in such a facility.

One "should prove useful to the colleges and universities in the area for their advanced students and faculty members," he said.

He spoke of two-way benefits, with the laboratory profiting from an "infusion of new ideas from students" and the students from the availability of advanced equipment at the plant.

A spokesman for SRP said the medical colleges and state universities in South Carolina and in Georgia, as well as Georgia Tech and Clemson are considering cooperative establishment of such a center.

Savannah River Plant News 4-19-68

AEC Chairman Seaborg, speaking to 1,600 students from several schools at Aiken High gym, relates humorous incidents in discovery of new elements in the 1940s.

Seaborg Sees Promising Future in Californium

Californium-252 is "perhaps the most exciting of all" of the promising man-made radioisotopes, and prospects for large-scale production in the future "are best at the Savannah River Plant," Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission, said in Augusta Monday night.

The AEC chairman, co-discoverer of nine transuranium elements and holder of more than 50 patents, addressed a gathering of more than 400 persons. The meeting was sponsored jointly by the South Carolina-Georgia Nuclear Council and the CSRA Joint Council of Engineering and Scientific Societies.

Setting a busy pace, Dr. Seaborg spoke to about 1,600 students at Aiken High School Monday morning, giving them a whimsical, inside account of the pioneering discovery of new elements. He also visited the Savannah River Plant and, in the afternoon, conducted a press conference.

Answering a question, the noted scientist said SRP might meet a growing demand for radioisotopes by operating a reactor at a high flux level or later by converting a reactor to the resonance process.

His Augusta talk afforded listeners a roundup of many potential uses of the atom -- some already realized and others envisioned for the distant future.

"We may see economic nuclear power used to generate electricity, desalt sea water and produce large amounts of fertilizer, all in one location," he declared. Serious studies are already underway, he added, on the possible development of "agro-industrial centers — nuclear powered complexes that would be combined with highly scientific farms known as 'food factories' using specially developed crops and located in coastal desert areas.

"The extensive studies on t subject, soon to be released, v show that if man and nature (cooperate in this fashion, fc production might be increased the extent that we could feed ma more millions of people an ac quate diet."

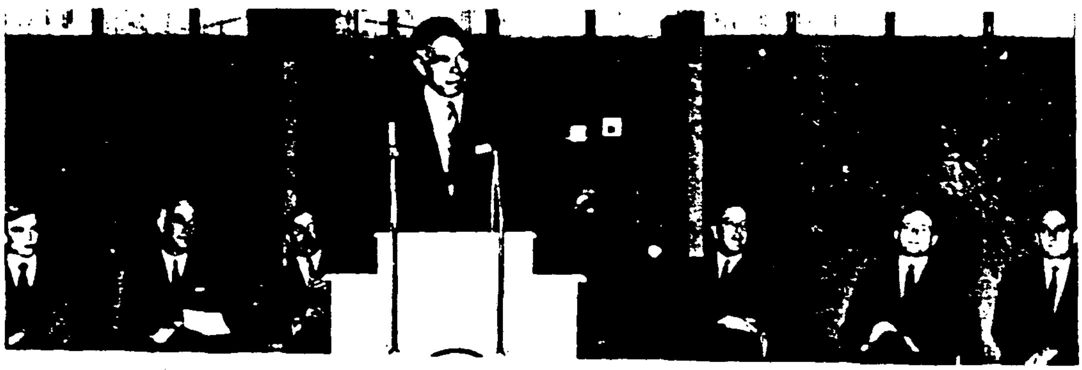
Dr. Seaborg noted "a great d of interest" in the establishm of an educational center at S to enable colleges and unive sities to make use of the pl and laboratory facilities. Su an arrangement, he said, wou be "mutually beneficial."

He declared that SRL is developing a number of diversified peacetime products which could insure the plant's stability in years to come.

Citing the more than 30 radioisotopes useful in medicine, Dr. Seaborg described how plutonium - 238 may some day power a cardiac pacemaker or even a complete artificial heart.

Savannah River Plant News, April 19, 1968 (Continued)

Dr. Seaborg talks with prospective scientists Corwin Robison; Ricky Sand, son of Merv Sand, SRL; David Jennings, son of A. S. Jennings, SRL; and Ronnie Patterson, son of James D. Patterson, Reactor. At right, he is shown with AHS Student Council President Steve Pekkala, son of Ralph Pekkala, Reactor, who presided at the meeting.



Platform dignitaries include C. Tom Marsh, AEC, chairman of Aiken County Board of Education; Nathaniel Stetson, SROO manager; Dr. Seaborg, shown speaking; Julius Rubin, staff assistant to Dr. Seaborg; R. L. Folger, SRL, member of the county board; and AHS Principal J. O. Willis.

Fantastic World Of Peaceful Atom Outlined Here By US AEC Chief

US AEC Chairman

Glenn T. Seaborg, chairman of the United States Atomic Energy Commission, talks to a reporter during his visit to Mexico. Seaborg delivered a major speech here entitled "The Variety of Nuclear Applications."

Dr. Glenn T. Seaborg, chairman of the United States Atomic Energy commission, Wednesday night described a world of the near future —where peaceful atoms perform seemingly fantastic tasks.

Speaking here at the Second International Conference of Radiochemistry, Seaborg documented his nuclear predictions with hard, scientific facts.

He reported first on the aspect of nuclear energy that directly affects the greatest number of people —as a power source for the generation of electricity.

Then he stated a few of the "over a thousand industrial uses" of the peaceful atom —ranging from the measurement of mountain snow to the eradication of insects.

"What has accounted for the remarkable surge of nuclear power, and why are we so optimistic about its future?" he asked. "Simply stated, the reason is that after some twenty-odd years of research and development we have reached the stage where the nuclear reactor can show some decided advantages..."

Huge nuclear plants in the multi-million kilowatt range "may have a dramatic effect upon many aspects of economic and social life," he said.

He spoke of present and future diverse utilizations of peaceful atoms: obtaining fresh water from the sea, probing for oil with underground explosions, treating cancer and Parkinson's disease, powering artificial human body organs, scanning the brain with isotopes, killing weeds and insects, improving livestock, preserving food, and tracing fish.

In industry, he said, radioisotopes can measure the thickness of steel, the level of liquid in canned food, the thickness of an auto tire... and the amount of glue on postage stamps.

Radiation can make wood harder, improve wool and cotton.

He reported on atoms in space and underwater. For seven years a navigational satellite, powered by decaying radioisotopes, has circled the earth.

After three years —more than 15,000 feet below the Atlantic Ocean— an atom-powered acoustic beacon is still operating.

"I have given you only a few samples of the vast range of applications of the peaceful atom," Dr. Seaborg said. "These peaceful applications are proliferating rapidly.

"This is the kind of 'nuclear proliferation' we all approve of —the kind that will lead eventually to a better life for all mankind."

Seaborg Lauds Mexico For Nuclear Research

The Treaty of Tlatelolco — creating a Latin American nuclear free zone and signed in Mexico by Vice-President Hubert H. Humphrey — was cited as "precedent-setting" Wednesday night by the chairman of the U.S. Atomic Energy Commission.

Further, Dr. Glenn T. Seaborg, acknowledged: "Mexico's contribution to the International Atomic Energy Agency (headquartered in Vienna), is today one of the most important of Latin America.

"Mexican scientists and engineers are making major contributions in basic nuclear physics research, in radiobiology, in radiation chemistry, in solid state science, and, as I had the opportunity to observe, in the important field of radiochemistry.

"The Mexican program in nuclear science will be even further expended when the new Nuclear Energy Center at Salazar is completed (Reported in THE NEWS April 12). Director of the Salazar Center is Dr. Carlos Graef Fernández, who, along with other top Mexican scientists, was on Wednesday night's program.

The Mexican nuclear program is being carried out at the National University of Mexico and at other institutions including the National Polytechnic Institute, the University of Sonora, the University of Guadalajara and the Monterrey Technological Institute, which are all doing important work, the AEC chairman said.

"My country values greatly the long and effective cooperation which we have had with Mexico in the area of peaceful applications of nuclear energy," he told the scientists.

Berkeley Daily Gazette, May 21, 1968

Lawrence Hall Dedicated at Campus

Dr. Seaborg Gives Award

By FRED GARDNER
Gazette Staff Writer

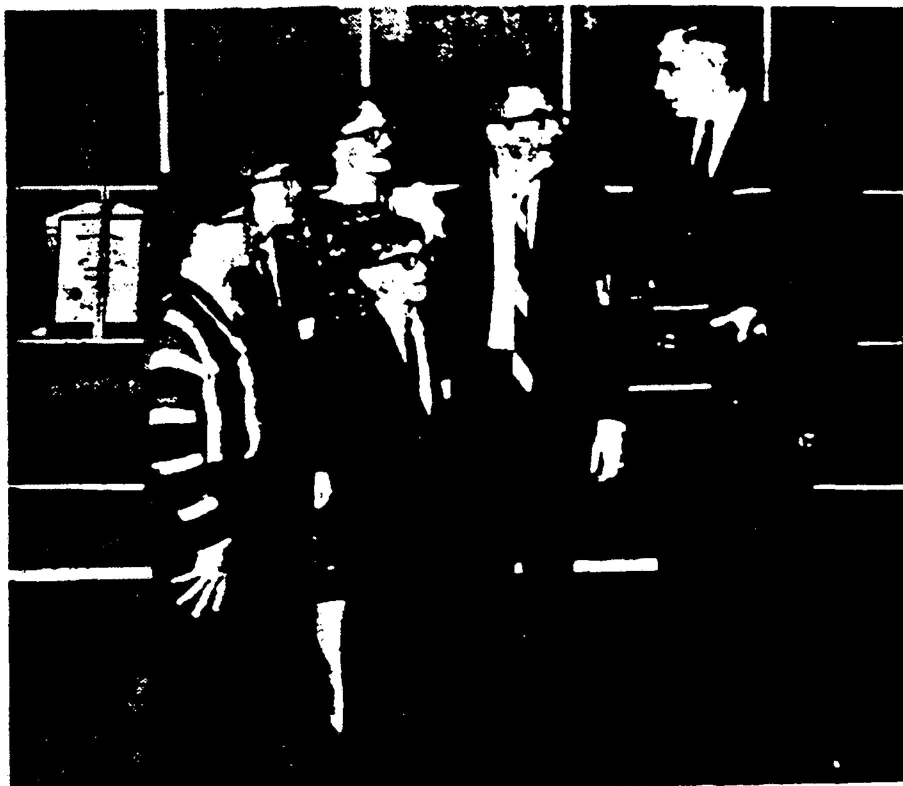
The Lawrence Hall of Science, one of the most advanced teaching facilities in the nation, was dedicated yesterday as part of the University of California's Centennial observance.

Named in honor of Ernest O. Lawrence, creator of the cyclotron, the facility houses numerous scientific exhibits and demonstration devices, as well as the ultimate in facilities for training science teachers.

Many of the participants in yesterday's ceremony were friends, scientific colleagues or relatives of the late Dr. Lawrence, the first Californian to win the Nobel Prize.

SPEAKERS RECALLED his achievements on the Berkeley campus and his worldwide scientific leadership, which were cut short by his death in 1958. There was also recognition of the achievements of today's scientists, who continue Lawrence's work, and of the high hopes for the Hall of Science in its goal of bringing scientific inspiration and better science understanding to future generations.

Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission and former Berkeley chancellor, said, "The hall, as was Lawrence, is centrally concerned with the young, with science, and with the future.



HONORED—Atomic Energy Commission Chairman Dr. Glen Seaborg displays to Dr. James R. Arnold the citation presented to Arnold yesterday as a winner of the AEC Lawrence Award at yesterday's Lawrence Hall of Science dedication ceremonies. From the left are Theodore, Robert Cabot, Mrs. and James R. Arnold and AEC Chairman Seaborg.
—Gazette photo by Dick Dubois

"The Lawrence Hall of Science will influence future adventurers on the frontiers of knowledge and help us all to profit from and adapt to the harvest of practical benefits inevitably following the expansion of knowledge.'

A feature of yesterday's ceremony was the presentation of the annual Lawrence Memorial awards of the AEC to five young scientists "for especially meritorious contributions to the development, use, or control of atomic energy." The awards were presented to Dr. James R. Arnold, chemistry professor at UC San D'iego; Dr. Richard Cohen, associate director of the North American Rockwell Science Center; Dr. Val L. Fitch, on the Princeton University faculty; Dr. Richard Latter, Rand Corp. physicist and Dr. John B. Storer, deputy director of the AEC's biology and medicine division.

AN AEC citation was also presented to Dr. Donald Cooksey, longtime principal assistant to the late Dr. Lawrence and retired associate director of the Lawrence Radiation Laboratory here.

A plaque was also presented to Dr. Harvey White, who has guided the planning of the Hall of Science. Presented by Dr. Seaborg, the plaque reads "Presented to the Lawrence Hall of Science by the United States Atomic Energy Commission on the occasion of the dedication of the Lawrence Hall of Science an dthe ninth E. O. Lawrence Award Ceremony, May 20, 1968."

In addition, UC Centennial Citations were presented to UC Regent Edwin W. Pauley of Los Angeles, Director Edwin M. McMillan of the UC Lawrence Radiation Laboratory and Dr. Seaborg, all of them instrumental in founding and supporting the Lawrence Hall of Science.

Staff Photo

GIFT BEARER—Dr. Glenn T. Seaborg, on the speakers' platform at the Ernest Lawrence Jr. High School, Chatsworth, Wednesday presented the new school with a model of a cyclotron and a plaque. The AEC chairman told of electrical energy from nuclear sources.

Dr. Seaborg Visits Valley

By PAT BRYANT
West Valley Bureau

CHATSWORTH — The tall man with the friendly smile was making up new words.

"If you young people grow up and become nuclear scientists, then you can invent a new element and call it 'Chatsworthium,' " he said.

Dr. Glenn T. Seaborg, chairman of the U.S. Atomic Energy Commission, addressed the Ernest Lawrence Junior High School student body Wednesday.

He explained that Dr. Lawrence's great invention, the cyclotron, made possible 10 new chemical elements. The new chemicals were given such strange-sounding names as "Lawrenceium" and "Berkeleyium" and "Universityium."

During his visit Dr. Seaborg also presented the new school at 10100 Variel Ave. with a model of Dr. Lawrence's cyclotron and a plaque with a Lawrence medal.

Student body president Love Collins, 13, a Valley Times' carrier, accepted the gifts from Dr. Seaborg for the school.

The AEC chairman told the group here that more than 100 nuclear power reactors are now in production in the United States as a new source of electrical energy.

He predicted that eventually almost all electricity will be produced through nuclear sources, but said it will take a long time.

Richard Valentine, principal of the new school, introduced Dr. Seaborg.

'The Process ... Wasn't Decided Upon Until The Plant Was Well Along'

TRI-CITY HERALD, June 9, 1968

How can a bomb be made out of something that's never been seen or even made in weighable amounts?

And, particularly, how can it be made when no one knows how to separate the precious plutonium from a batch of other radioactive materials?

This perplexing challenge of turning out the vital metal on a production scale at Hanford not only was met but the accomplishment exceeded expectations.

The remarkable feat took place in the early 1940's in a "flying - by - the - seat - of - the - pants" research, design and development operation.

ANNIVERSARY

Dr. Glenn T. Seaborg, Atomic Energy Commission chairman, recalled in ceremonies Friday marking the 25th anniversary of Hanford, in February, 1942, leaders in the top-secret project decided that chemists might be needed to devise a means of separating plutonium from the other materials that had been irradiated in a reactor.

At that point in time, he said, he (a co-discoverer of plutonium) and two other scientists were the only persons in the world who had worked with the plutonium. And the amount they had produced could only be measured by sensitive instruments.

He said that he was contacted in early 1942 by nuclear-project leaders and asked if he thought the critical metal could be separated from the other materials by a chemical process yet to be devised.

Dr. Seaborg replied yes, estimated that a means could be developed for a 50-per-cent-recovery rate and he headed back to the University of California to work on the process with fellow scientists.

He returned to the University of Chicago on April 4, 1942 — his 30th birthday— and an extensive research program was launched to find a way to isolate plutonium.

He was told to develop the process with no more than 20 scientists, and preferably less. When he explained that besides separating the plutonium, it would also have to be purified, "the ceiling was lifted" and more personnel approved.

After studying various processes, it was finally decided to use bismuth - phosphate - precipitation process. Seaborg felt another process being considered might be better but experience with bismuth phosphate and the urgency of the program dictated the decision that was made June 1, 1943.

PROBLEM

Seaborg, emphasizing the complexity of the problem, noted that scientists were looking toward determining a means of going from a slight, trace amount of the metal to a production-scale operation.

Dr. O. H. Greager, now manager of General Electric Company's nuclear-energy planning operation, told of setting up a pilot plant at Clinton Laboratories at Oak Ridge 1-25 the size of the T Plant planned for construction at Hanford.

This mock-up was 10,000 times larger than the previous test-tube procedure and still a far cry from the actual plant, constructed between October 1943 and October 1944.

Greager said that by mid-1944 Seaborg's estimate of 50 per cent had been realized and the figure continued to improve with research.

Greager said that as fast as plutonium was being produced through use of a cyclotron bombarding uranium with neutrons (not a reactor), the material was shipped to Los Alamos.

Finally, however, Clinton Laboratories was able to talk officials out of 10 grams of the scarce material and were admonished "not to lose it. And we didn't," although it was considerably "watered down" during the research.

Dr. Lombard Squires, active in T Plant design and startup, wryly observed that his people weren't always involved in the decision-making process. "The process to be used wasn't decided upon until the plant was well along in construction."

As a result, the plant design had to have great flexibility and it had to be designed for remote maintenance — that is, techniques had to be developed for handling the radioactive materials through remote methods.

This led to development of a wrench that could be operated from a heavily shielded overhead crane. It also meant the development of precision separations equipment, with precise fits and alignments, that could be handled by an operator manipulating the equipment while looking through a periscope in the crane's cab.

Finally, he said, it was necessary for safety's sake to come up with the necessary thickness for walls and cell covers to provide adequate protection from the extremely radioactive material to be handled.

He pointed out that the plant "took just a year to construct. That gives you an idea how time scales were compressed in time of war. Ten years later, the same type plant took 2½ years to complete as a commercial undertaking."

But Squires was proud of the work of his people, noting that the yield from the first run was 90 per cent — far above Dr. Seaborg's early estimates — and this figure rose to 95-97 per cent as the process was perfected.

The first shipment of plutonium from the separations plant came in February, 1945, about five months after the completion of construction.

Dr. George Watt, professor of chemistry at the University of Texas, was responsible for concentrating and purifying the plutonium.

"The specifications had been approved by everyone — except those of us who had to run the process," he grinned.

'BATCH'

He said the first container he received fell far short of expectations "but the second batch went quite well."

Dr. Seaborg said that right to the very end there were several reputable theoricians who said the process wouldn't work and wouldn't produce the plutonium concentration estimated.

So he decided, in addition to work being done at Oak Ridge, to have a micro chemist check out the process.

The first report came back that it wouldn't carry the concentration required and Dr. Seaborg said that "to me, it was inconceivable that it couldn't be done."

He told the chemist's boss to check it out himself — and after a series of additional experiments, each showing improvement, the feasibility of the process was confirmed from this second research program.

Pointing to the highly technical, complex work of the micro chemists, he noted that their work was conducted in the laboratory on one-billionth the scale of the plant that was built.

Dr. Seaborg praised the work of Du Pont at Hanford. "In my opinion, Du Pont's job of scaling up to successful implementation on a production scale is one of the most marvelous feats in the history of industrial chemistry."

TRIBUTE

Dr. Seaborg also paid tribute to a number of Hanford employes who played roles in the early days of nuclear development that led to an early peace in World War II and the advent of the bright new age that has dawned for the peaceful use of nuclear energy.

OAK RIDGER July 1, 1968

Two-Year Seaborg Bonus

That Glenn T. Seaborg has agreed to continue as chairman of the U.S. Atomic Energy Commission for at least the next two years comes as a pleasant surprise.

There has been much speculation that he would not accept re-appointment at all — having served now as AEC chief since 1961 — one of the initial appointments of the late President John Kennedy and one of the few such appointees still in office.

It has been said by those close to Seaborg that he has a yen to return to education and research. Surely the line of universities and research installations that would welcome him to their staffs is long. In agreeing to remain on at the AEC, he has certainly resisted many tempting offers.

Seaborg has many things other than longevity going for him in his AEC post. He is without question the most effective chairman the AEC has had since its origin in 1947. While the times and circumstances have been somewhat on his side, he has, nevertheless, kept the nuclear program moving boldly forward with very little controversy — and none of the acrimonious dealings with Congress that marked some of the earlier years of the AEC.

Seaborg has been a very special friend of Oak Ridge. His interest in the transuranium facilities that have been developed here during his term of office is natural enough, he being the primary discoverer of these elements that do not exist in nature.

But more recently he has come to be a champion of some of the basic philosophies of research that have originated here at Oak Ridge. He has been especially an ardent advocate of the idea of "Agro Industrial Complexes" giant multi - purpose nuclear plants — being built in the world's underdeveloped areas.

The occasion of his appointment to a term of two more years brought indirect high praise from President Johnson, who is known to place Seaborg at the very top of his list.

Seaborg's career now encompasses a most impressive variety of experiences. From scientist and researcher to chancellor of the University of California to government agency chief — and all posts held with distinction.

There has been some talk of the eventual creation of a cabinet level position of "Secretary of Science." He would be in charge of a new overall federal science agency embracing not only the nuclear program, but many other federally - sponsored scientific efforts. Should this ever be done, there would be no better qualified man than Seaborg.

In fact, there is no national post for which Seaborg is not qualified.

Several years ago The New York Times speculated on the day when the nation might have a scientist for a president. And if it did, The Times said, Seaborg would be one of the most likely candidates. Everything that has occurred since The Times published this only tends to confirm the idea.

The news that Seaborg will stay — for two years at least — in the AEC chairmanship is exceedingly good news for the whole nuclear program, Oak Ridge very much included.

Albuquerque Journal 9/1/68

PAY DIRT: Dr. Glenn T. Seaborg, center, chairman of the U.S. Atomic Energy Commission, examines ore in a newly opened ore body of Kerr-McGee's Sec. 33 uranium mine in Ambrosia Lake. At left is Stanley Schneider of Washington, assistant to Dr. Seaborg, and at right is Jack Robinson of Oklahoma City, manager of Kerr-McGee's uranium mining and milling operations. Dr. Seaborg's tour of uranium mining and milling facilities in the Grants area was his first close-range exposure to raw materials resources in the nuclear field. (Journal photo by Ray Cary)

/isits Grants Uranium Area

Atom Use Just Begun, AEC Chairman Says

By W. WILSON CLIFF
Of the Journal Staff

GRANTS — The world has only begun to utilize a vast store of potential energy that will support a population considerably larger than that now inhabiting the earth, the chairman of the U.S. Atomic Energy Commission said here Saturday evening.

Dr. Glenn T. Seaborg, AEC chairman, was principal speaker at a uranium appreciation dinner and reception here. Earlier in the day he inspected uranium mines and milling facilities in the nearby Laguna and Ambrosia Lake areas.

His address at a $10-a-plate dinner was heard by 510 diners.

"THE ALMOST unbounded limits for applying nuclear energy here on earth" for the collective benefit of mankind are "limits set only by man's capacity for wisdom, imagination, hard work and good will," said Dr. Seaborg. These limits parallel, in a sense, "the vast reaches of space and the opportunities for making exciting discoveries out there."

Looking to the future, he expressed a personal belief th "nuclear power will help enab us to develop a manned color on the moon" where nucle: reactors will provide the bas power for communication transportation, light, heat ar cooling.

He even envisioned a "Lun: Hilton (hotel) from whic tourists in a dome-covere cocktail lounge can have spectacular view of the eart Naturally, such a hotel wou be sustained by energ generated from uranium."

DR. SEABORG also e visioned a "nuclear agr industrial center" in the futu whereby low-cost nuclear pow would deliver fresh water a rich fertilizers from the sea desert areas to support vast agricultural "food factories."

He pictured a day of nuclear powered industrial complexes or "Nuplexes," which would apply revolutionary new technologies in a clean and quiet manner. He reviewed research already achieved in the field of peaceful nuclear explosives.

"The potential significance of uranium," Dr. Seaborg said, "is that it could play a much broader role in shaping the technological basis of a civilization than does any other single material . . . for uranium is a force that could direct and shape man's relationship to many different materials through the creation of new materials for use in a radically different economic and technological framework."

DR. SEABORG paid special tribute to New Mexico, as the birthplace of modern nuclear technology, the proving ground for atomic explosives and the nation's leading source of nuclear fuels.

Referring to the first nuclear blast at Trinity Site, 70 miles southeast of Albuquerque, in July, 1945, he said, "The light from the fireball rising through the oncoming morning of the New Mexico desert radiated the dawn of a new imperative in relations among men and nations."

As of July, 1968, he said the AEC had purchased 160,000 tons of uranium concentrate for $2.8 billion. More than $1 billion of the total has gone for "yellowcake" produced in New Mexico, and almost all of the state's total has come from the Grants district.

LAST YEAR, he reported, 56 per cent of the uranium produced in the United States came from New Mexico, and its value amounted to $75 million.

Last year, he added, 2.5 million feet — almost 500 miles — of exploratory drilling was carried out in New Mexico. This was almost one-fourth of total 1967 drilling for uranium in the entire United States.

With the tremendous expansion in the civilian applications of nuclear energy that has come during recent years, New Mexico's prominence has continued to grow," he declared.

IN AN EARLIER interview, Dr. Seaborg said no discoveries or developments in uranium-bearing fields elsewhere in the nation have, as yet, modified the Grants district's preeminence as the location of 60 per cent of the nation's known uranium reserves.

At the uranium mining tribute banquet Saturday evening, the Grants and West Valencia County Chamber of Commerce presented a special recognition to U.S. Sen. Clinton P. Anderson, D-N.M., member and for many years chairman of the Joint Congressional Committee on Atomic Energy, for his efforts on behalf of the development of atomic energy.

The chamber also awarded plaques of appreciation to the 12 companies which have developed the Grants area's uranium resources since the initial discovery in July, 1950.

THE companies so honored are the Anaconda Co., the Atchison, Topeka and Santa Fe Railway Co., Bailey & Fife, E. P. Moe Mining Co., Faris Mines, Four Corners Exploration Co., Homestake-Sapin Partners, Kerr-McGee Corp., KSN Co., Mokie Oil & Rare Metals Co., United Nuclear Corp. and U.S. Gypsum Co.

High executives of many of the companies honored were among the banquet guests.

Dr. Seaborg's tour of uranium mines and milling facilities earlier in the day was his first close-up exposure to the raw materials in the nuclear energy field.

HE WAS accompanied on the tour by Stanley Schneider of Washington, one of his assistants; Allen E. Jones, manager of the AEC's Grand Junction, Colo., office, and Jim Peed of the transportation branch of the AEC's Albuquerque operations.

The group breakfasted in Albuquerque's Alvarado Hotel with Gen. H. C. Donnelly, new manager of the AEC's Albuquerque operations, before commencing the tour.

The tour group was conducted on an inspection of Anaconda's open pit uranium mining operations at the Jackpile site, north of Laguna, by Ray Holmquist of the Grants AEC office; Albert Fitch, manager of Anaconda's operations here, and John Herndon, mining superintendent.

GUIDING THE tour group through Kerr-McGee Corp.'s underground Sec. 33 mine in the Ambrosia Lake area, northwest of Grants, were F. C. Love of Oklahoma City, Kerr-McGee president; Jack Robinson, also of Oklahoma City, manager of uranium mining and milling operations for Kerr-McGee; Bill Stevens, manager of the company's Grants operations; Paul Stucker, assistant manager, and James Meisner, superintendent of the Sec. 33 mine.

Dr. Seaborg and his group were guided on a tour of the Homestake-Sapin Partners uranium mill near Ambrosia Lake by John Gustofson of San Francisco, president of Homestake Mining Co.; Langan W. Swent, formerly of Grants but now of San Francisco, Homestake vice president Milton H. Ward, genera managers of Homestake-Sapi Partners, and Jack Q. Jone: metallurgical superintendent fc Homestake Sapin.

The Anaconda Recreation Center in Grants, scene of the banquet, was decorated wit paintings by Grants area artis — at least half of them de picting uranium mining (milling facilities or operation The banquet was catered by the Hilton Hotel of Albuquerque.

Dr. Seaborg Gets Science Award

Atomic Enery Commission chairman Dr. Glenn T. Seaborg, 56, is the 1968 winner of the Arches of Science Award, given annually by the Pacific Science Center of Seattle.

Announcement of his selection was made Tuesday in Washington, D.C.

The $25,000 cash gift and a gold medal wil pre presented in ceremonies in Seattle on Oct. 16.

A Nobel prize winner and the co-discoverer of plutonium, Dr. Seaborg was lauded for his activities in "a second career in the public aspects of science."

JURY

Members of the 12-man jury selecting Dr. Seaborg included Dr. Joseph L. McCarthy, dean of the graduate school at the University of Washington; Edward C. Wells, senior vice president of the Boeing Co.; William K. Reed, chairman of Simpson Timber Co. in seattle, and the Very Reverend John A. Fitterer, S.J., President John Kennedy. sity.

Dr. Seaborg has been chairman of the Atomic Energy Commission since 1961 when he was appointed by

DR. GLENN SEABORG

Arches of Science winner

Presient John Kennedy.

Dr. Seaborg noted that matters of "health, environment, communications, transportation and education" are based on sciene.

He added:

"It is almost a personal and civic responsibility to keep up with the world of science and know enough about it to make intelligent decisions where science is involved in the affairs of our community and our nation."

PLEASED

Dr. Seaborg said he was particularly pleased to receive the award because it was for "an area about which I have always felt strongly — that is, the need for the general public to understand and be kept well informed about science."

This year's recipient is the fourth since the award was begun in 1965.

Previous winners were Dr. Warren Weaver, former vice president of the Alfred P. Sloan Foundation (1965); Dr. Rene Dubos, professor at Rockefeller Unversity (1966), and Dr. James B. Conant, president emeritus at Harvard (1967).

Seaborg received the 1951 Nobel Prize in chemistry and served with the Manhattan Project during the war.

He was one of the original trustees of the Pacific Science Center Foundation when it was created in 1962 and is still on that board.

Funds to support the Arches of science award are provided by Pacific Northwest business and industry.

Page 20 The Knoxville News-Sentinel Wednesday, October 9, 1968

Co-discoverer

Seaborg Activates N-Reactor on U-233

By GENE WELLS
News-Sentinel Correspondent

OAK RIDGE, Oct. 9—An unusual fluid-fuel nuclear reactor at Oak Ridge National Laboratory—the Molten Salt Reactor Experiment—is now the world's first reactor to operate on uranium-233 fuel.

In an historical event, Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission and a co-discoverer of uranium-233, brought the reactor to power Tuesday afternoon by turning on certain instruments in the reactor control room. AEC Commissioner Wilfrid Johnson, as well as local AEC and ORNL officials, were present when the reactor reached a power level of 100 thermal kilowatts. It will later reach full power of 8000 thermal kilowatts.

Also present was ORNL research chemist R. W. Stoughton who, along with Seaborg and University of California professor J. W. Gofman, first identified uranium-233 Feb. 2, 1942.

Dr. Seaborg came to Oak Ridge from Gatlinburg where he spoke earlier in the day at the 12th annual Conference on Analytical Chemistry.

Uranium-233 is a man-made form of uranium and is fissionable like naturally occurring uranium-235 which fueled the reactor when it was first operated over three years ago.

Uranium-233 could eventually be produced in quantity in future thermal "breeder" reactors based on the molten salt concept.

"We are on the threshhold of making tremendous advances in the amount of energy that could be obtained economically from nature," said Dr. Seaborg.

Dr. Alvin M. Weinberg, ORNL director, introduced Dr. Seaborg. Dr. Weinberg commended Beecher Briggs, a reactor expert. P. N. Haubenreich, Knoxville, also a molten salt expert, made introductory remarks.

—photo by Gene Wells

TURNS IT ON—AEC Chairman Dr. Glenn T. Seaborg at Oak Ridge turns a lever to start the world's first reactor to operate on Uranium-233 fuel.

Thursday, October 17, 1968 . . The Seattle Times 63

Possible Cancer Cure Faces Test

—Times staff photo by Ron DeRosa.

DR. GLENN T. SEABORG
With Arches of Science Gold Medal

By HILL WILLIAMS
Science Editor, The Times

A man-made material with promise in such varied fields as cancer treatment and gold mining will soon be released by the Atomic Energy Commission for testing purposes.

The announcement was made here yesterday by Dr. Glenn T. Seaborg, chairman of the A. E. C., who participated in the discovery of the element in the 1950s.

Seaborg was in Seattle to receive the fourth annual Arches of Science Award. But he broke his real news at a press conference before the award banquet.

The element is californium 252, discovered while Seaborg was a nuclear scientist at the University of California.

The significance of californium 252 is that it produces neutrons at a rate previously available only in huge devices such as nuclear reactors or particle accelerators.

BECAUSE THIS neutron source is easily portable, Seaborg calls it a "hip-pocket reactor."

Seaborg said that there are indications that some forms of cancer respond better to neutron radiation than to other forms of radioactivity more commonly used in hospitals.

"With californium 252, there will no longer be a need to wheel cancer patients into a massive machine for neutron bombardment," Seaborg said. "Instead, a tiny bit of the material can be implanted in the diseased tissue itself.

"There need be no radiation of other parts of the body as is necessary with neutron radiation now."

Tiny bitss of calinornium 252 can be taken into the field to give prospectors on-the-spot measurements of the amount of gold in "them thar hills." However, shielding necessary to protect the miners from the neutrons will make the device much bigger and heavier than would fit in the hip pocket.

Seaborg explained that samples of earth would be subjected to neutron bombardment by the californium 252. Some atoms of gold capture neutrons and become transformed into a radioactive form of gold.

THIS RADIOACTIVE form of gold has its own distinctive "fingerprint" which the prospector can measure to determine the amount of gold in the original sample.

The technique, known as neutron-activation analysis, is well known but has always been tied to the huge reactors and accelerators. Having a portable neutron source will be a major advance for industrial uses.

Californium 252 is fantastically expensive, but Seaborg is confident the price will come down rapidly with more production experience.

The A. E. C., by law, is the only producer and controls use of the element.

The price tag now is $1,000 for a millionth of a gram. Considering that it takes 31 grams to make an ounce, it's easy to see how californium 252 could shatter a budget.

But Seaborg, those life has been intertwined with the development of atomic energy, thinks the benefits will be well worth the price.

"We are fiding so many peaceful uses of nuclear energy," he said, "that I like to call it the proliferation of the benefits of nuclear energy."

BRIGHT PAST, FUTURE

Dr. Seaborg Tours Mound Lab

By JOE FENLEY, Daily News Business Editor

MIAMISBURG — Mound Laboratory's present and future are as bright as its past, according to Dr. Glenn T. Seaborg, chairman of the Atomic Energy commission. (AEC).

Mound Laboratory and Monsanto Research Corp. have ranked high among the leaders in developing nuclear energy for defense and civilian applications, according to Dr. Seaborg.

Seaborg

Dr. Seaborg is in Miamisburg today for ceremonies noting Monsanto Research Corp.'s 25 years of activity in the nuclear field and the 20th anniversary of the establishment of Mound Laboratory.

Monsanto Research operates Mound for the AEC.

The AEC chairman noted that the parent firm, the Monsanto Co., brought the nuclear age to Dayton 25 years ago by accepting the government's invitation to participate in the wartime atomic bomb projects.

IN 1948, WHEN the first building at Mound Laboratory was opened for occupancy, the laboratory complex became one of the AEC's first new facilities.

"In the generation that has followed this coming of the nuclear age to the Dayton-Miamisburg area, the atom has brought one war to an end and helped to maintain international peace and security," Dr. Seaborg stated in remarks prepared for delivery at a commerative luncheon.

IN THE MEDICAL field, Mound is carrying out research work on cardiac pacemaker and an artificial heart project. It is developing power sources.

"Mound Laboratory stands as a living and working institution for building a better future," said Dr. Seaborg.

"AT THE same time," Dr. Seaborg continued, "the non-military applications of nuclear energy have grown to the point where the atom has become a major force for scientific advancement and technological progress."

In his talk, Dr. Seaborg payed tribute to Dr. Charles A. Thomas, director and past president of Monsanto, who originally undertook Monsanto's nuclear energy work for the government, and Howard Nason, president of Monsanto Research Corp.

Dr. . . . Thomas was among the first leaders of industry to influence the course of our nation's nuclear energy policies, in both the wartime and peacetime developments," said Dr. Seaborg.

"DESPITE many problems, the Dayton project made a distinguished record," Dr. Seaborg continued. All commitments for the production of polonium were made, and all shipments were made on schedule."

Aside from defense activities, Mound Laboratory is conducting work on radioactive isotopes used in activities related to outer space, medical diagnosis and therapy, industrial quality control, agriculture food preservation, research, and the development of new products, Dr. Seaborg said.

Mound, according to Dr. Seaborg, is also exploring another new frontier — the ocean depths — by developing a heater for divers venturing into extremely cold waters.

AEC to Put $450 Billion-a-Pound Element on Sale

By Victor Cohn
Washington Post Staff Writer

"A fantastic material" named californium 252 — a man-made element so rare that its price would be $450 billion a pound if a pound existed — was put on sale by the Atomic Energy Commission yesterday.

One of its first uses will be in trying to treat some now incurable cancers.

A radioactive metal, it produces the powerful and penetrating atomic particles called neutrons in copious amounts.

Mainly for this reason, said AEC Chairman Glenn T. Seaborg, it is expected to be "one of the most important radioactive elements" yet made available. In fact, he added, having a mere speck of it is a little like having a "hip pocket" atomic reactor or atomic power plant (which produces neutrons when its atoms split).

Seabourg is a certified californium expert. At the University of California in Berkeley in 1950, he was one of its four co-discoverers. In 1951 he won the Nobel prize for leadership in making such elements (the "trans-uranic elements"—sub stances heavier than uranium on the atomic scale).

Californium was named after the state of California. Another — berkelium — was named after Berkeley.

Californium 252 is unique not only because it is a rich neutron producer, but because it is a long-lasting one.

Neutrons, as it happens, penetrate and kill human cells that are poor in oxygen supply. And some cancer cells are of this type.

Therefore, Seaborg said, one of californium 252's great potentials is in cancer treatment. The material's first shipment outside AEC laboratories—an AEC loan, not a sale—is about to go to the noted M.D. Anderson Hospital and Tumor Clinic in Houston to see if it lives up to this promise.

Other possible uses: Seeking and analyzing oil and minerals (by their response to neutron bombardment; continuous analysis of industrial products; and neutron "radiographs" of the body (like present X-rays, but emphasizing soft tissues.

The total amount of californium 252 made so far—is about 30-thousandths of a gram. A gram is only a 28th of an ounce.

But far greater production is possible, Seaborg said, and the price might eventually be cut to 50 cents per microgram (millionth of a gram). Mere micrograms suffice for cancer treatment.

Seaborg forecasts 'humanistic era' 11-20-68

By Neal Stanford

Staff correspondent of The Christian Science Monitor

Washington

"We are entering a new phase of the scientific age," Dr. Glenn Seaborg, chairman of the United States Atomic Energy Commission, told a Pittsburgh audience the other day, that "may herald the renaissance of the 21st century."

While others see destruction and dismay, Dr. Seaborg, Nobel Prize winner, university chancellor, longtime public servant, sees the dawn of a new scientific era, a scientific-humanistic era, a "quiet revolution that will prevail—simply because it speaks a prevailing truth."

In what may be his valedictory to his present post, Dr. Seaborg spoke of three major confrontations of today:

- The current confrontation of nations "obsessed with military security in a world of gross economic disparities," he suggests, "may be the last we will see of such a phenomenon."

For, he asserts, the world will have to realize soon that it cannot act "tribally," that "we are rapidly becoming one world technologically" and so must become one economically and socially.

- The second confrontation he sees as that between man and nature, possibly less a confrontation than "a moment of truth in which we are experiencing an exploding awareness of our environmental bond." The assumption has been, he continues, "that man progresses by conquering nature."

But now mankind is beginning to realize "we do not conquer nature, we coexist with her—or even more correctly, within her realm—and for every insult to her or assault on her we sooner or later pay some price."

- The third confrontation he sees as between man and certain aspects of his manmade environment—such as the urban complex and its subsidiary problems. He dramatizes this by pointing out that "three-quarters of all the people in this country [150,000,000 persons] have been drawn into some 200 densely packed urban centers occupying only about 10 percent of our land."

Physical aspects 'overwhelming'

Just the physical aspects of this urban implosion and explosion are overwhelming, he says: "90,000,000 automobiles and trucks drawn in and expelled from the core cities with a pulsating regularity through increasingly congested arteries; 30 billion gallons of water per day flowing in [pure enough for drinking] and 22 billion gallons flowing out, carrying enormous burdens of waste; 800,000 pounds of trash produced each day, trash that must be disposed of daily if it is not to suffocate and inundate our cities."

He disagrees completely with, what he calls, "that vocal minority that argues we must tear down all of today's institutions to make way for tomorrow's. This makes even less sense when you have no idea of what you plan to build in their place.

"We must free science from sin, stop flailing science for some of our current predicaments. It is actually more science, better science, more wisely applied science that is going to free us from these predicaments. We must use science to solve our environmental problems.

"The affluence-is-the-cause-of-our-effluents school of thought blames our waste on our productivity," he says. But what mankind must do is "find economic ways of processing and reusing waste, recycling seawater into potable water and useful fertilizer. The millions of tons of automobiles junked every year can be the 'mother lodes' of the future."

Ground Is Broken in Weston Cornfield for Big Nuclear Lab

Chicago Tribune BY ANNE GETZ 12/2

Ground was broken in a cornfield yesterday for the National Accelerator laboratory which will soon house the world's most powerful proton accelerator.

Dr. Glenn T. Seaborg, chairman of the Atomic Energy commission, hailed the event as the first step toward the "nation's deepest penetration into science." He called the new laboratory a "catalyst for change" in Illinois.

Seaborg, Dr. Gerald F. Tape, and James T. Raney, were the principal speakers in the brief ceremony at the site of the first of a complex of buildings to be built near Batavia about 30 miles west of Chicago.

Open Housing Aided

Seaborg said that the choice of Illinois for the laboratory promoted policies of equal opportunity and housing here and brought renewed closeness between the federal government and local industry, community leaders, and trade unions.

The National Accelerator laboratory will be operated for the United States Atomic Energy commission [U. S. A. E. C.] by the Universities' Research association, Inc., an organization of 47 universities in the United States and Canada.

Seaborg said the facility, designed to provide 200 billion electron volts and acceleration, will be in full use by 1973.

Congressional Support Seen

Tape underscored the importance of the laboratory for national security. He predicted that the new Congress would support United States leadership in science and technology.

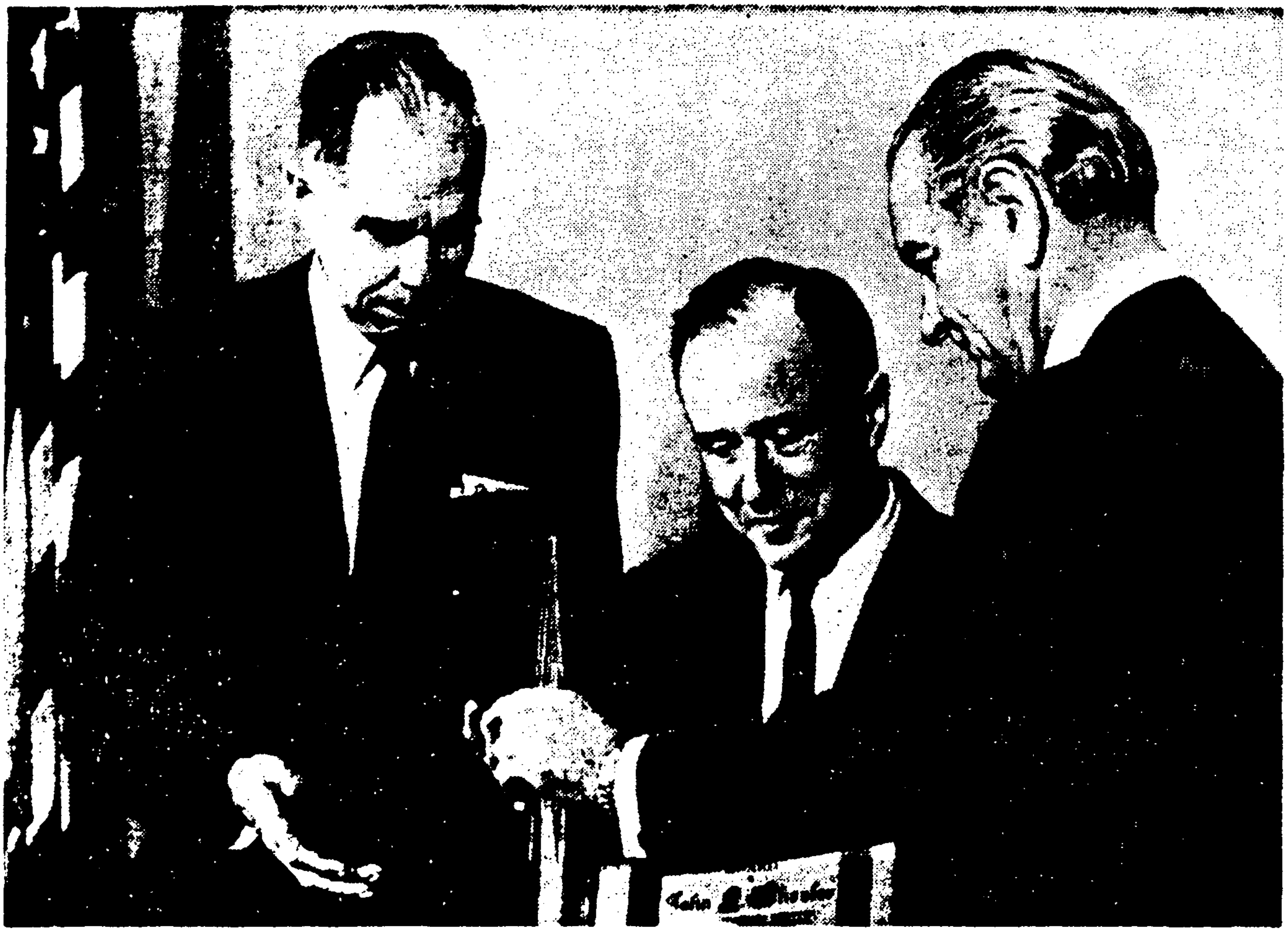
The complex of buildings will cost about 250 million dollars, and eventually will supply jobs for about 2,500 scientists and technicians.

The accelerator will outsize and outpower a 100-million-electron volt accelerator now being operated in the Soviet Union.

The first building will be built near the western boundary of the 6,800 acre site in Du Page and Kane counties in what was formerly known as Weston. The property, now being acquired for the U. S. A. E. C. by the state, is located north of Giese and Kautz roads in Kane county.

The first building will house the first two of four separate accelerators, each of which will be used to create the 200-billion-electron voltage.

WASHINGTON POST DECEMBER 3, 1968



Associated Press

President Johnson gives Fermi award to Dr. John Wheeler of Princeton as AEC Chairman Seaborg (left) looks on.

LBJ Gives Fermi Award To Wheeler

Dr. John Archibald Wheeler of Princeton University received science's Enrico Fermi Award from President Johnson last night.

Haltingly, Wheeler told the President and almost 100 guests that his work in the field of nuclear fission might have helped to make "the world safe for liberty" and that, he said, was itself a great reward.

The Fermi Award, named after one of Wheeler's colleagues in the pioneer nuclear days, consists of a gold medal, a citation and $25,000.

The President told the East Room ceremony that Wheeler, working with Niels Bohr, wrote the paper that "became the cornerstone of all later understanding in this field. Its publication was a step toward unlocking the fantastic secrets of the nuclear age."

Wheeler, the Joseph Henry professor of physics at Princeton, was cited for "his pioneering contributions to understanding nuclear fission and to developing the technology of plutonium production reactors."

Four generations of his family were on hand for the presentation. Glenn Seaborg, chairman of the Atomic Energy Commission, participated in the presentation.

Other recipients of the Fermi Award have been Dr. Hans Bethe, Dr. Edward Teller, the late Dr. J. Robert Oppenheimer, Vice Admiral Hyman G. Rickover and Seaborg.

SAN FRANCISCO CHRONICLE, Dec. 5, 1968

Seaborg's Warning on 'Stagnation'

Activism vs. Learning on Campuses

By Jerry Carroll

The chairman of the Atomic Energy Commission warned last night that "intellectual stagnation" may be looming for the Nation's college campuses.

This could be the fate if the campuses are transformed by political activists from centers of learning into agencies for direct social reform, said Dr. Glenn T. Seaborg.

Dr. Seaborg, the former chancellor of the University of California at Berkeley, addressed some 700 delegates to the Council of Graduate Schools convention at the Hilton Hotel.

He said he doesn't think the campuses have either the resources or the tactical position to serve as a launching pad for direct attacks on society's shortcomings.

And more importantly, Seaborg said, it would interfere with the chief mission of universities and colleges: to produce the men and knowledge to solve society's ills.

Seaborg told the delegates he fears stagnation could descend on the campuses by one of two ways:

"Through the dominance of internally generated political activism over intellectual achievement; or through the imposition by an alarmed public or repressive political restrictions."

The task of the university is to attack problems "that lie at the base of today's ferment; problems that, unsolved, provide ammunition for the extremist," Seaborg declared.

Additionally, it must demonstrate to the young "that they can influence the course of events through participation in our institutional processes."

Seaborg said he finds it curious that today's campus activist appear to have an anti-science bias — a bias that seems to rise "with the degree of activism."

"Do they know that we are on the verge of revolutions of greater magnitude than in the past — revolutions more powerful than a few of the young hope to achieve in the streets?" he asked.

Among them, said Seaborg, are modifying the characteristics of mankind by disciphering the genetic code, providing unlimited nuclear energy and providing material "well-being" for everyone.

Earlier in the day, Betty N. Vetter — director of the private Scientific Manpower Commission — warned that the nation's is wasting an irreplacable natural resource by drafting its graduate students.

The students being drafted are the teachers and researchers of tomorrow, she said — the very people who can help "in the solution of the many problems of the underprivileged."

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San Francisco Examiner

Wednesday, December 11, 1968

Word of Caution From Dr. Seaborg

THE CHAIRMAN of the Atomic Energy Commission, Dr. Glenn T. Seaborg, left some thoughtful advice in San Francisco last week, advice we hope will penetrate the consciousness of everyone involved in the struggle at San Francisco State. The advice gains additional impact when it is recalled that it comes from a man with long, honored service in the academic world. Dr. Seaborg is a former chancellor of UC-Berkeley.

We quote from his address to the Council of Graduate Schools:

"The university's first duty is excellence in the expansion of knowledge and in teaching the young. Its second is to contribute to society through its able graduates and in such other ways as do not imperil its first obligation . . .

"For the universities to yield to extreme commands that they become PRIMARILY direct social action agencies would appear to be self-defeating. It does not seem likely that the university has the resources or the tactical position to undertake the central role in solving complex social problems directly. But what is more important, the attempt could weaken or destroy its unique primary mission (to teach)."

In short, students go (or should go) to the university to learn. Extreme political activism on and off the campus is the enemy of the educational process. The university cannot contribute the "able graduates" of whom Dr. Seaborg speaks if it is torn by activist agitators who would rather close it down than see it operate without their stamp of approval. It cannot proceed with education if it yields to the brute force of radicals who trample on the constitutional rights of others and the Constitution itself.

AS ASSOCIATE Justice Hugo Black of the U. S. Supreme Court said in his remarkable television interview last week, protesters do not have the inherent right to use the streets or public places . . . "I've never said that freedom of speech gives people the right to tramp up and down the streets by thousands, either saying things that threaten others, with real literal language, or that threaten them because of the circumstances under which they do it . . .

"The government would be in a very bad fix, I think, if the Constitution provided that Congress was without power to keep the people from coming into the Library of Congress and spend the day there, demonstrating or singing, because they wanted to protest the government."

Justice Black's remarks are based on 31 years on the bench, living with the Constitution day and night.

THE PLAIN DEALER, Wednesday, December 18, 1968

Cynthia Bassett, Dr. Glenn Seaborg and Paula Steichen (right).

For IPA Party

Coast-to-Coast Guest List

The International Platform Association held its mid-winter Christmas party yesterday at Hotel Statler-Hilton, and it was a tremendous success.

Glenn Seaborg, chairman of the Atomic Energy Commission and president of the IPA, and columnist Drew Pearson. Pearson and Thomas are members of the group's board of governors.

In earlier sessions, members heard humorist John Henry Falk and psychologist Dr. Cleo Dawson. Musician Henry Pildner played and spoke his way through the topic, "Musical Absolutism through Tonal Relativity and How I Can Do My Part."

Also on the program were Thayer Soule with "Magic of the Mediterranean," William Wingfield with a demonstration in Afro-American rhythms, and magician Stuart Cramer with his program. "Master of Mirthmaking Mystification."

"We have 200 people here — from all over the country," said Mrs. Dan T. Moore, wife of the IPA's director general. "They've come from as far away as San Francisco for this one-day meeting."

The one-day meeting (and party) was chockful of speeches, music and merriment, beginning with the 10 a.m. board of governors meeting.

BUT the doings last night capped the program. Following cocktails, members and guests gathered in the Statler-Hilton's Grand Ballroom for fellow member Lowell Thomas' national radio broadcast, direct from the meeting to the nation. And with Thomas' fellow members as spectators.

Following a 7 p.m. dinner, members and guests heard

CHICAGO TRIBUNE JANUARY 22, 1969

SAVE

Because of Our Excesses, 21st-Century Chicago May Never See the Sun Shine

Chicago Tribune 1/22/69

BY MICHAEL SMITH

Man's excesses of the 20th century are the biggest threat to the 21st century.

The reckless technological abuse and destruction of natural resources, the use of the atmosphere as a dumping ground, and the rising tide of sewage all are part of this century's legacy to the next.

Dr. Glenn T. Seaborg, chairman of the Atomic Energy commission, has said:

"For a long time, we proceeded on the assumption that man progressed by 'conquering' nature . . . Now our growth in sheer numbers and some indiscriminate technological excesses have us eyeball-to-eyeball with our true relationship to nature.

Cost May Be High

"We realize now that we do not conquer nature. We co-exist with her—or even more correctly, within her realm — and for every insult to her or assault on her we sooner or later pay some price."

For 21st century Chicago, the price could be the creation of a city in which the sun never shines because it cannot penetrate the tons of airborne pollutants and a city where rainfall strikes terror because it drenches everything with destructive and deadly acids.

For 21st century Chicago, the price could be the rationing of water that, to be potable, must be treated again in the home before it can be used, and a city in which every man, woman, and child lives and works in sealed structures where all air is washed.

Need Action Now

Dr. Seaborg and environmental scientists are hopeful Chicago and every other city will not be forced to pay such a price. But they warn that expensive steps must be taken now to save the city and the nation from paying a more costly price in the 21st century.

"There are still too many . . . who believe that even if we do nothing, 'something will turn up,'" warned Dr. Seaborg. "Considering the rate of change we experience today, such an attitude can be catastrophic."

Dr. Albert V. Crewe, a physics professor at the University of Chicago and the Enrico Fermi Institute for Nuclear Studies, has observed that Great Lakes' "cities and industries have saved a few hundred million dollars by ignoring adequate waste treatment and disposal, but the net effect is that we are faced with a cost of 15 billion dollars [to clean and save the Great Lakes]."

Our Lake Ages Fast

Obvious costs of these short-sighted savings have been the death of Lake Erie and the premature aging of Lake Michigan. The findings of a recent University of Michigan study indicate that Lake Michigan, Chicago's most valuable natural asset and a key to its future, is aging at three to six times the natural rate.

Two University of Michigan scientists, summing up their findings, concluded: "Basically, the destructive agent is pollution."

The deteriorating of Lake Michigan places a critical question mark at the end of projections for Chicago's growth and future.

The pollutants strangling Lake Michigan are pumped there thru a vast network of waterways that are models of what a polluted lake might look like.

Heaps of Waste

But water pollution is only one of man's abuses threatening Chicago. Each Chicago resident now produces nearly three-quarters of a ton of solid wastes each year. As his affluence grows, this production will grow 4 per cent each year.

Included in these wastes are such products of modern technology as aluminum cans and plastic containers. Americans each year toss out 48 billion aluminum cans, 28 billion bottles and jars, and countless billions of plastic containers and wrappers. The aluminum cans and plastics are almost indestructible and are piling up as one of the great waste problems of the century.

The dilemma of wastes is symbolized by Dr. Crewe in the fate of a single beer can:

"What happens after you drink a beer? You throw the can away. Eventually, somebody has to pick it up and that costs money. If you have the time and energy to drink the beer, you should have the time and energy to do something with the empty beer can."

Our Air Is No Bargain

Waterways and trash heaps are not Chicago's only sinks; so is the air. Chicago's air is the second dirtiest in the nation. As a consequence, Chicagoans have more than their share of the 65 million tons of carbon monoxide and 23 million tons of sulphur compounds pumped into the nation's air each year.

It has been projected that, as metropolitan Chicago nearly doubles its size going into the 21st century, its contribution to air pollution also will double.

Compounding the effects of these abuses will be Chicago's geographical growth into what urban planners believe will be a giant urban creature sprawling from Milwaukee to Chicago, thru northern Indiana and across Michigan to Detroit, and then on across Ohio to Pittsburgh.

This giant of the 21st century, termed a "megalopolis" by planners, will intensify the production and effects of wastes and pollutants.

How, then, can Chicago survive the harmful products of its 20th century affluence on its way to the 21st century? Must productivity be limited to survive? Dr. Seaborg doesn't think so.

"There is the 'affluence-is-the-cause-of-our-effluents' school of thinking that blames all our waste on productivity," he said. "But it does not follow that the good life of the future [materially speaking] must be the wasteful one of the past—not when we have the knowledge and ability to deal rationally with our environment.

Sees Solutions Ahead

"The enormous amount of scientific and technical literature on this subject . . . hopefully indicates that we are on our way to solving our waste and conservation problems."

Dr. Seaborg said that "we are . . . advancing an over-all philosophy of conservation and recycle. This philosophy, which I think is another example of the underlying new scientific spirit, has people thinking in terms of finding economic ways to process and reuse almost all of our natural resources, and where some waste disposal is necessary, never to do it in a way that abuses nature or man."

The projects to which Dr. Seaborg referred include those which recycle sewage into potable water and useful fertilizer, proposals to use today's junk piles as "mother lodes" of minerals for the future, and the construction of nuclear power plants to replace today's power plants, one of the five leading contributors to air and water pollution.

Biggest Offender Is Auto

There also are projects to reduce the status of the automobile as the number one contributor to air pollution. These efforts include use of natural gas and electricity as power sources and increasing the efficiency of today's power plants and their exhaust systems.

Dr. Seaborg referred to projects like those in metropolitan Chicago that employ wastes in land filling and reclamation and convert the pollutant by-products of industry into new products. One chemical firm uses its fermantation wastes, formerly dumped into the lake, to make a dry animal feed substance.

"What we must realize now," Dr. Seaborg concluded, "is that there is a price to pay these days for clean air, clean waterways, attractive living areas, open spaces, and the flourishing of nature and wildlife. And for some time, that price may be high and will have to be shared by all."

WASHINGTON POST JANUARY 29, 1969

Nixon Retains AEC Chairman

1-29-69

By Carroll Kilpatrick
Washington Post Staff Writer

President Nixon yesterday asked Glenn T. Seaborg to remain as Chairman of the Atomic Energy Commission and named Russell E. Train, president of the Conservation Foundation, as Under Secretary of the Interior.

Seaborg said after a meeting with the President that he agreed to continue for an indefinite period. His term expires June 30, 1970. He was first appointed to the AEC by President Kennedy in 1961.

Seaborg announced that the President had authorized the AEC to make an immediate study to determine the feasibility of using nuclear explosives to excavate a new harbor in northwestern Australia.

Australia has asked for assistance in opening a harbor at Keraudrean Bay. Seaborg said he believed the excavation could be done without violating the treaty banning nuclear tests in the atmosphere.

The explosions would break the surface of the earth, he said, but the detonations would be some 200 feet under the water.

The President also expressed interest in other peaceful uses of nuclear energy, including its use in opening a canal to supplement the Panama Canal, Seaborg reported.

Train, 48, is a lifelong resident of the District of Columbia and was a member of the United States Tax Court from 1957 to 1965.

His interests in conservation and wildlife led to his selection in 1965 as president of the Conservation Foundation.

Last year, President Johnson named him a member of the seven-man National Water Commission. He was recommended for the Interior appointment by leading members of the Senate and House Interior Committees, and is expected to be confirmed without difficulty.

A graduate of Princeton University and Columbia University law school, Train is a former GOP adviser to the House Ways and Means Committee.

Reports of Train's nomination became public during debate over the nomination of Walter J. Hickel as Secretary of the Interior.

Hickel said yesterday he picked Train early in January after one long conversation with him. When Train was asked if he had any conflict of interest problems, he said he believed he had solved them by disposing of oil stocks he held.

He said he had already sold stock he held in Gulf Oil Corp. and in the Diamond Shamrock Co.

President Nixon held his first White House meeting with House and Senate Republican leaders yesterday and later went to Capitol Hill for a rousing welcome in the well of the House and a luncheon in the Speaker's dining room.

After the legislative meeting, Senate Minority Leader Everett M. Dirksen (Ill.) promised a major attack on crime in Washington and in the Nation and indicated that the surtax probably would have to be retained for another year.

Mr. Nixon also added his endorsement to an impending 41 per cent pay raise for Congressmen. With time running out, opponents all but gave up trying to block the increase. It appeared the $12,500 congressional salary boost—from $30,000 to $42,500 a year—would go into effect Feb. 13 unless Congress vetoes it by Feb. 7, when both the House and Senate start a ten-day Lincoln's Birthday vacation.

Speaker John W. McCormack (D-Mass.) declared the House in recess when the President arrived. He stood for about 45 minutes below the Speaker's rostrum as Democrats and Republicans filed by to shake his hand.

Mr. Nixon is scheduled to visit the Senate at noon today and to speak briefly to State Department employes at 3 p.m.

Also yesterday, the President summoned Sen. Henry M. Jackson (D-Wash.), who reportedly was his first choice for Secretary of Defense, to a White House meeting on what Jackson called "the National Security Council, intelligence and strategic balance."

Attending were Mr. Nixon, Jackson, Henry A. Kissinger, the President's adviser for national security affairs, Gen. Andrew Goodpaster, on leave from his post as deputy American commander in Vietnam, and Bryce Harlow, Mr. Nixon's assistant for Congressional relations.

In other actions, the President nominated Fred J. Russell, 52, president of the Weiser Lock Co. of Beverly Hills, Calif., as deputy director of the Office of Emergency Preparedness.

The President also named George V. Hansen, 38, of Idaho, who gave up his House seat last year to make an unsuccessful race for the Senate, as Deputy Under Secretary of Agriculture for Congressional Relations.

Seaborg

Pact Won't Limit Research: Seaborg

WASHINGTON —(UPI)— The Atomic Energy Commission (AEC) assured Senators Friday that the international treaty to stop the spread of nuclear weapons would not impose any new restrictions on U.S. weapons development.

AEC Chairman Glenn T. Seaborg told the Senate Armed Services Committee the real significance of the nuclear nonproliferation treaty was that the Soviet Union had accepted restraints already written into U.S. law.

Seaborg and Gerard C. Smith, director of the U.S. Disarmament Agency, testified as the committee continued hearings on the treaty.

Seaborg acknowledged that the United States had voluntarily agreed to accept international inspection of its nuclear activities, "excluding only those which the U.S. determines to have direct national security significance."

NOT NEW

But he stressed that the treaty itself "does not impose restrictions on our nuclear weapons programs or activities beyond those we have imposed upon ourselves by legislation."

He added: "Of even greater significance is the fact that, under the treaty, the Soviet Union will accept restraints for itself which the U.S. Congress laid down so wisely for the U.S. in the Atomic Energy Act."

The committee chairman, Sen. John C. Stennis, D-Miss., said Thursday, however, he may vote against ratification because the United States had agreed to submit to inspection procedures that had not even been formulated yet.

INSPECTION CLAUSE

Stennis' objection was to the clause requiring inspection of peaceful nuclear devices, like reactors. The exact inspection procedures are not to be negotiated until six months after the treaty becomes effective. Stennis said he would rather have the inspection procedures on paper before the United States makes such a commitment.

So far, three senators—Republicans John G. Tower, of Texas, Barry M. Goldwater of Arizona, and Strom Thurmond of South Carolina—have announced they will vote against the treaty when it comes to the floor next month. All are members of the Armed Services Committee.

Stennis said after Thursday's session he had not decided how to vote. But he said if the treaty's safeguards provisions prove "serious enough my idea would be to stop the measure at this point" and try to renegotiate the disputed section.

Nuclear Experts Fail to Satisfy Stennis Unit on A-Treaty Doubts

Washington Post, March 1, 1969

United Press International

Sen. John Stennis (D-Miss.), whose Armed Services Committee is holding hearings on the Nuclear Non-proliferation Treaty, is flanked by two Government officials who testified for the treaty yesterday, Glenn T. Seaborg (right), chairman of the Atomic Energy Commission, and Gerard C. Smith, director of U.S. Disarmament Agency.

Administration experts assured the Senate yesterday that the treaty to stop the spread of nuclear weapons imposes no new restrictions on the United States. But balking members of the Armed Services Committee were not satisfied.

Chairman John Stennis (D-Miss.) said he may schedule additional hearings to clarify U.S. obligations under the treaty's safeguards provisions, which he branded "an unknown quantity." The move could further delay ratification of the treaty, which has languished in the Senate for six months.

The Commitee, in a second day of closed hearings on military implications of the treaty, heard Chairman Glenn T. Seaborg of the Atomic Energy Commission and Gerard C. Smith, director of the U.S. Disarmament Agency.

Both endorsed the treaty and repeated administration assurances that it would in no way jeopardize U.S. national security or impose new restrictions on U.S. nuclear weapons programs.

In fact, Seaborg said the treaty itself makes no limitations on the United States beyond those it has imposed upon itself voluntarily. Its real significance, he said, is that "the Soviet Union will accept restraints for itself, which the U.S. Congress laid down so wisely for the United States in the Atomic Energy Act."

But Stennis, following the three-hour session, told newsmen the United States had committed itself to inspection procedures that have not been formulated.

He said he had not decided whether to vote for or against ratification. Asked if the hearings were finished, he said, "I would not say that they are. I want to make a close check on the record . . . and then make a determination about how many other hearings will be necessary."

Floor debate on the treaty was to have started Thursday, but senate leaders now say it probably will be March 11 before the ratification session can begin. The Senate Foreign Relations Committee, which approved the treaty 14 to 0 Tuesday, does not plan to file a report until next Thursday.

Out of courtesy to the Armed Services Committee, however, it probably will not insist on bringing the treaty to the floor until Stennis is finished.

"We're not trying to take over the treaty," Stennis said emphasizing that the Committee would not intentionally delay a ratification vote.

Seaborg Talks of Atoms for Health

San Francisco Chronicle
Fri., Mar. 7, 1969

By David Perlman
Science Correspondent

However controversial the atom may be in the affairs of men — in bombs and ballistic missiles, in power reactors mr peacetime blasting projects — its role in medicine is undisputed and increasingly important.

The age of nuclear medicine is flourishing right now, and yesterday the Nation's atomic chief, Dr. Glenn T. Seaborg, described its current progress in glowing terms.

Dr. Seaborg, chairman of the Atomic Energy Commission, was in Livermore to participate in a symposium inaugurating a new biomedical research facility at the University of California's Lawrence Radiation Laboratory.

To Seaborg, as to other scientists, the medical uses of nuclear energy alone have justified the enormous costs of the multi-billion-dollar AEC program over the past two decades.

"While we know the great potential of nuclear energy and nuclear science in other areas, in medicine we know more than its potential," Dr. Seaborg said.

"We are already experiencing its benefits every day—every day that it is helping to save human lives and relieve human suffering in this country and throughout the world. Such benefits reveal a pay-off on our investment in the atom that few people realize."

The examples Seaborg cited did indeed offer an astonishing glimpse at how far atomic medicine has come—and how unexpectedly varied have been its directions—since Wilhelm von Roentgen discovered X-rays nearly 75 years ago.

Radioactive isotopes are now manufactured in reactors on a vast scale, transmuting common or exotic elements into substances whose radiations can diagnose disease or treat it. Atom smashers — nuclear particle accelerators — emit high-energy radiation beams that attack diseases from pituitary anomalies to cancer.

More than 100 different radioactive isotopes produced in nuclear reactors have been used in medical research, Seaborg said, and 30 of them are now available in quantity for use around the world.

In the United States alone, Dr. Seaborg said, "these amazing servants of mankind" are now being employed in 8 million individual treatments a year for either diagnosis or therapy.

And the passage of history is underscored, Dr. Seaborg noted, by the fact that today the radium — first of all the radioactive elements to be employed in medicine — is now used in less than 1 per cent of all isotope applications.

With increasing medical use of radiation comes an expansion of the nuclear health industry, Dr. Seaborg said: nuclear medical equipment and chemicals are a \$25-million a year business now.

By 1980 — "With Medicare to spur its growth," Dr. Seaborg said — the "nuclear medicine market" will approach \$100 million a year.

It's not hard to see why: the most effective tool in thyroid function diagnosis, for example, is radioactive iodine which can be traced by electronic detectors on its metabolic course through the thyroid gland.

"About one million atomic cocktails containing iodine-131 are now served annually in the U.S.," Dr. Seaborg said.

And already more than 2000 American hospitals, plus countless clinics and individual medical offices, use nuclear equipment, drugs and instruments on patients every day. A hundred new nuclear medical facilities are being added every year.

Nuclear medicine is moving into unexpected frontier areas, too, Dr. Seaborg said.

Right now, he noted, the AEC and the National Heart Institute are sponsoring a research effort to build a plutonium-powered "pacemaker" to be implanted in the body and deliver its rhythmic shocks to diseased hearts that cannot maintain their own natural beating rhythm.

Present-day pacemakers are battery-powered and must be re-implanted surgically every two years or so. An atomic-powered one could last ten years or more.

Another AEC-sponsored project is a nuclear-powered artificial heart, with the heat from the decay of an isotope like plutonium providing hydraulic or pneumatic power to pump blood through the body.

Not long ago, with all the progress in machines to replace human body functions, people spoke of the possibility of a "semi-artificial man."

Today, it appears from Dr. Seaborg's view of things, we may be approaching the advent of the "semi-radioactive man," his body flowing with atomic juices, his ills cured by atomic rays, his beating heart a plastic pump — atomic powered.

CHICAGO TRIBUNE, FRIDAY, APRIL 11, 1969

A New Era Dawns as Weston Lab Site Is Presented to AEC

BY RONALD KOTULAK

Gov. Ogilvie formally transferred the 6,800 acre Weston atom smasher site to the Atomic Energy commission yesterday. He described the event as heralding a new era of scientific and technological eminence for Illinois.

He said the National Accelerator laboratory will make Illinois the research capital of the world, and pledged that the state will gear up its educational and business machinery to meet the challenge.

"The launching of this bold project to probe deeper into the infinite reaches of the atom is the capstone of a development which has guaranteed a new era of sustained economic progress," he said.

30 Miles West of City

The deed to the 12 square mile site, which is located 30 miles west of Chicago near Batavia, was engraved on a large plaque in the shape of Illinois.

The deed was accepted by Dr. Glenn T. Seaborg, AEC chairman, in ceremonies at the Palmer House. Others attending included Otto Kerner and Samuel Shapiro, former governors, and Gene Graves, former director of the state department of business and economic development, who played a key role in attracting the installation to Illinois.

[TRIBUNE Staff Photo]

Gov. Ogilvie speaks at deed presentation as Dr. Glenn Seaborg listens.

The ceremonies marked the successful conclusion of a four year drive to have the 200 billion electron volt accelerator located near Chicago. During the height of the competition for the scientific plum, 46 states sought the facility.

Illinois Offers Land

Illinois, along with the six other finalist states, offered to provide the land free. The state spent 25.5 million dollars to acquire the property.

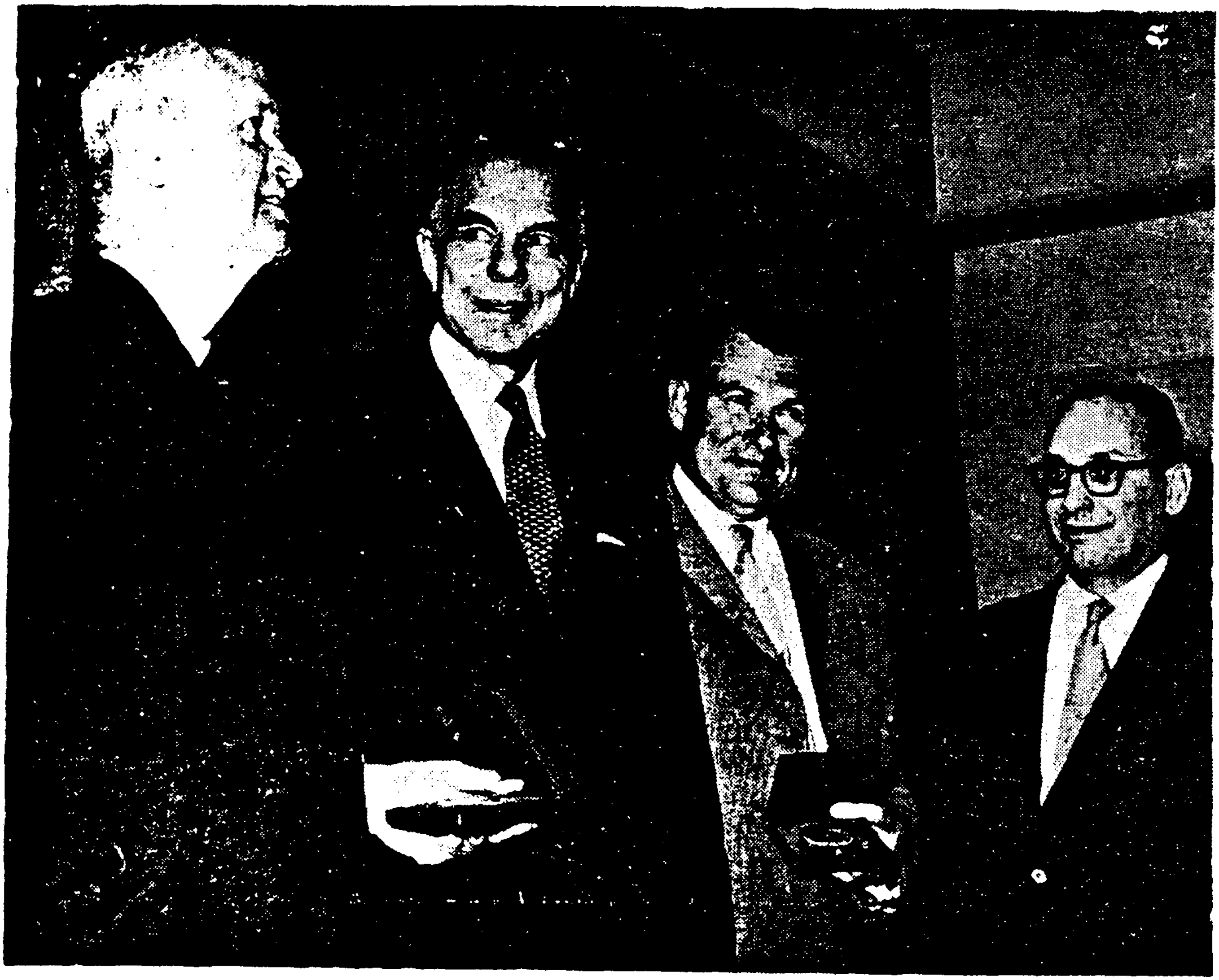
The 300 million dollar accelerator, which will be the largest atom smasher in the world, will be built in the shape of a huge doughnut, 1¼ miles in diameter. Subatomic particles will race around the track at nearly the speed of light. They will then be directed at target atoms to break them apart so that scientists can study the fundamental building blocks of nature.

Dr. Robert R. Wilson, director of the Weston laboratory, said that while construction is proceeding on schedule, the laboratory has experienced some difficulty in attracting and keeping some scientists.

He called for the state to establish a university near the site as a lure to potential scientific employes. The laboratory would be able to supply an "instant" staff for the university, he said.

The laboratory, which is expected to be ready for preliminary operation in the summer of 1972, will employ 2,000 scientists and engineers.

Ogilvie said that the Chicago area leads the nation in attracting new research and development facilities. A recent count showed 456 research laboratories in the metropolitan area, employing more than 18,000 persons.



Augusta Chronicle photo/Kay Lawrence

TOP ATOMIC ENERGY CITATIONS GO TO AIKEN AND FLORIDA MAN IN SRP CEREMONY
Overbeck (left) is shown with AEC chairman Seaborg, Squires, Costagliola

Augusta Chronicle 4/12/69

AEC Chairman Seaborg cites two in special ceremonies at SRP

By KAY LAWRENCE
Chronicle Aiken Bureau

AIKEN — One of the nation's highest civilian awards, the Atomic Energy Commission Citation and medal, was presented to W. P. Overbeck of Aiken and Lombard Squires of Naples, Fla., in a special ceremony at the Savannah River Plant Friday.

Both men had been associated with the nation's atomic energy program for almost three decades.

Here from Washington to make the presentation were Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission, and Francesco Costagliola, a member of the commission.

Overbeck, director of the Savannah River Laboratory until his retirement in 1967, was among the small group of scientific pioneers who achieved the world's first nuclear reaction at the University of Chicago in December 1942.

Squires, assistant general manager of the Du Pont Co.'s Explosives Department until his retirement in 1968, helped design and operate the reactors and chemical separation plants at Richland, Wash., which produced plutonium, one of two nuclear weapons materials used during World War II.

About 100 attended the ceremony, including relatives of the recipients, Savannah River Plant officials who had been closesly associated with the two men through the years, and U. S. Rep. W. J. Bryan Dorn, who came from Washington.

Nathaniel Stetson, manager of the Savannah River Operations Office, AEC, noted it was the first time such awards had been made at SRP and termed it "a happy and historic occasion."

Dr. Seaborg commented during the program that his April visits to SRP "just happened to coincide with another event going on across the Savannah River."

Overbeck, who is now lecturing in the field of astronomy and doing research at the University of South Carolina, was given his citation and medal by Costagliola.

The Aiken man was cited for his "outstanding service to the nation's atomic energy program in designing the instrumentation for the world's first nuclear reactor."

He was also lauded for his contributions in reactor instrumentation at Clinton Laboratories and Hanford Engineer Works from 1943 to 1948, and for his leadership in the construction and successful operation of the Savannah River Plant, as general superintendent of Works Technical and later as director of the laboratory.

A native of Colorado, he was graduated from Massachusetts Institute of Technology in 1934, and returned in 1939 as a research associate to work on the development of electronic computing devices.

After his work on the first nuclear reactor in Chicago, he did further atomic energey work at Clinton Laboratory, Oak Ridge, Tenn. After joining Du Pont in 1944, he became superintendent of instrumentation of the Hanford Engineer Works that Du Pont built and operated for the government for the manufacture of plutonium.

In 1951, when Du Pont undertook the design and construction of the Savannah River Plant, Overbeck became director of instrument development in the Atomic Energy Division of the Explosives Department, and a year later became general superintendent of Works Technical at the plant.

As an avocation he began working in astronomy and celestial mechanics a number of years ago and has earned a national reputation. He has done research on cosmic rays, as well as on electronic devices, and has assisted NASA in tracking satellites.

He is married to the former Daphne Fraser of Long Beach, Calif., and they have a son, James, who is assistant professor in the department of physics at M. I. T.

I honoring Lombard Squires, Dr. Seaborg said that for 27 years he "played a leading role in the development of our nation's nuclear defense capabilities."

"He contributed significantly to the production of plutonium at Hanford during World War II," Seaborg said, "and to the development of heavy water moderated reactors following the war, and more recently to the large-scale production of transuranium elements for peaceful uses."

Squires taught at M. I. T. for seven years before joining the Du Pont Co. in 1939. In 1950 he directed the design of the Savannah River Plant.

He and his wife now live in Naples, Fla., where his hobbies include skin diving, sailing and underwater photography. He continues as a member of three advisory committees for the Atomic Energy Commission.

MINNEAPOLIS STAR APRIL 15, 1969

States can't regulate radiation--AEC head

By MIKE WOLFF
Minneapolis Star Staff Writer

The Atomic Energy Commission's position that states do not have the power to regulate the discharge of radioactive waste from nuclear power plants was reiterated by the AEC chairman Monday.

In an interview before a meeting of the American Chemical Society at the Radisson Hotel, Dr. Glenn T. Seaborg said the problem is "primarily a legal one."

Seaborg was questioned about the controversy over the Minnesota Pollution Control Agency's pending decision on issuing Northern States Power Co. a permit to discharge radioactive waste into the Mississippi River at its nuclear generating plant at Monticello, Minn.

The AEC has set up standards that limit the discharge of radioactive waste to "a safe level," Seaborg said.

However, a proposed permit from the state pollution control agency would limit the discharge to 2 to 3 percent of the AEC limits.

The AEC has told the state agency that since Congress has granted regulation of radioactive discharge to the AEC, the state cannot also regulate it.

Seaborg said AEC standards are "very reasonable" and are "continuously subject to revision."

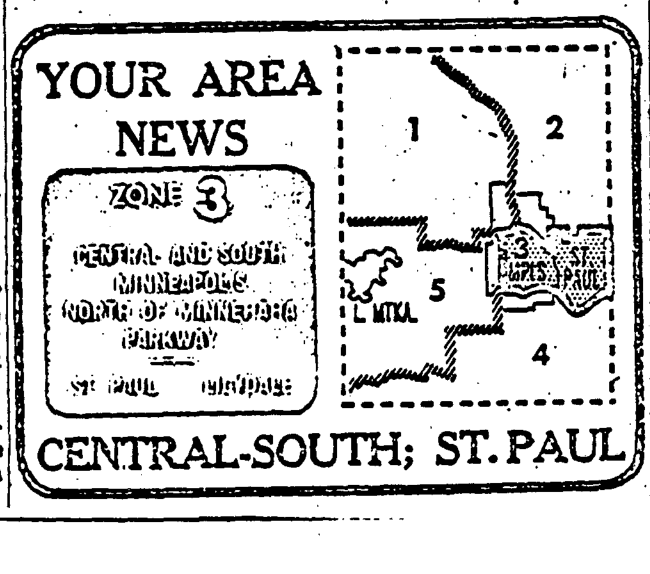
Critics of the NSP plant have called for reduction of radioactivity to zero. Seaborg said that this level is not attainable because of naturally occurring radioactivity in the environment.

"The AEC's responsibility is not to issue a license" if a nuclear plant does not keep radioactive discharge at a "safe" level, Seaborg said.

Seaborg also discounted rumors that a uranium processing plant would be built at Knife River, Minn., on Lake Superior, about 10 miles northeast of Duluth.

The rumors began last October when the Union Carbide Co. reportedly submitted a $2-billion estimate for building the plant in Minnesota to the AEC.

Uranium processing plants now in operation can supply enough uranium until about 1980, Seaborg said. A decision on new plants would be made about 1975 to meet anticipated needs, he said.



St. Paul Pioneer Press

First Newspaper in Minnesota

ST. PAUL, MINN., WEDNESDAY, APRIL 16, 1969 C☆

GLENN T. SEABORG
Radioactive Concern

Seaborg Backs AEC Limits On Nuclear Waste

By DEWEY BERSCHEID
Staff Writer

The people of Minnesota "are not foolish to be concerned" about the possible health hazards from the radioactive discharges of the Monticello nuclear power generating plant, the chairman of the U.S. Atomic Energy Commission (AEC) said at a press conference Tuesday.

Dr. Glenn T. Seaborg, Nobel Prize winner, said, however, that he believes the AEC standards for nuclear waste discharges are adequate to protect the public.

Seaborg also stated he concurs in the opinion of the AEC legal counsel that the commission, and not state agencies, has the power to regulate radioactive pollution from nuclear reactors used to generate electricity.

The Minnesota Pollution Control Agency (PCA) is considering the adoption of standards for the control of radioactive pollutants from atomic reactors. The proposed state standards, as recommended by the PCA's nuclear consultant, are much more strict than the current AEC regulations.

Seaborg said the AEC is studying the proposed Minnesota standards, but has made no decision whether to let the state proceed with their adoption. He also mentioned the AEC is now considering the tightening up of its standards to decrease the amount of radioactive discharge into the environment.

"Northern States Power Co. is building its Monticello plant according to rules and regulations of the AEC, and these, I believe, are adequate to assure the safety of the public," Seaborg said.

Public concern about the Monticello 550-megawatt power plant being constructed at a cost of $92 million about 30 miles north of the Twin Cities on the Mississippi River has been mounting in recent months.

It apparently reached a peak last week as the PCA

Nuclear Wastes Limits Defended

conducted hearings on the NSP application for a permit to operate the power facility which is expected to be completed by May of 1970.

Most of the testimony at the PCA hearing related to the potential health hazards of human exposure to radioactive materials.

At the same hearing, Rep. Joseph Karth, D-Minn., said the states should assume the authority to set nuclear pollution control standards more stringent than those of the AEC. He urged PCA members to fight through the courts any challenge to their authority as a control agency.

Seaborg was in Minneapolis Monday and Tuesday for a meeting of the American Chemical Society.

TERRE HAUTE TRIBUNE

COMPLETE WIRE SERVICES OF THE ASSOCIATED PRESS AND UNITED PRESS INTERNATIONAL ★ FOR ALL DEPARTMENTS DIAL 232-0581

TEN CENTS. FINAL EDITION Terre Haute, Ind., Wednesday, April 16, 1969.

TIME FOR A COFFEE BREAK—Dr. Glenn T. Seaborg, chairman of the United States Atomic Energy Commission, pauses for a cup of coffee during an informal session with students and faculty members Wednesday at Indiana State University. Serving Dr. Seaborg is student Becky Carroll, as Dr. Henry Carroll, professor of physics, looks on.
Chuck Strausburg Photo.

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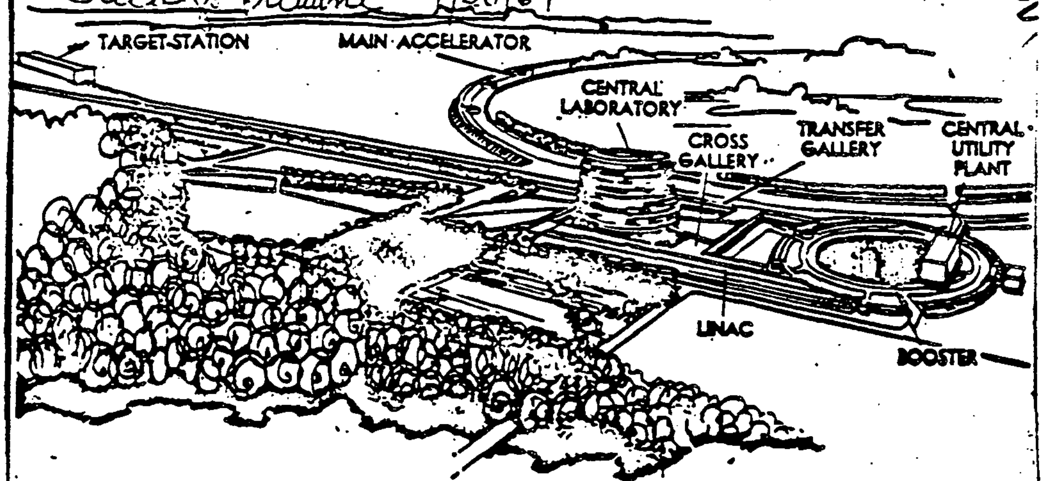
CHICAGO TRIBUNE APRIL 30, 1969

Chicago Tribune 4/30/69



Sketch of 200 billion electron volt accelerator laboratory east of Batavia, which is to be named after Enrico Fermi.

Atom Smasher at Weston Named for Dr. Enrico Fermi

BY RONALD KOTULAK

The world's mightiest atom smasher, now under construction 30 miles west of Chicago, will be named after the late Enrico Fermi, the father of the atomic age, the Atomic Energy commission announced yesterday.

Dr. Fermi led a group of scientists at the University of Chicago who lit the first man-made nuclear "fire" in December, 1942.

Announced by Seaborg

They achieved a self-sustaining nuclear chain reaction under the west stands of Stagg field with a crude graphite reactor—an event that made possible the atomic bomb and the development of nearly limitless nuclear power for peaceful purposes.

Dr. Glenn T. Seaborg, AEC chairman, said in Washington that the 200 billion electron volt accelerator will be called the Enrico Fermi laboratory.

Formal dedication is expected to take place in the fall of 1972 when major construction work on the facility has been completed. The installa-

Enrico Fermi

tion is now called the National Accelerator laboratory.

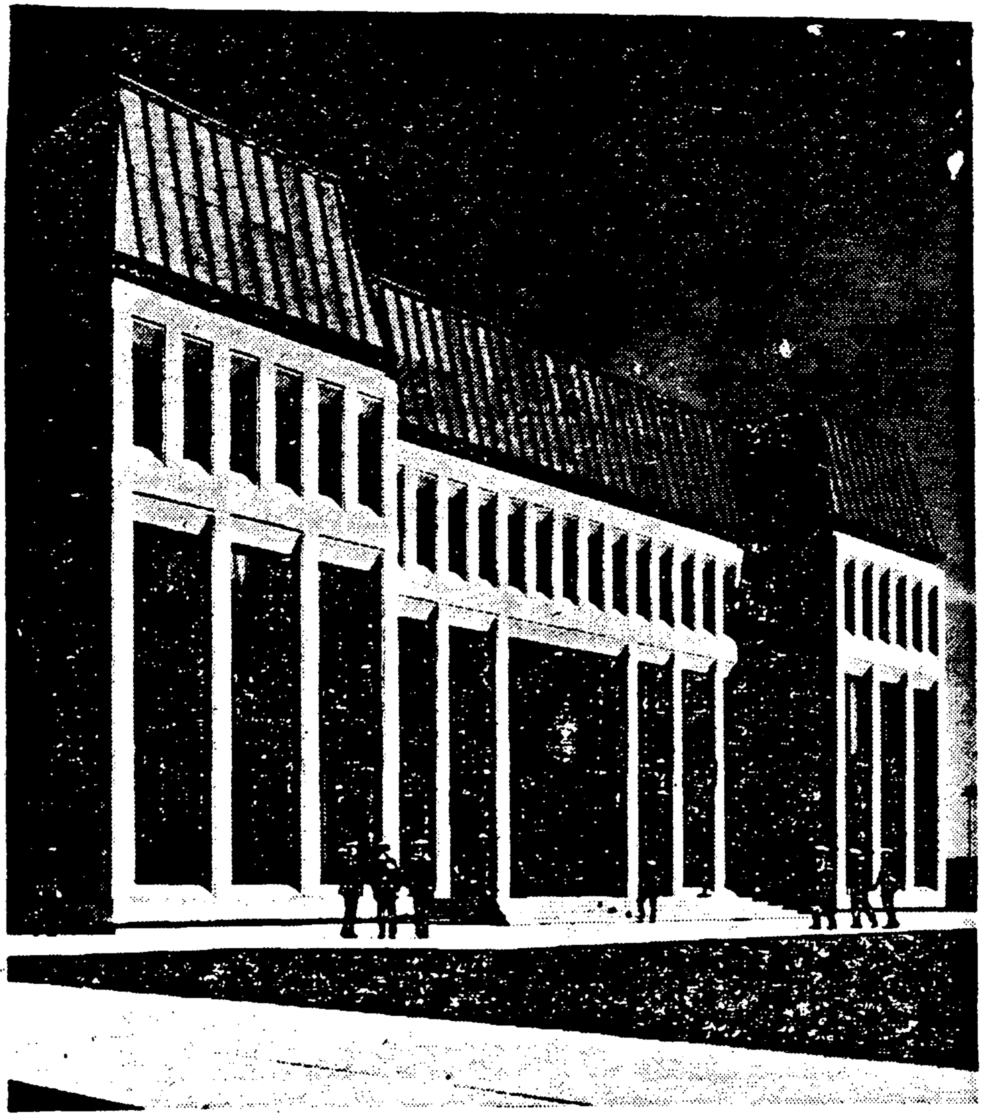
"It is particularly fitting that we honor Dr. Fermi in this manner, for in so doing we further acknowledge his many contributions to the progress of nuclear science," Dr. Seaborg said.

Expect 2,000 Experts

The 300 million dollar installation is being built on a 6,800 acre site near Batavia. When finished, it will have a full time staff of 1,650 scientists, engineers, and other workers in addition to 380 visiting scientists.

Dr. Fermi, who died in 1954, fled Fascist Italy with his family in 1938, while he was on a trip to accept a Nobel prize in Stockholm.

After Fermi's super-secret experiment succeeded, Dr. Arthur Holly Compton, who was in over-all charge of the project, sent a coded message to Washington: "The Italian navigator has landed in the new world and found the natives friendly."



NEW SCIENCE HALL DEDICATED AT NAVAL ACADEMY
. . . view of $14 million Michaelson Hall.

Baltimore News American

May 11, 1969

At New Science Hall

AEC Head Top Speaker

News American Bureau

ANNAPOLIS, May 10 — Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission, principal speaker at the dedication ceremonies of a new $14 million science hall at the Naval Academy here today bolstered the hopes of midshipmen who may be struggling through the Academy.

Dr. Seaborg, researching the life of Albert A. Michelson, for whom the building has been named, discovered that the famed scientist "was charged with 129 infractions and more than once found himself in the brig," during his four years at the Academy.

He cited the accomplishments of Michelson who went on from graduation to become the second American to receive a Nobel prize.

MICHELSON HALL has 50 classrooms in various sizes to accomodate 18, 24 and 40 student classes. All classrooms have TV monitor and remote terminal outlet for computer operation.

Five lecture halls seating 82 to 430 students with each lecture hall equipped with TV monitors, TV camera outlets, front and rear screen projection and outlets for water, gas, compressed air and AC and DC electrical current.

The buildng also contains electrical science laboratories which accomodate 350 students at two-man work tables.

There are also offices for the entire 115-man faculty as well as conference rooms and administrative facilities.

San Francisco Examiner EDI

Tuesday, June 3, 1969

Dr. Seaborg Tells the Grads . . .

DR. GLENN T. SEABORG, Atomic Energy Commission chairman and former UC-Berkeley chancellor, has taken on with delightful zest and considerable success that great challenge of the public speaker — to deliver a commencement address sans cliche and jaded aphorism, yet well-loaded with wisdom.

We must assume that his auditors — graduates at Wisconsin State University — were as impressed as we were.

Dr. Seaborg's thesis was that enormous changes for the better have occurred in American life in the past 20 years. He went on to say:

"My point in discussing all these recent advances is simply to show that considerable progress is being made through the very institutions that are so widely beleaguered today. Perhaps the progress does not come always as quickly and logically as we would like, but it does come . . .

"It is only natural that members of my generation, whose heads are spinning from the upheaval we have seen in the past two decades, would occasionally be slow to react to calls for still faster progress. To many of my contemporaries, our world seems like an automobile whose brakes have failed, plunging down a steep, tortuous road; the driver is frantically trying to keep his car from plummeting over a cliff while his young son is bouncing on the back seat, shouting 'Faster, Dad, faster!'"

An excellent metaphor that illuminates today's problems.

American institutions, far from being stultified, are perhaps the most flexible and amenable to experiment in the world. Dr. Seaborg's plea that they not be destroyed through blind ignorance of their past achievements and future potential is hard-rock common sense.

The seniors at Wisconsin State have put their diplomas in their luggage and are on their way. But hundreds of thousands remain on American college campuses. We wish they could be exposed to Dr. Seaborg's message.

★ ★ ★

IN CONNECTION with the above, we noted with interest that the press, in covering the Mills College and University of San Francisco commencements, emphasized the remarks of the valedictorians over those of the traditional commencement speakers.

This is an abrupt departure from journalistic tradition and one that is subject to change at future exercises, depending on who says what and how well. But with due respect to the official commencement speakers, it seems to us the emphasis was properly laid, the times being such a they are.

It is good to get the views of those young people who have hit the books instead of the bricks.

Not that either of the valedictorians sounded joyful notes of optimism as is the hallowed custom of valedictorians. In fact the young woman at Mills was quite despairing.

But we can profit from the voices of the young, just as the young might well profit from the voices of those whose memories of college are more than yesterday old.

UTILITIES URGED TO BACK A-POWER

N.Y. Times

Seaborg Says Its Enemies Harbor 'Unfounded Fears'

6-10-69

By GENE SMITH

Special to The New York Times

PORTLAND, Ore., June 9—The Atomic Energy Commission has called on the nation's utilities to aid in its battle against opponents of nuclear power.

Speaking today before the opening session of the 37th annual convention of the Edison Electric Institute, Glenn T. Seaborg, chairman of the A.E.C., said:

"I and my fellow commissioners have been speaking out more strongly—and will continue to do so—in defense of nuclear power and in support of the conservation of our natural resources and the improvement of our environment. We intend to set the record straight on past accomplishments and to make it clear what can be accomplished in the future. We hope you will join us in these efforts."

Dr. Seaborg said he deplored the "irrational thinking and activity based on misinformation and unfounded fears" that appeared to be spreading around the nation's nuclear power program.

"While a sense of urgency is important for dealing with environmental problems, these problems will only be solved by sane, reasoned approaches backed by scientific and technical advances," Dr. Seaborg said. "Rash actions based on unsound judgments forced by the outcries of a misinformed public will probably do more harm than good in programs affecting the environment."

Describing himself as a conservationist, the chairman said that conservationists who opposed nuclear power "have just not considered the facts . . . nor weighed those facts in terms of realistic alternatives." He said that, while tremendous efforts were under way to cut the sulphur content of coal, oil and gas—fossel fuels— there were "no methods known of eliminatingg the carbon dioxide that results from combustion."

Nuclear power adds no pollutants to the atmosphere, Dr. Seaborg added.

He repeated an A.E.C. finding that the stacks of coal-burning plants released more radioactive effluents than nuclear plants of comparable size, and added that a case for be made in the matter of the more aesthetically pleasing plants that eliminate coal piles, oil tanks, tankers and noise.

Robert H. Gerdes, president of the Edison Electric Institute, told the meeting that it would take as much as 2 billion kilowatts of generating capability, or six times the capability at the end of 1968, to meet future needs.

"Our investor-owned power systems will require an investment of about $550-billion, measured in present-day dollars, present investment," Mr. Gerdes said. "This means an investment approximately equal to the otal investment of all business in the nation today."

W. H. Dennler, vice chairman of the General Electric Company, predicted that by the year 2000 the market for electrical energy "may well exceed 11 trillion kilowatt hours." This would require an investment of "perhaps $1-trillion in plants between now and the year 2000," he added.

Mr. Dennler, who delivered a talk that was to have been given by Fred J. Borch, chairman and chief executive officer of G.E., attacked foreign competitors who, he said, "have the capacity to compete in the most advanced technological businesses, but to support this capability, must seek out such large, open and technically demanding markets as the United States and Canada."

He charged that such competitors were nationalized by their Governments, and were thus able "in effect, to buy a share of United States markets at a price their Governments consider advantageous, while at the same time they are protected from competition in their own markets."

Mr. Borch was unable to deliver his talk because of illness in his family.

In an interview before his talk, Dr. Seaborg said it was "hard to identify" specific individuals or their reasons for opposing the nuclear power program. He said he recognized there were some who had genuine concern about the program, but added that they were generally misinformed.

Science can solve ills, Seaborg tells graduates

ATLANTA (AP) — Scientists and engineers must work to convince the world that mankind's problems can be solved, Nobel Prize winner Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission, said Saturday.

Seaborg told Georgia Tech graduates in a commencement address that "throughout the ages there have always been a good number of people determined to doubt man's potential for progress."

Some suffered from a failure of nerve or a failure of imagination, he said. "Many others have sought to hold back innovation because of special economic interest."

Seaborg said that the scientific and engineering community must go out in the world and prove that the current ills can be overcome.

Present-day doubts about mankind's future, he said, "are perhaps more widespread and dangerous than those of the past...because they reflect a broad pessimism about mankind in general.

"We are in the midst of a very confusing era," he said. "On the one hand our advances in science and technology have been such as to make the public believe that almost anything is scientific or technically possible.

"On the other hand there seems to be doubt, frustration and sometimes almost universal despair over our inability to apply what we know and can do to better the condition of man, and to solve our widespread environmental, social and human problems.

"If we can understand the code of life, why can't we control our explosive population growth? If we can send men to the moon and back, why can't we solve our earth-bound transportation problems? If we can create an industrial system that produces such affluence, why can't we create systems that control industry's effluents?"

Seabord said that scientists and engineers could solve many of the problems facing mankind "if we could solve the political problems.

"Scientists and engineers must show initiative and leadership in seeking peaceful solutions to the nation's and the world's political, economic and human problems," he said.

"It is one thing to demonstrate against something, and quite another to demonstrate a workable alternative to it," he added.

Seaborg told the Tech graduates to go out and "bring to the people of this country who doubt—who still feel 'it can't be done or it won't be done'—a new level of confidence, a new faith in our scientific and technological age."

Atomic-Ray Incinerator Envisioned by Seaborg

Washington Post Foreign Service July 18, 1969

STOCKHOLM, Sept. 17—A "fusion torch" capable of destroying what ought to be destroyed is "within the realm of possibility," Glenn T. Seaborg, chairman of the U.S. Atomic Energy Commission, told an international group of scientists and scholars today.

If the process of nuclear fusion—the reaction in which the cores of atoms are joined with an indescribably large release of energy—is accomplished, all the wastes of the world could be subjected to the cold plasma and reduced to their constituent atoms, he said. Everything that one wanted to get rid of—old automobiles, pollution and waste of all sorts—could be introduced into the flow and returned to the dust from which they sprang, thus completing the cycle of creation, destruction and preparedness of the material for new creation.

The ensuing radiation, Seaborg suggested, also could be directed at other constructive purposes.

The American official conceded that in the search for controlled fusion the Soviet Union appears to be somewhat ahead of the United States but has shared its knowledge willingly; with the result that American work has changed its former direction. Whatever the Americans find out in their studies, he said, will be made known to the Russans.

BURLINGTON FREE PRESS SEPTEMBER 12, 1969

Seaborg Cites Safety Of Nuclear Generators

The chairman of the Atomic Energy Commission, Dr. Glenn T. Seaborg, told an audience at the University of Vermont Wednesday night the commission had not done enough to explain the atom to the average man in the street.

Seaborg's speech climaxed a full day of seminars and meetings on the use of the atom and its effect on the environment.

Seaborg spent much of his time advocating the use of the atom as the source of power for the future, and its comparison in terms of pollution with other power generation systems, such as coal-fired generators.

He also emphasized the safety of nuclear power, noting no one has ever been killed in a licensed atomic power plant. Said Seaborg, "The nuclear energy industry, including the commission's own program, has consistently been among the safest of industrial activities."

The chair played down the issue of thermal pollution, one of the main reasons for the AEC's invitation to visit Vermont. In fact, Seaborg referred to the effect on the environment of heat released from an atomic plant as "thermal effects," rather than pollution.

He explained at a press conference earlier in the evening that heated water from a plant doesn't necessarily pollute the environment, and in some cases may have a healthy effect. He mentioned that the St. Lawrence Seaway might be kept open year round in the future by heat from a series of nuclear power stations.

Seaborg said that while his agency was doing a great deal of research on the problem of thermal pollution, it has no control or regulatory powers in this area.

The audience at Seaborg's address was much smaller than the turnout for the afternoon panel discussion, which included comments by a number of scientists concerned with the question of pollution. The commissioner's speech drew a crowd of about 500, perhaps one third of the audience at the afternoon session.

Seaborg said the effect of thermal pollution would be greatly decreased by the 1980's when what he called "fast breeder reactors" would go into use. He didn't comment on what would happen in the meantime.

Dr. Seaborg did say his agency is supporting a bill sponsored by Sen. Edmund Muskie, D-Maine, which would in Seaborg's words "establish a system of state certification to the AEC that the water quality standards will be met by the proposed plants." In simpler terms, the Muskie bill would leave the thermal effect problem up to the individual states.

In conclusion, Seaborg emphasized that his agency's prime concern is the health and safety of the public. Said Seaborg, "we will do everything possible to make certain that the outstanding safety record of this industry is maintained in the years ahead as more and more people reap the benefits of the peaceful atom."

VC Says China Has Nuclear Missiles

TOKYO, Sept. 29 (UPI)—Communist China has developed a missile capable of carrying nuclear warheads, the Vietcong press agency said today.

A transmission monitored here did not elaborate, but it was the first time a Communist news agency close to the Peking regime has said China possesses missiles capable of carrying nuclear warheads.

In an editorial greeting the 20th anniversary of the founding of Red China, the broadcast said: "China has made wonderful progress in the research on and production and development of nuclear weapons.

"Within two years and eight months, China has repeatedly astounded the world with the successive explosion of her atomic bomb, hydrogen bomb, and the launching of nuclear warheads by means of remote-control engines."

Reports reaching the West said China tested a rocket with a range of 400 miles in October 1966.

The same reports also predicted that China could be deploying a small number of medium-range missiles in 1969 and be well on its way toward an ICBM capability by 1972 or sooner.

China has conducted nine atomic explosions in recent years. Western experts have said the bombs were carried by planes or detonated on the ground.

ALBUQUERQUE JOURNAL 10/14/69

AEC HEAD WELCOMED: Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission, receives an official "red carpet" welcome to Albuquerque from Chamber of Commerce President Frank Schifani, left, and Lt. Gen. H. C. Donnelly, Ret., chairman of the Presbyterian Hospital Center Foundation. Dr. Seaborg was principal speaker at the hospital center's annual Founder's Day Dinner Monday night, and was recipient of the foundation's first Award for Excellence.

(Journal photo by Barry Aguilar)

AEC Chairman Outlines Nuclear Medicine Efforts

By JOLINE DAFFER

Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission, said Monday night the AEC has carried on major efforts to advance the cause of nuclear medicine.

Dr. Seaborg, speaking to about 350 persons at the annual Founders Day Dinner of Presbyterian Hospital Center, also accepted the PCH Foundation's Award of Excellence for his outstanding contributions to the peaceful uses of atomic energy, particularly in the field of medicine.

THE AWARD, decorated with the New Mexico Zia and the hospital's insignia was presented by Lt. Gen. H. C. Donnelly (USAF Ret.), chairman of the Board of Directors of the hospital foundation, and manager of the AEC's Albuquerque operations.

The AEC, Dr. Seaborg said, produces and distributes radioactive isotopes useful in medical research, diagnosis and therapy; provides training opportunities for medical personnel in the safe and efficient us of radio-isotopes; operates major medical research facilities; and supports promising research projects through contracts with medical schools, universities, hospitals, and other research organizations.

Monday afternoon, shortly after his arrival in Albuquerque, Dr. Seaborg said at a Sunport press conference he foresees nuclear energy playing a significant part in future planetary exploration and in efforts aimed at perfecting the artificial heart.

THE 59-YEAR-OLD winner of the Nobel Prize in chemistry told newsmen "nuclear energy undoubtedly will be used for manned exploration of Mars."

He said the AEC now is working on a multi-purpose rocket for such flights. The rocket would be designed to transmit space ships from earth orbit to synchronous orbit to lunar orbit.

The commission also is engaged in joint research with the National Heart Institute, Dr. Seaborg said, forecasting that "in about 10 years" an artificial heart will have been perfected, with a nuclear power source that will preclude possibility of the human body rejecting the man-made organ.

DR. SEABORG'S Albuquerque appearance came immediately after his tour of Russia and the Iron Curtain countries, and he said the Russians have come much closer to the United States in the field of nuclear research since his last visit to Russia six years ago.

"I think this is because they had farther to go," Dr. Seaborg opined. "They were using relatively crude instrumentation six years ago. I think they will close the gap. After all, we are reaching a plateau of sophistication—although there is really no plateau—so someone that is behind is bound to come up."

The chemist said he discussed with his "Russian counterpart," the peaceful use of nuclear energy, adding that "we are anxious to set up our cooperation in this field. We talked of exchanging scientists in this field."

Seaborg said he encountered no peace movements or demonstrations during his tour.

OTHER OPINIONS of Dr. Seaborg:

— The application energy of nuclear power would do much to alleviate problems of air pollution.

—Atomic energy solves more problems than it creates.

—The side effects of nuclear problems are not always pleasant, but "on the whole we are benefitting."

—In time, the Meson Facility at Los Alamos will be applied to medical research, with studies expected to involve the possibility of the "meson beam" as a treatment for cancer.

MONDAY NIGHT, Dr. Seaborg outlined the history of nuclear medicine—which began with the use of radiation in x-raying in the early 1900's—and characterized its growth as "remarkable, considering it was in its infancy in the 1950's."

He told of its value in diagnosing diseases of the liver, thyroid, brain, kidney, and lungs. He explained the use of radiation in the treatment of cancer, and said physicians have claimed "excellent therapeutic results."

Presently being studied is the use of intermittent irradiation of blood in the treatment of leukemia, the chemist stated, and to prepare recipient patients for kidney transplants.

ONE AEC MEDICAL development, which Dr. Seaborg called the "Zonal Centrifuge," has "given us the ability to produce vaccines and possibly isolate viruses responsible for hepatitis, polio, rabies, the common cold, animal tumors and other diseases."

Another nuclear chemistry technique is being used with favorable results in treatment of Parkinson's disease, he explained.

Dr. Seaborg received an official "red carpet welcome" to Albuquerque from Chamber of Commerce President Frank Schifani, vice-president G. Y. Fails.

Schifani and Fails joined City Commissioners Pete V. Domenici, Harry Kinney, Charles Barnhart, Word Payne and their wives in honoring Dr. Seaborg. The regular Monday night City Commission meeting was postponed so commissioners could attend the formal dinner, held at Sandia Base Officers' Club.

ALSO PRESENT with their wives were H. L. Galles Jr., chairman of the Founders Day committee and master of ceremonies for the evening; George W. Savage, president of the PHC's board of directors, who gave a progress report; Richard L. Olsen, Administrator of the Anna Kaseman Hospital, under construction at Wyoming and Constitution NE; Presbyterian Hospital Administrator Richard R. Barr; Dr. Robert O. Gathings of the hospital center; Ray Woodham, PHC executive director; James F. Futrell, PHCF executive vice-president; and Dr. Merrill W. Brown, president of the hospital's medical and dental staff.

The Very Reverend K. W. Kadey, dean of St. John's Episcopal Cathedral, delivered the invocation, and the Rev. Millard Murphey of Rio Grande Presbytery, Synod of New Mexico of the United Presbyterian Church, gave the benediction.

The "Award for Excellence" was established by the foundation to honor individuals for outstanding achievements which have benefitted mankind.

BETWEEN 1940 AND 1958, Dr. Seaborg was the co-discoverer of more than 100 radioisotopes, a number of which have practical applications in research and medicine.

Under his chairmanship, the AEC has strongly supportd programs in biology and medicine, successful treatments for Parkinson's disease and leukemia, and techniques for controlling the rejection of transplants and grafts are the result of AEC research.

Life saving equipment, including a nuclear heart pacemaker expected to function for 10 years without repair, and a portable and inexpensive artificial kidney also have been developed by the AEC under Dr. Seaborg's leadership.

DR. SEABORG, who in 1951 shared the Nobel Prize in chemistry with E. M. McMillan, was appointed AEC chairman in 1961. Before that, he served as a member of its first General Advisory Committee from 1946 until 1950, and as a member of the President's Science Advisory committee from 1959 to 1961.

He is the author of more than a dozen books, many of which have been translated into foreign languages, and has published more than 200 scientific papers.

From 1958 to 1961, Dr. Seaborg was Chancellor of the University of California at Berkeley, having served on the faculty since 1939. He currently is on leave as professor of chemistry.

WASHINGTON POST

October 30, 1969

By Bob Burchette—The Washington Post

Dr. Glenn T. Seaborg, Atomic Energy Commission chairman, tells a joint congressional committee that outcries over nuclear pollution will be nothing compared to anger over blackouts caused by a lack of sufficient power capacities.

Seaborg Warns A-Power Foes

By Victor Cohn
Washington Post Staff Writer

Some foes of nuclear power are engaging in "unsubstantiated fear-mongering" and "hysteria" and creating a danger of perilous future power failures in American cities, Dr. Glenn T. Seaborg charged yesterday.

The U.S. Atomic Energy Commission chairman and Nobel prize-winning chemist, ordinarily a quiet, soft-spoken man, yesterday was a man deeply stirred.

He told the Joint Committee on Atomic Energy, now investigating the effects of nuclear plants on the environment:

"In years ahead," if critics prevail, "today's outcries about the environment will be nothing compared to cries of angry citizens who find power failures due to lack of sufficient generating capacity have plunged them into prolonged blackouts—not mere minutes but hours, perhaps days—when their health and well-being and that of their families may be seriously endangered.

"The environment of a city whose lifes energy has been cut, whose transportation and communications are dead, in which medical and police help cannot be had, and where food spoils and people strifle or shiver while imprisoned in stalled subways or darkened skyscrapers—all this also represents a dangerous environment."

"Problems Manageable"

Answering charges that nuclear plants spill dangerous radiation into the rivers and air, Seaborg maintained: "The environmental problems associated with nuclear energy are manageable. With good planning and work, we can have safe, clean and reliable nuclear power, as much of it as we will need."

If fact, he argued, "nuclear energy has arrived on the scene, historically speaking, in the nick of time"—both because of huge future demands for electricity and for a cleaner energy source than coal and oil-burning plants.

The pollution load from burning coal and oil alone, he maintained—if they alone were used to produce future power "in the massive amounts" man will need—"would pose a disastrous environmental hazard.

"This thought becomes staggering when one considers that two billion people in the world still have no electricity, and Asia, with half the world's population, produces only one-tenth of the world's total electric power. In raising their standard of living, these people cannot and will not relive our Industrial Revolution, the Coal Age. They obviously are going to enter the Nuclear Age."

Minnesota Governor

Seaborg's defense was heard by one of the AECs current antagonists, Minnesota's Republican Gov. Harold LeVander, here to meet later in the day with the atomic commissioners.

They met, discussed Minnesota's disputed position—that it can make nuclear plants adopt tougher radiation standards than the AEC's—and, LeVander said later, settled nothing.

But LeVander later visited Vice President Agnew and said he was "pleased." Rep. Clark MacGregor (R-Minn.) said earlier this week that Agnew feels Minnesota or any state should be able to make tougher anti-radiation rules if it wants, using federal standards only as a minimum.

Federal Power Commission Chairman John N. Nassikas said The Washington Post erred yesterday in reporting that his testimony Monday in effect supported Minnesota. "We believe the law gives the AEC control," he said. "It is this which is about to be tested in the courts"—in suits by Northern States Power Co., nuclear plant builder, against the state of Minnesota.

Houston Chronicle 11/17/69

Photo by Larry Evans, Chronicle Staff

WELCH FOUNDATION CONFEREES MEET
Left to Right, Dr. V. Strutinsky, Dr. G. Seaborg, Dr. I. Zvara

1000 Scientists Open Conference Sponsored by Welch Foundation

A thousand of the world's most brilliant scientists opened a three-day conference today at the Rice Hotel.

The meeting, focusing on man-made chemical elements, is sponsored by the Robert A. Welch Foundation.

"We hope to stimulate chemical research in Texas and in this area through a presentation of the latest scientific information by international experts in this field," said Dr. W. O. Milligan, the Welch Foundation's director of research.

Heading the list of speakers is Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission.

"This is the largest, most qualified group ever to meet in conference anywhere on this topic," Dr. Seaborg said.

The meeting coincides almost to the day with the 25th anniversary of the discovery of elements 95 and 96 (two of the earlier man-made elements), he said.

Dr. Seaborg was one of the codiscoverers of these elements while working on the Manhattan Project at the University of Chicago metallurgical laboratory.

He also was codiscoverer of the first artificially made element, plutonium, while he was a chemistry instructor at the University of California in Berkeley.

LOS ANGELES TIMES - Tuesday, November 18, 1969

OF ATOMS AND MEN

Warning Sounded on Anti-Intellectualism

BY IRVING S. BENGELSDORF, Ph.D
Times Science Writer

Almost 50 years ago, in his classic book "The Outline of History," H. G. Wells wrote, "Human history becomes more and more a race between education and catastrophe." His words, written right after the global trauma of World War I, sound even more prophetic today in our age of nuclear weapons, instantaneous worldwide communications, and computers.

Yet, in spite of Wells' warning and in the face of our sophisticated technological developments, a new wave of anti-intellecualism seems to be sweeping over society.

In a speech entitled "Science, Technology and the Citizen" presented in Stockholm at the recent Nobel symposium's discussion of "The Place of Values in a World of Facts," Dr. Glenn T. Seaborg, chairman of the U.S. Atomic Energy Commission states:

Warns of Tyranny

"I would hate to see some of man's current irrational behavior become an excuse for his acting and reacting on the basis of hate, fear, hysteria and ignorance. If we do not at some point—and, admittedly, on faith — trust in the power of reason and act accordingly, we will either end up living under the worst kind of organized tyranny or in a physical and spirtual jungle."

Dr. Seaborg continued, "The antirationalism or anti-intellectualism attitude is somehow tied to the ridiculous notion that the intellect and the emotions are divorced entities, that the thinking man cannot be a man of deep feeling and sensitivity.

"I believe that quite the opposite is true. Those who develop their minds, who understand the scientific disciplines, who think most deeply and broadly about man and nature, about the physical forces and the beauty of the earth and the universe—those individuals can achieve a far greater degree of sensitivity and emotional awareness than anyone who rejects the power of his mind. We need today more than ever men and women who can combine great intellectual power with a new depth of feeling and awareness."

Calls for Balance

Dr. Seaborg cautioned, however, that any benefits or advances of science and technology if used excessively, with poor judgment, must be balanced or they can become horrors. He pointed out: "If the medical advances that have prevented epidemics and prolonged life are not balanced with birth control, you face a new disaster.

"Take modern mechanized agriculture that, while producing more food, causes a flow of rural workers into cities, and if you do not balance it with greater education and newer opportunities for these displaced workers you face another explosive situation. Take any of the processes that add to civilization — modern water and sanitary systems, more efficient industrial production, larger power plants—and if you do not control and plan for their side-effects as well as their products and services you are in trouble."

And in the race between education and catastrophe, the electronic digital computer can play a major role, Dr. Seaborg stated, "We have, and are developing further, new ways to organize and communicate information. I think that over the coming decades we are going to see enormous strides in the application of the computer and that it will become a central part of the lives of all of us.

"Today we are still going through the stage where, while we may marvel at many of the things the computer can do, many of us still fear it, resent it and are only too happy when we can catch it in error. But in a world of many more people, far more complicated than it is today, we are going to be vitally dependent on the computer, and learn soon that its benefits will far outweigh its drawbacks and that it will grant us greater freedom, not become a tool of restriction and repression."

Technological advances provide tools to be used by society. According to scientists like Dr. Seaborg, there is need for more education, not less, to use these tools properly for the benefit of mankind.

DENVER POST, November 30, 1969

How technology can help man meet his goals

By GLENN T. SEABORG

Editor's Note: The following article is adapted from an address by Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission, at a Nobel symposium in Sweden. Dr. Seaborg is himself a Nobel Prize winner.

THE great questions before us as citizens of the world—and they are questions that must be answered by those of us at conferences such as these and by thinking, concerned people throughout the world—are:

- How do we move from awareness and alarm to agreement and action?
- How do we create and crystalize a universal urgency over such life-and-death matters for mankind when so much of that mankind remains educationally and spiritually fragmented?

How do we achieve global goals, a global commitment and a global course of action toward the solution of global problems in a world where the first priorities of so many must remain tied to their daily existence, where insecurity—real or imagined—shackles so much human creativity?

In what I have said to this point you may readily see exposed the attitude and outlook of a scientist. As such I am inclined to delineate problems in a logical and systematic manner, to attack them with confidence and a positive outlook.

This approach naturally carries over into my life as a private citizen and as a public official. But I would be the first to admit that there are powerful forces in the world today at work against such an attitude. What are some of these forces? How might we combat them? Let me devote some time to these questions.

Dangerous side-effect

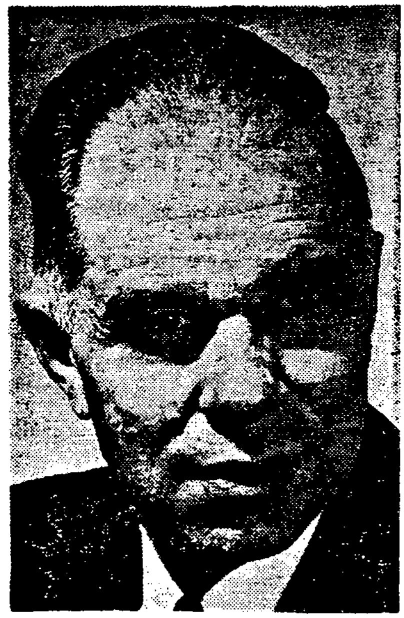
For one thing, our system of modern communications, effective as it is as an instrument of public education, is producing a dangerous side-effect. I believe too many people, bombarded daily by the mass media's pessimistic and disheartening emphasis on such subjects as pollution, poverty, the problems of controlling an exploding population and explosive political and military power, are falling victim to negativism and despair. Filled with a mixture of shocking facts and gloomy forecasts, they are too readily accepting the belief that we cannot or will not turn the tide of our mounting problems. They see only disaster ahead.

In his book, "So Human an Animal," Rene Dubos refers to this doomsday feeling as "the new pessimism" and says of it: "As the year

Denver Post, 11/30/69
(Continued)

antitechnological feelings taking place by establishing a more balanced and reasonable view of technology. The current outcry against technology has its roots to a great extent in the environmental problems that are receiving so much public attention today, particularly in the United States.

Because our productivity has moved far ahead of our current ability or past desire to handle the waste products associated with it, the discomforts and dangers of the latter are overbalancing the comforts and advantages of the former. The natural, or at least simplistic, reaction to this is to "turn off" technology, to return to earlier days and simpler ways. Even if this were possible — and we know it is not — I do not think, after a little reflection, that most of the people sharing this view would want to go back in time. I am inclined to agree with the spirit of the old French proverb "Ah, for the good old days—when we were so unhappy."



Dr. Glenn Seaborg

Creative technology

Technology can be directed creatively so as to bring human society into close harmony with its natural environment. It can be made to create more wealth with less waste—both waste products and waste of human and natural resources. It can be made to create beauty where we have let it spawn ugliness. It can be made to bring man both greater security and more individual freedom. What it does, however, will be accomplished only when we stop blaming it for our shortcomings, reassert our mastery over it and agree on what we want it to do.

We must also be willing to pay for advancing those scientific and technological developments that we find necessary to meet our agreed-upon goals. Particularly in the pursuit of a healthier environment there are large costs involved that, directly or indirectly, must be shared by society as a whole.

With population growths and a rise in the standard of living we must upgrade those technologies that will abate air and water pollution and control and manage solid waste. These are matters of international concern even though environmental pollution currently poses a greater threat to the more industrialized areas of the world.

During the coming years much will have to be done in the way of "technological assessment" — in wise planning for the development of man's new tools and for their application toward the most human goals with a minimum of harmful impact on the natural environment. All in all, we must not be against technology—we must be for better technology.

2000 approaches, an epidemic of sinister prediction is spreading all over the world, as happened among Christians during the period preceding the year 1000." Later, when speaking of the "new optimism," he states: "Despite the foreboding of the 10th century, the world did not come to an end in the year 1000. . . ." He goes on to point out that "the new optimism finds its sustenance in the belief that science, technology and social organization can be made to serve the fundamental needs and urges of mankind, instead of being allowed to distort human life."

My agreement with Dr. Dubos' last statement, I believe, classifies me as a "new optimist," and to be such today entails a certain responsibility which is often difficult to bear. I find it both frightening and pathetic that when I give a talk or write a statement that reflects some optimism and hope for the future so many people respond so gratefully, almost as drowning men grasping at straws. I believe we must fight such despair and emphasize that today's problems, as big and as pressing as they are, are not insurmountable.

Physically we are better equipped than at any time in human history to resolve those problems and realize many of man's age-old dreams. And our awareness of our problems and our knowledge of the urgency with which we must deal with them are also positive factors that are going to work in our favor despite the current pessimism they create.

In addition to overcoming the paralysis of negativism and despair today, we must combat the general surge of

Thurs., Dec. 4, 1969 San Francisco Chronicle 17

Seaborg Says A-Treaty Best Disarmament Hope

By David Perlman
Science Correspondent

The chairman of the Atomic Energy Commission is convinced the treaty barring the spread of nuclear weapons is the world's best hope for real disarmament over the next decade.

And without the safeguards in that treaty he feels, the world may very well not be around for another ten years.

But there's no doubt at all now that the treaty will come into force early next year and that more and more nations will ratify it. according to DriGlenn T. Seaborg. AEC chairman and Nobel laureate in physics.

Dr. Seaborg discussed the nuclear non-proliferation treaty during a press conference here yesterday at the national conference of the Atomic Industrial Forum. powerful trade association of the nation's nuclear industries... holding a discussion on the treaty's enforcement provisions. which will involve inspection of United States atomic firms by teams from the Vienna-based International Atomic Energy Agency.

The treaty has already been ratified by the United States, the Soviet Union and Britain .as the three major powers ith nuclear weapons. It ha salso been ratified by 22 smaller nations with no nucl.ar weapons of their own; when 18 more nations ratify it, the document will come into force.

France and Mainland China, with H-bombs of their own , have spurned the treaty.

Under the pact the three powers with nuclear arms promise not to spread weapons or weapons materials to other countries. and not to help other countries make weapons of their own.

The other adherents pledge not to make atomic weapons, not to build up stockpiles of weapons material such as plutonium. and not to help each other on any nuclear weapons programs.

All the signers have agreed to opn all their vicilian nuclear plants and faciliites to international inspection

As Dr. Seaborg noted yesterday. any nation with a nuclear reactor could gradually accumulate weapons-grade plutonium because the element is produced as a by-product in reactor cores.

PLUTONIUM

With the swift world-wide growth of reactors producing electricity. Dr. Seaborg said. the non-weapons countries will have about 40.000 kilograms of plutonium by 1980.

On paper at least. this would be enough plutonium to make thousands of atom bombs — dozens a day. Dr. Jeaborg said.

But under the non-proliferation treaty international inspectors will be able to "expose and reveal to the world" any villation of the pact. including the secret stockpiling of pultonium for weapons or the illegal diversion of weapons material.

These safeguards are already in operation for nations receiving peacetime nuclear fuels through international Atomic Energy. That agency's inspector-general. Rudolf Rometsch of Switzerland. spoke at Seaborg's press conference yesterday. He said he is completely satisfied that in the past seven years there has not been a single violationo of safeguard agreements by any of the 30 nations now under inspection.

While new inspection methods will have to be arranged when the new treaty comes into force. Dr. Seaborg said he is confident there will be little chance for any nation to cheat the inspeciton system.

As for France and China, the AEC chairman said he is sorry they are not signing the treaty, but that if the further spread of nuclear weapons can be prevented there will be a real chance for more successful disarmament talks in the coming decade.

"We might not have another ten years at all if we don't hve the treaty and its safeguards." Dr. Seaborg said.

Seattle Times, December 7, 1969

Nuclear Power: Conference Depicts Friendly Atom

By BOB LANE
Times Staff Reporter

PORTLAND — By the end of the two-day conference the message almost had become tiresome through repetition: Nuclear power is not dangerous; it can be a good neighbor, and it is needed.

The stage for the scientists, technicians and bureaucrats who delivered the message in a succession of talks and papers here was the Northwest Conference on the Role of Nuclear Energy, a program sponsored by Gov. Tom McCall of Oregon.

Without hesitation and without variation, experts from across the United States and Great Britain said that what little pollution is caused by nuclear power plants does no harm and that it is the best understood and best controlled of all the pollutants that man produces.

Two speakers had some questions and worries about the use of the atom to generate electricity, but they agreed that the nation's energy needs cannot be filled without using the atom.

LEADING THE TEAM of pro-atom speakers was Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission. Seaborg described the studies made by dozens of scientists of the radio active wastes escaping from nuclear power plants and the controls and standards imposed by the A. E. C. to keep the level low. He added:

"I would like to emphasize here that on the basis of such information these effluents are not causing any environmental harm and will not in the future so long as we maintain our present standards of performance."

Seaborg said nuclear plants also must be located and designed to prevent damage to the environment from waste heat.

Dr. H. J. Dunster, of Oxford, England, director of the International Commission on Radiation Protection, said bluntly:

"Radioactivity is not a problem . . ."

Dunster said the people of Europe and Great Britain are not worried about heat and radioactive wastes from nuclear power plants.

"They are concerned with the natural beauty and are especially concerned about power lines. They hate 'em like hell,"," Dunster said.

Speakers explained that the amount of radioactivity allowed to escape from nuclear plants has been established by international agreement. The amount of radioactivity escaping from United States power plants, with one exception, amounts generally to less than 5 per cent of the permitted level.

One plant, with some poor internal parts, went much higher before it was repaired — but it never reached the permitted maximum level.

Dr. Arthur Tamplin, a biophysicist at the Lawrence Radiation Laboratory in Livermore, Calif., said the nation has the knowledge to make a nuclear-power -plant accident "almost impossible" and urged that stricter controls and guidelines be established by the A. E. C.

ANOTHER SPEAKER with reservations was Louis S. Clapper, conservation director of the National Wildlife Federation in Washington. He said nuclear plants, if properly operated, produce fewer pollutants than other types of power plants. He recommended that the states form agencies to plan the orderly development and placement of nuclear power plants and predicted the public would willingly pay the higher cost of power from plants that do not harm the environment.

Dr. Morton Goldman, vice president of Nuclear Utility Services, said: "Nuclear power provides the best basis for preserving the environment for the future."

Goldman explained that the world is naturally radioactive and that it can be measured. He said that nuclear plants have been operating without causing any increase in that natural background radiation level.

The harm to the public from radioactive wastes can be calculated and "usually is so small as to be statistically zero," Goldman said. In total, its effect might cause less than one extra case of leukemia among 8 million people in a 40-year period, Goldman said.

Ernest B. Tremmel, director of the Division of Industrial Participation of the A. E. C., said he is "somewhat surprised" at the concern expressed over nuclear plants and said he believed public doubt has developed because "we have been talking too much to ourselves and not to the public."

Russell Train, undersecretary of the interior, said the government must work to bring understanding of the nuclear program to the public, adding that "an informed public is our critical need."

Train also urged the development of new procedures for the selection of nuclear-power sites "to provide power planning on a sound basis with consideration of the environment . . . we must stop pretending environmental problems don't exist and that they are not important. They do and they must be met in cooperation with an informed citizenry."

Sports Editor

New Wages For Old Sin

SF Chronicle 12/11/69

Art Rosenbaum

LIKE SEX, there is a new submissiveness in Pacific Coast college football. A decision to allow board, room and tuition to an athlete was approved by the Pacific-8 and it has turned the moralistic table upside down.

What was scandalous sin only 15 years ago is now s.o.p. It is in tune with our times and, in its way, a remarkable story.

Dr. Glenn Seaborg

When the Pacific Coast Conference was formed in 1915, the only code was a gentlemen's agreement that sport was amateur. None would be paid to play.

But then the tramp athlete appeared, a fellow who would play four years in one school, change his name, and start somewhere else.

The "ringer" was introduced for big games. Money changed hands.

It was necessary to set up some rules. Along the line the PCC devised the purest code in the history of U.S. sport. Violations were frequent and, in 1940, the Conference appointed a former FBI man, Edwin Atherton, to investigate and police its tight recruitment-subsidization code with the eventual plan of writing a new set of rules. His report, after the first two years, totaled two million words. That man, and those PCC representatives, were SINCERE.

★ ★ ★

ONE AWFUL RULE—by modern thinking—was a restriction on writing or visiting a prospective athlete. The penalty—ineligibility for the athlete.

In 1941, Atherton announced the names of 13 Oklahoma and Texas prep graduates who would be ineligible if they attended Stanford. Their crime? They had received a letter from a Stanford alumnus inviting them to consider Stanford as an institutoin of higher learning.

Many of them went to Oklahoma U. instead and helped create some tremendous football teams there.

Atherton died in 1944 and Vic Schmidt, another ex-G man, took over. In 1953 a scandal broke on confessed "under the table" payments to football players at Washington, USC and UCLA. Other schools were suspected of using slush funds to acquire and care for athletes but were not penalized.

★ ★ ★

BY THE RULES, one school was allowed to accuse another of wrongdoing, and the Commissioner's office would start an investigation. It was a tattle-tale world and the revelations were considered very, very juicy. When the semi-annual conference meetings were held, the press was there in bunches to dredge up the saucy stuff on suspensions or fines.

Dr. Glenn Seaborg, Nobel prize winner in chemistry, was the University of California faculty athletic representative and was usually the appointed spokesmen at these Conference meetings.

In mournful tones, he would list the infractions — some less sinful than the lifetime prisoner who stole a loaf of bread in 'Les Miserables' — and the newspapers would banner the penalties.

I often thought, then, that the insoluble problems in athletics drove the great discoverer of one chemical element away from the campus to accept a high post with the Atomic Energy Commission.

★ ★ ★

PAPPY WALDORF had taken three successive UC teams to the Rose Bowl, but the harassment of dealing with precocious freshman quarterback Ronnie Knox and his equally notorious father, Harvey, may have hastened Papy's departure toward the relative calm of a new job as chief scout for the 49ers.

Harvey was an official recruiter for the Southern C's, a Cal alumni fund-raising group, and he admitted contacting a lot of athletes and in some cases buying their dinners.

The revelations were wild. One came from UCLA where football players were sent downtown once a week to collect their $25 to $50 pay checks.

The old PCC broke up. Later it was re-organized to become the Athletic Association of Western Universities (AAWU). The first major agreement was individual integrity — each school would police its own, and the commissioner's investigative staff was abolished.

★ ★ ★

IT IS AMAZING, now, how little scandalous news has came out of the new conference, now known as the Pacific-8. When nobody pointed a finger, all the juice ran out of the stories.

Certain lenient rules were established on work-hours by athletes. The whole book was thrown away on the amount of volunteer money that could be spent on recruitment. Of course, gratuities or excessive gifts or salaries are forbiden, but if such transgressions occur, their discovery is kept strictly intramural.

The "free ride" lifts the final self-righteous barrier from Coast football. The free ride allows an athlete MORE than he got under the Table.

Sin? What are you?

WASHINGTON POST 12/28/69

Head of AEC Reports Progress and Protest

W. Post Associated Press 12-25

The chairman of the Atomic Energy Commission said yesterday the nation's nuclear energy program experienced "protest along with progress" during 1969—especially in the area of atomic power plants.

The chairman, Dr. Glenn T. Seaborg, said in a year-end statement that concern was voiced during 1969 by some segments of the public "over possible environmental effects of nuclear power plants." Then he added:

"It became more apparent that there was still a lack of understanding of nuclear energy within a large segment of the public and that fear of the atom, because of its introduction in a weapon, was still a factor in resistance to its peaceful applications.

"The commission is working to increase public understanding of nuclear power through forums, public debate and an expanded educational program."

Seaborg noted that the number of new nuclear plants ordered in the United States dropped in 1969, following a trend begun in the previous year.

"Seventeen units totaling nearly 16 million kilowatts were ordered in 1968 and only six units totaling six million kilowatts in 1969," he said.

"Public concern was a factor but the setbacks were caused primarily by rising costs and construction delays."

Nevertheless, he said, the AEC has not changed its forecast of a 150-million kilowatt production capacity for U.S. nuclear plants by 1980.

With such a capacity, nuclear power would be capable of furnishing one-fourth of all the nation's requirements for electric power.

On the progress side of the ledger, Seaborg said:

"Meanwhile, the breeder reactor technology has developed to the point where we can predict that transition to large commercial breeders, which make more nuclear fuel than they consume, will begin in the mid 1980s.

"This reactor is the key to fulfilling expanding energy demands for a growing population by furnishing an abundance of cheap, clean electrical power."

Scientists Seeking to Expand Periodic Table

Theory Indicates Number of Synthetic Chemical Elements Can Be Increased

BY DR. GLENN T. SEABORG
Exclusive to The Times from Science Service

The year 1969 marked the 100th anniversary of the formulation of the periodic table of chemical elements by the famous Russian chemist, Dmitri Ivanovitch Mendeleev.

Celebrations in honor of this event were held throughout the world, because the order which Mendeleev derived from the relative chaos of chemistry in the 1860s has profoundly affected science ever since.

Everyone who has taken high school chemistry will recall the periodic table. It now seems so obvious that the periodic similarity in properties of groups of elements is not an accident but another elegant example of the orderliness of nature.

The concept of periodicity in the chemical elements is still a very active scientific challenge. A great stimulus to expand the confines of the periodic table has come from one of the most exciting theories that has been developed since the discovery of nuclear fission—one that is receiving the attention of hundreds of scientists. It proposes that the number of chemical elements which can be created synthetically can be increased substantially.

Dr. Seaborg is chairman of the U.S. Atomic Energy Commission. He won the Nobel Prize for Chemistry in 1951 for the discovery of elements heavier than uranium — the heaviest known to exist naturally.

Until a few years ago, scientists were more or less satisfied with a state of affairs which said that about 90 elements exist in nature, their origin being the primordial events which created the solar system and probably the universe. To these, scientists added the 14 elements or so that have been created by nuclear processes on earth through man's ingenuity, and scientists thus account for 104 elements—the building blocks of matter. When they are arranged in groupings which show trends in their chemical properties, these 104 elements comprise today's periodic table. The 104th element was only added conclusively to the periodic table in 1969.

View New Elements

Now scientists predict that one or more regions of previously unexpected nuclear stability should exist far beyond the existing limit of the periodic table. That is, it should be possible through nuclear reactions to create new elements which possess properties completely different from any matter now known.

To understand the nature of this process, it should be recalled that the nucleus of each atom consists of protons and neutrons, and that the number of protons identifies each chemical element. The number of protons is called the atomic number; uranium, the heaviest naturally occurring element, has the atomic number 92, and element 104, mentioned above, has 104 protons in the nuclei of its atoms.

Scientists know that certain specific numbers of protons and neutrons provide to the nucleus exceptional stability against radioactive decomposition. This effect was observed more or less empirically at first, and the numbers were called "magic numbers."

Nuclear theory can explain why certain numbers of protons and neutrons are magic, and indeed can predict the existence of magic numbers that have not been observed experimentally. When a given nucleus has magic numbers of both protons and neutrons, then even greater stability can be expected.

Magic Numbers

The islands of stability are thus centered around predicted doubly magic numbers of protons and neutrons. One island is expected in the vicinity of the hypothetical element with 114 protons (element 114) and 184 neutrons. Both are magic numbers.

The calculations actually indicate that elements 110 to 114 could be quite stable, so much so that some scientists are trying to find them as minute quantities in naturally occurring materials, on the basis of the belief that they might have been created along with the other elements of the solar system and have not been completely lost by radioactive decay.

Another island is expected in the vicinity of hypothetical element 164.

What can be said about the properties of these undiscovered elements?

Here scientists again resort to predictions based on theoretical calculations which enable extension of the periodic table.

It can be seen that element 110 falls below platinum and thus is expected to be like that precious metal in its properties; element 111 would be somewhat like gold, element 112 like mercury, element 113 like the relatively rare metal thallium and element 114 like lead.

Strangely enough, element 164 falls under element 114 and thus the two hypothetical elements which are predicted to serve as centers of islands of stability might be similar chemically.

I caution that predictions of this sort are somewhat risky and must be taken with a grain of sodium chloride, chemically speaking. Still, the indications that these elements will be created by man some day soon are so strong that the pleasure of scientific speculation cannot be denied.

L'Opinion, January 5, 1970

Au cours de la conférence de presse tenue hier, à Casablanca

« Il faudrait former davantage de techniciens marocains »

déclare le professeur Gleen T. Seaborg, président de la commission américaine pour l'énergie atomique

Le professeur Gleen T. Seaborg, président de la commission américaine pour l'énergie atomique et récipiendaire du prix Nobel 1951 (découverte de l'iode 131 et d'autres éléments), a tenu hier matin une conférence de presse en la résidence du consul général des Etats-Unis à Casablanca, M. Woolf.

Le professeur Gleen T. Seaborg, entouré des huit hommes de science qui composent la délégation américaine, ainsi que de MM. Lawrence et Ralph du consulat général des USA dans la capitale économique, à tout d'abord défini le but du voyage entrepris par les personnalités américaines au Maroc, et qui consiste essentiellement en une mission d'information scientifique.

Le président de la commission américaine pour l'énergie atomique a ensuite commencé son entretien avec les journalistes en déclarant : « C'est sur la suggestion de M. William Rogers, ministre des Affaires Etrangères des Etats Unis d'Amérique, que nous entreprenons actuellement un périple d'études qui nous conduira dans différents pays africains.

« Dans mon cas particulier, a ajouté le professeur Gleen T. Seaborg, je fais partie de la mission américaine en tant qu'homme de science et non en tant que président de la commission américaine pour l'énergie atomique des USA ».

Après avoir présenté les membres de sa délégation, le conférencier a souligné que le but de son voyage est de mieux connaître la science dans les pays africains, de recueillir les renseignements les plus divers à son sujet, et d'en faire part à de nombreux scientifiques américains ».

Par cette plus ample connaissance de la science africaine, a déclaré le professeur Seaborg, nous espérons surtout amener une entente entre tous les hommes de science Américains et Africains ».

Pour ce qui est du cas particulier du Maroc, le professeur Gleen T. Seaborg a déclaré : « Notre mission a déjà entendu parler de l'application dans ce pays des isotopes radioactifs dans les hôpitaux pour le traitement de certaines maladies, mais aussi dans l'agriculture. Nous espérons par nos contacts futurs en apprendre plus à ce propos très intéressant et nous renseigner à l'occasion par nos différents spécialistes biologistes, ingénieurs, experts en application des isotopes etc... sur les installations modernes des hôpitaux du Maroc qui abritent des dépôts de cobalt 60 à rayons Gama.

Interrogé si la mission scientifique américaine avait en perspective des projets de coopération pour l'avenir avec le Maroc, le professeur Gleen T. Seaborg a répondu par la négative, rappelant qu'il était seulement question de recueillir ou d'échanger des renseignements sur diverses données précises.

« Le conférencier a dit par ailleurs que des visites de courtoisie seront faites lundi 5 janvier (aujourd'hui) aux ministres de l'Agriculture et de la Santé, au conseiller commercial du Premier ministre, au directeur du département économique et technique du ministère des Affaires Etrangères, ainsi qu'à différentes personnalités marocaines pour de larges échanges de vues.

Prié de dire enfin ses impressions et ses suggestions après les renseignements scientifiques recueillis jusqu'ici sur le Maroc, le professeur Gleen T. Seaborg a répondu : « Les informations dont nous disposons jusqu'à maintenant sont très relatives. Toutefois, l'impression première que nous avons dans le domaine particulier de l'application des isotopes radioactifs au domaine de l'agriculture et dans d'autres domaines, tel celui de la santé par exemple est qu'il faudrait former davantage de techniciens marocains — si ce n'est à l'échelle des médecins, du moins à l'échelle des techniciens — pour l'application de ces isotopes.

« Pour ce faire des centres de formation spécialisés devraient voir le jour ».

Le conférencier a conclu en ajoutant qu'il ne pourrait donner d'autres informations précises qu'à la fin du séjour de la délégation américaine au Maroc.

The Ethiopian Herald, Addis Ababa, Ethiopia, Friday, January 9, 1970

Afro-American Contact Of Scientists Urged

Dr. Glenn T. Seaborg, chairman of the US Atomic Energy Commission (USAEC) said here yesterday that individual contacts between African and American scientists should be established soon to let science work out its role in national development.

His Imperial Majesty, Haile Selassie I, received in audience Dr. Glenn Seaborg, a Nobel Prize winner and Chairman of the U.S. Atomic Energy Commission, yesterday morning at the Grand Palace.

Dr. Seaborg said in an interview with *The Ethiopian Herald* that technological advancement in the developing countries could be enhanced through friendly contacts of scientists working in a variety of scientific fields.

The USAEC head arrived here Wednesday afternoon with a group of eleven American scientists engaged in a ten-day tour to Africa.

Their main objective of establishing individual contacts between African and American scientists could be achieved easily, Dr. Seaborg believes.

This group of American scientists met and discussed with the university officials, deans and professors, "working scientists" from various private and government agencies and officials from different ministries. In a reception at the American Embassy held yesterday evening, Dr. Seaborg talked on the role of science in developing countries.

The tour was organized by the US Secretary of State William Rogers and the group of scientists will later report about their ten-day "experiences" in Africa.

This tour was organised because the American Government "wants better relations" between African and American scientists, Dr. Seaborg said. He hopes that the tour will also enable the formation of an association between African and US scientists.

Besides prominent scientists and heads of scientific and technological departments, the group includes Ambassador H. Taff from the US foreign affairs department.

The American scientists are due to leave for Nairobi today and later visit Congo Kinshasa and Ghana before they go to Spain and other European countries.

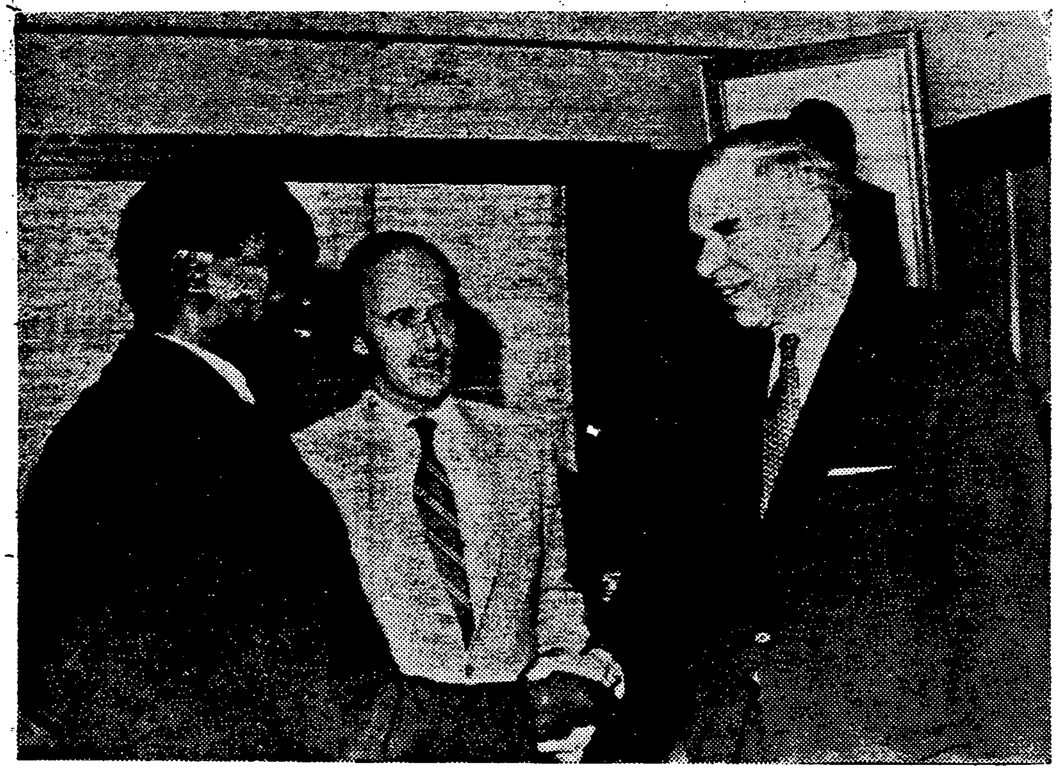
Dr. Seaborg, is a Nobel Prize winner in chemistry and physics and has so far discovered twelve elements and isotopes.

He says an important application of atomic energy to the needs of developing countries is the use of radioisotopes in fields such as medicine and agriculture.

Radioisotopes could be used for the diagnosis and treatment of disease and radioactive isotopes could help increase agricultural production when used as fertilizers and insecticides, Dr. Seaborg said.

Later yesterday, Dr. Seaborg made a courtesy call on His Imperial Highness Crown Prince Merid Azmatch Asfa Wossen at his residence.

East African Standard, Nairobi, Africa. January 10, 1970



The Vice-President, Mr. Moi, met Dr. Seaborg in his office yesterday. The picture shows Mr. Moi and Dr. Seaborg talking. With them is the American Ambassador to Kenya, Mr. McIlvaine.

U.S. promise on scientific aid to Kenya

Despite the disparity in scientific and technological development between African nations and the United States, America will provide scientific and technological aid, particularly in medicine and agriculture, to the developing world.

This assurance was given by a top American nuclear scientist and chairman of the United States Atomic Energy Commission, Dr. Glenn Seaborg, who arrived in Nairobi yesterday for a two-day visit to Kenya.

He told a Press conference that the United States recognises the disparity and "wide gap" that exists between the United States and the developing nations of Africa, but scientific sophistication can still be put to use in Africa at the "level that Africa operates".

Dr. Seaborg, who is accompanied by 11 top U.S. scientists from the Atomic Energy Commission, the Division of Biology and Medicine, and the Division of Inter-National Affairs of the U.S. State Department, promised that the U.S. would use her knowledge to help Kenya.

The group, he said, wanted more contact between the American scientific community and their counterparts in Africa.

Dr. Seaborg said this was because America believed it useful to develop closer ties between American and African scientists as individuals in a bid to increase communication with the public.

— *K.N.A.*

Texto: Dr. Glenn T. SEABORG,

Premio Nobel de Química 1951, presidente de la Comisión de Energía Atómica de los Estados Unidos
(Coprensa.)

LA CIENCIA Y LOS JOVENES

Madrid, domingo 11 enero 1970 4 Ptas.

Escribe Glenn T. Seaborg
PREMIO NOBEL DE QUIMICA

LOS BENEFICIOS TECNOLOGICOS PUEDEN ENGENDRAR, POR PRIMERA VEZ EN LA HISTORIA, UNA PAZ MUNDIAL AUTENTICA Y DURADERA

LA ciencia se ha convertido en uno de los blancos favoritos de los jóvenes filósofos de hoy día y también de algunos de los más maduros y respetados críticos de la sociedad actual. Hay muchas razones que hacen comprensible esta actitud.

La ciencia ha aumentado el bienestar material del hombre, pero también ha ampliado sus conocimientos y elevado sus metas y sus sueños. Por consiguiente, un nivel de vida que hace unas cuantas generaciones hubiera parecido utópico, a menudo aparece hoy inadecuado.

Por otra parte, estos servicios de la ciencia, de valor incalculable, no hubieran podido llevarse a cabo sin someter duramente a prueba la capacidad de la sociedad para asimilarlos. Asimismo, la ciencia no habría podido dejar de ser identificada con el origen de las enormes dificultades que han acompañado a sus dramáticos logros.

Un número sin precedente de estudiantes se está especializando en las disciplinas científicas; pero otros muchos las miran sin interés y aun con repugnancia. Ni siquiera adoptan una actitud neutral frente a las cuestiones científicas, antes bien, las consideran como si se tratase de un enemigo. El origen de esta reacción quizá se halle en una desafortunada polarización de la sociedad en lo referente a muchas cuestiones.

Esta antipatía hacia los conocimientos científicos es muy de lamentar, sobre todo porque afecta en especial a los estudiantes más interesados en los grandes problemas sociales de nuestros días.

Ante todo hay que aclarar perfectamente a los estudiantes que la ciencia no es una conspiración para destruir el espíritu humano y la belleza de la vida, sino que se trata de una búsqueda sistemática para descubrir los misterios de la Naturaleza y del Universo, de una compilación de conocimientos destinada a responder, algún día, a las preguntas básicas que el hombre formula: ¿Quién soy? ¿Dónde estoy?

La tecnología no es meramente un intento encaminado a deshumanizar al hombre; de hecho, podría decirse que la verdad radica en un punto de vista casi totalmente opuesto. Un grupo de sabios de la Universidad de Harvard, después de estudiar durante cuatro años los efectos de la tecnología en la sociedad norteamericana, informó que "ésta es, probablemente, la primera época de la Historia en que una proporción tan elevada de seres humanos ha sentido su propia individualidad".

Algunas personas identifican los estudios científicos con los problemas a que dan origen, sin reconocer los efectos reales que han tenido a través de los siglos. Muchos de los críticos más severos han tratado de poner una barrera entre la ciencia y el flujo de la vida. Hubiera sido mucho más realista decir que la ciencia y el flujo vital se identifican.

Es de suma importancia comprender lo que la ciencia *puede* hacer en beneficio de la sociedad. Prácticamente, cuantos pasos hacia adelante ha dado el hombre han recibido el influjo decisivo del progreso científico. Pues bien: el progreso que alcance en el futuro dependerá también de la ciencia, incluyendo los problemas sociales que perturban a tantos jóvenes.

Los hombres de ciencia y los técnicos están investigando y perfeccionando soluciones para los grandes problemas de nuestros tiempos: reconstrucciones urbanas, viviendas de precio moderado, atención médica, producción alimenticia suficiente para todos los pueblos del mundo, control y eliminación de la contaminación, sistemas de tránsito bien organizados, medidas contra la sobrepoblación y sistemas educativos modernos. Las cuestiones que acabamos de mencionar constituyen algunas de las metas a las cuales se dirige la acción social, para cuyo logro se requieren las aportaciones de los hombres de ciencia y de los ingenieros.

Aun el objetivo supremo, la paz internacional, en última instancia, quizá se alcance mediante la cooperación de la ciencia y de la tecnología con la política y la diplomacia.

La difusión de los conocimientos científicos y de la capacidad tecnológica en escala internacional ayudará a eliminar las grandes desigualdades que separan a las naciones más avanzadas de las naciones menos avanzadas. Los beneficios tecnológicos, que en los Estados Unidos se toman como cosa muy natural—y que algunos desprecian—, elevarán en forma impresionante el nivel de vida de las naciones menos privilegiadas y, por lo tanto, ayudarán a hacer realidad las aspiraciones de una revolución mundial cuyos anhelos se agudizan de día en día. Estos adelantos pueden engendrar, por primera vez en la Historia, una paz mundial auténtica y duradera. Debido a la obra que han realizado en lo concerniente a los graves problemas sociales mencionados, los hombres de ciencia experimentan gran satisfacción no sólo por haber contribuido al aumento de los conocimientos humanos básicos, sino por haber hecho aportaciones de carácter social.

Mucho se habla actualmente sobre la enajenación de la juventud. Es un síndrome terrible, quizá, y en todo caso muy popular.

Supongamos que un equipo de historiadores y de especialistas en ciencias sociales descubriese un "cociente de enajenación" que pudiera aplicarse por igual a nuestra época y a las anteriores. ¿Sería más elevado el cociente actual que el de, pongamos por caso, un granjero o el de un artesano de hace dos siglos que tuviera que trabajar de sol a sol para poder subsistir? ¿Puede uno comparar la enajenación provocada hoy día por la necesidad de tomar un medicamento, que fácilmente cura una enfermedad, con la que surgía en el seno de una familia hace cincuenta años cuando uno de sus miembros se veía condenado a muerte por esa misma enfermedad?

Otra cuestión digna de tomarse en cuenta: solamente una sociedad próspera puede contar con un gran número de jóvenes que no tengan la necesidad de pasarse el día preocupados por la forma de conseguir la comida, alojamiento y ropa, y de satisfacer todas las otras necesidades urgentes de la vida diaria.

Bien sabemos que la sociedad norteamericana no es perfecta, a pesar de sus adelantos científicos y tecnológicos. Pero muchos jóvenes, y otros que ya no lo son, están tan impacientes por corregir lo imperfecto, que ni siquiera se fijan en lo bueno.

(Ilustración: Oscar ESTRUGA)

The Sunday Post - (East Africa's Independent Weekly)

Nairobi, January 11, 1970

Dr. Glenn T. Seaborg, American Nobel Prize-winning scientist and chairman of the U.S. Atomic Energy Commission, currently visiting Cairo, is shown here when he paid a call on Dr. L. S. B. Leakey at the Centre for Pre-History and Palaenthology, yesterday. Dr. Seaborg and his party, who arrived in Nairobi by air on Friday morning, leaves at 8 a.m. today.

— Photo by Mohamed Amin.

La Tribune Africaine, January 12, 1970

"La Tribune Africaine" 1-12-70

M. Seaborg parle de l'utilisation de l'énergie nuclaire en Afrique

M. Glenn T. Seaborg, lauréat du Prix Nobel de chimie et président de la Commission américaine de l'énergie atomique (CEA), estime que la première utilisation de l'énergie nucléaire en Afrique devrait être l'introduction d'isotopes radio-actifs dans l'agriculture, la médecine et l'industrie.

« Je crois savoir que le Kenya a pris un bon départ dans ces diverses applications », a-t-il déclaré à son arrivée à Nairobi, quatrième étape de sa tournée à travers l'Afrique.

M. Seaborg, qui est accompagné de onze autres savants américains, a souligné que l'un des buts de son voyage est de promouvoir des échanges entre les savants américains et ceux d'Afrique.

Il a signalé que cette tournée, qui a été préparée par le secrétaire d'Etat américain, M. William P. Rogers, met l'accent sur la valeur des contacts personnels entre les Américains et leurs collègues africains.

Un autre objectif tout aussi important de son voyage, a-t-il indiqué, est d'encourager les contacts entre les savants du monde entier et le grand public.

L'éminent savant américain a déclaré : « De nos jours, un pays en voie de développement est, par définition, un pays qui cherche à appliquer la science et la technologie pour le mieux-être de sa population.

« Grâce à notre association avec leurs savants, nous espérons faire profiter ces pays de nos connaissances ».

Peu auparavant, à Addis-Abéba, il déclarait à un groupe de savants, d'enseignants et de hauts fonctionnaires éthiopiens, qu'il considérait l'adoption, par les dirigeants du tiers monde, d'« une philosophie de soutien à la science et à la technologie » comme un facteur déterminant.

Il a souligné qu'une telle philosophie était nécessaire pour promouvoir la formation, sur une grande échelle, d'ingénieurs et de savants.

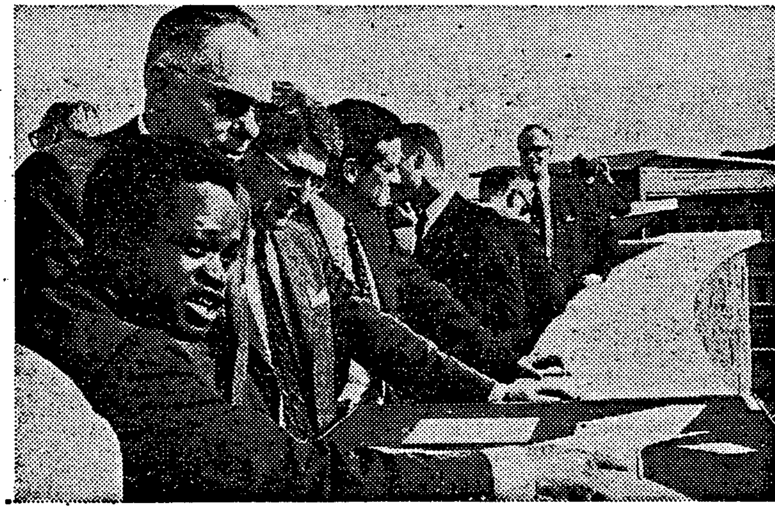
La compréhension des questions scientifiques devrait recevoir l'attention des dirigeants politiques des pays du tiers monde, a-t-il affirmé, afin de « promouvoir le bien-être de l'ensemble de votre population grâce aux progrès réalisés dans l'agriculture, la transformation des denrées alimentaires, les moyens de communications et dans la mise au point de matériaux et techniques de construction ».

M. Seaborg a affirmé que l'utilisation des isotopes en agriculture « permet d'obtenir de meilleurs engrais et substances nutritives pour les plantes et de produire des récoltes plus abondantes. Il a également souligné l'importance des isotopes dans la réalisation d'intéressantes mutations, dans l'éradication des maladies des plantes et dans la préservation des aliments.

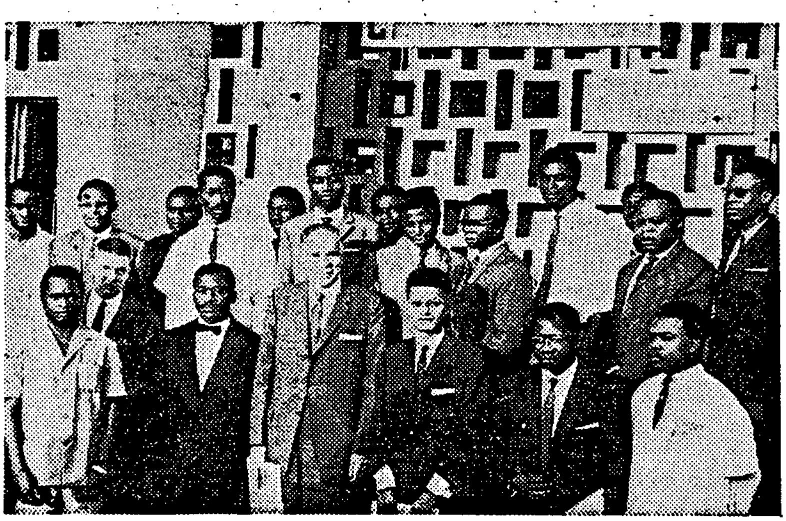
Durant son séjour au Kenya, M. Seaborg compte rendre visite au vice-président Daniel Arap Moi, rencontrer les scientifiques du Collège universitaire de Nairobi, s'entretenir avec les responsables des départements de chimie et de physique de cet établissement et prononcer un discours sur les utilisations pacifiques de l'énergie atomique.

Il projette également de visiter une station de recherche forestière et de s'entretenir avec M. Louis Leakey du Centre de préhistoire et de paléontologie.

La Tribune Africaine, January 14, 1970



Au cours de son séjour en République Démocratique du Congo du 11 au 12 janvier, le Dr Glenn T. Seaborg, président de la Commission américaine de l'énergie atomique a visité le Centre nucléaire Trico de l'Université Lovanium. Sur notre photo : Mgr Tharcisse Tshibangu, recteur de l'Université Lovanium montre la maquette des bâtiments de l'université à son hôte.



Au cours de son séjour en République Démocratique du Congo du 11 au 12 janvier, le Dr Glenn T. Seaborg, président de la Commission américaine de l'énergie atomique, a visité le Centre nucléaire Trico de Lovanium, le Dr Seaborg est entouré du professeur Félix Malu, commissaire général des sciences nucléaires et du personnel du commissariat.

EL PROFESOR SEABORG, EN LA REAL ACADEMIA DE CIENCIAS

Pronunció una conferencia sobre los elementos transuránicos

"Los alquimistas españoles del siglo X fueron los precursores de los químicos que, en el siglo XVI, dieron a España la reputación de ser el país más adelantado en química en el mundo occidental. La astronomía y la física desarrolladas en España durante los siglos X y XI tuvieron una influencia considerable en el adelanto posterior de la ciencia europea, y las primeras cartas marinas fueron realizadas por los cartógrafos y navegantes españoles."

Tras elogiar la tradición docente y científica de España, el profesor Glenn T. Seaborg, presidente de la Comisión de Energía Atómica de los Estados Unidos, abordó ayer tarde, en la Real Academia de Ciencias, el tema de su anunciada conferencia: "Los elementos transuránicos".

El profesor Seaborg trató a continuación de la tabla periódica de los elementos, tema de interés tanto histórico como objeto de investigación actual y futura. La razón por la que el conferenciante dijo haber elegido el tema es que estamos en el segundo siglo de evolución de la tabla periódica descubierta por Dimitri Mendeleyef el 6 de marzo de 1869. En 1969 se ha celebrado en todo el mundo el centenario de este suceso. El conferenciante explicó los precedentes de la Tabla de Mendeleyef en los trabajos de Döbereiner, Chancourtois y Newlands. Añadió que la clara preeminencia de Mendeleyef sobre los demás investigadores se debe a que tuvo la visión de reconocer que la tabla periódica constituye una ley fundamental de la Naturaleza. Por otra parte, Mendeleyef fue capaz de predecir la existencia y propiedades de elementos todavía no descubiertos, lo cual, cuando se comprobó la veracidad de sus predicciones, condujo a la aceptación universal de su Tabla.

Glenn T. Seaborg

DESCUBRIMIENTO DEL PLUTONIO

Explicó luego el profesor Seaborg el descubrimiento de los elementos con números atómicos 43, 61, 85 y 87 denominados tecnecio, prometio, astato y francio, respectivamente. Describió los trabajos de Fermi, Segré y colaboradores que en Italia comenzaron, ya en 1934, a intentar la obtención de elementos artificiales situados en la tabla después del uranio. Estas investigaciones —señaló— condujeron al descubrimiento de la fisión por Hahn y Strassmann en 1938. En 1940, en la Universidad de Berkeley, se descubrió el primer elemento transuránico, el neptunio, de número atómico 93. A finales del mismo año, un grupo de investigadores —del que formaba parte el propio Seaborg— descubrieron el elemento siguiente: el plutonio. Explicó después sus propias investigaciones para situar los elementos transuránicos dentro de la tabla periódica, creando una familia, los actínidos, hipótesis que quedó confirmada con el descubrimiento de los elementos cuyo número está comprendido entre 97 y 103.

LA DISCUSION SOBRE EL ELEMENTO 104

Respecto a los elementos de números 104 y 105, comentó que en 1964 un grupo de investigadores en el Instituto de Investigaciones Nucleares de Dubna (Unión Soviética), dirigidos por Fleroff, afirmaron haber descubierto un isótopo del elemento 104, al cual denominaron con el nombre de kurchatovio. Las investigaciones posteriores para confirmar la existencia de este isótopo no han dado un resultado positivo. Por otra parte, en la Universidad de Berkeley, Ghiorso y varios colaboradores afirmaron en 1968 y 1969 haber descubierto isótopos del mismo elemento. En esa Conferencia celebrada en 1969 Ghiorso afirmó que creía que los resultados de los trabajos de su grupo eran tan concluyentes que proponía que el elemento 104 recibiese el nombre de rutherfordio, en honor del físico Rutherford. La controversia entre los científicos de Dubna y de Berkeley aún no ha sido resuelta.

Fleroff y sus colaboradores, por bombardeo de americio con neón, en el ciclotrón de Dubna, han obtenido los isótopos que atribuyen al elemento 105, sin que estos resultados hayan podido ser confirmados por Ghiorso.

A continuación el profesor Seaborg describió los estudios realizados sobre la posible estructura electrónica de los elementos aún no descubiertos, posteriores al 103, llegando en su descripción hasta el elemento 168.

"Una cosa —afirmó, sin embargo— es predecir la estructura electrónica de elementos hipotéticos y otras es afirmar si alguno de estos elementos puede tener una estabilidad nuclear lo suficientemente estable para que pueda crearse por síntesis." Apoyándose en las últimas teorías sobre la estabilidad nuclear, expuso que determinados isótopos de los elementos 114 y 164 constituyen "islas de estabilidad", es decir, presentan una estabilidad relativamente alta, en comparación con los elementos que "les deben rodear".

Relató las investigaciones llevadas a cabo para hallar pequeñas cantidades de los elementos 110 a 114 en la Naturaleza.

SINTESIS DE ELEMENTOS TRANSURANICOS

Por último describió los métodos empleados para la síntesis de elementos transuránicos. Los actuales aceleradores parece ser que serán suficientes para sintetizar núcleos en la zona del elemento 114, pero no en la del 126. "Es necesario construir nuevos aceleradores o modificar los ya existentes —dijo— [illegible] tro de esta isla de estabilidad. [illegible] mento actual los dos aceleradores más importantes, dedicados a esta tarea, son el acelerador Lineal de Iones Pesados de Berkeley y los ciclotrones del Centro de Dubna, y ya se piensa en modificarlos para aumentar su potencialidad.

El acto estuvo presidido por S. A. R. Don Juan Carlos de Borbón, al que acompañaban, entre otras personalidades, el ministro de Educación y Ciencia, don José Luis Villar Palasí, y el presidente de la Corporación, don Julio Palacios.

Ocho millones de kilovatios «atómicos» españoles

Que "un científico nuclear ha de estar preocupado por la aplicación de sus investigaciones" y que "las conferencias sobre desarme son algo importante para cualquier hombre", fueron dos conceptos que profesor Seaborg, premio Nobel de Química y presidente de la Comisión de Energía Atómica de Estados Unidos, dijo en el curso de una rueda de Prensa celebrada ayer en Madrid, en la Embajada norteamericana.

"Un país en vías de desarrollo progresa según sea su capacidad para aplicar la tecnología de los países desarrollados a sus propias necesidades", dijo más tarde el doctor Seaborg que acaba de realizar, junto con otros once científicos americanos, un viaje por seis países africanos para, según propias palabras, "establecer un contacto científico a nivel personal".

Refiriéndose a España, y citando al profesor Otero, presidente de la Junta de Energía Nuclear y secretario de la Academia de Ciencias, el profesor Seaborg dijo que espera que en nuestro país se produzcan, al final de la década de los setenta, ocho millones de kilovatios de energía nuclear.

Arriba, January 15, 1970

MAQUINAS MAS POTENTES PARA CONOCER EL MUNDO SUBNUCLEAR

Conferencia del profesor Seaborg en la Academia de Ciencias

ASISTIERON EL PRINCIPE DE ESPAÑA Y EL MINISTRO DE EDUCACION Y CIENCIA

«Los alquimistas españoles del siglo X fueron los precursores de los químicos que en el siglo XVI dieron a España la reputación de ser el país más adelantado en química en el mundo occidental», dijo el profesor norteamericano doctor Glenn T. Seaborg, presidente de la Comisión de Energía Atómica de los Estados Unidos y Premio Nobel de Química 1951, en el curso de una conferencia pronunciada ayer tarde en los salones de la Real Academia de Ciencias Físicas, Exactas y Naturales, con el título de «Los elementos transuránicos». «La astronomía y la física desarrolladas en España durante los siglos X y XI —añadió— tuvieron una influencia considerable en el adelanto posterior de la ciencia europea. Las primeras cartas marinas fueron realizadas por los cartógrafos y navegantes españoles.»

El acto académico, de gran brillantez, estuvo presidido por Don Juan Carlos de Borbón, al que acompañaban, entre otras personalidades, el Ministro de Educación y Ciencia, don José Luis Villar Palasí, y el presidente de la corporación, don Julio Palacios.

La conferencia del doctor Seaborg trató más adelante de la tabla periódica de los elementos, tema de interés tanto histórico como objeto de investigación actual y futura. La razón por la que el conferenciante dijo haber elegido el tema es que estamos en el segundo siglo de evolución de la tabla periódica, descubierta por Dimitri Mendeleyev el 6 de marzo de 1869. En 1969 se ha celebrado en todo el mundo el centenario de este suceso. El conferenciante explicó los precedentes de la tabla de Mendeleyev en los Trabajos de Döbereiner, Chancourtois

El profesor Seaborg explicó después el descubrimiento de los elementos con números atómicos 43, 61, 85 y 87, denominados tecnecio, prometio, astato y francio, respectivamente. Describió los trabajos lasi, y el presidente de la Corporade Fermi, Segré y colaboradores que en Italia comenzaron en 1934 a intentar la obtención de elementos artificiales, situados en la tabla después del uranio. Estas investigaciones condujeron al descubrimiento de la fisión por Hahn y Strassmann, en 1938. En 1940, en la Universidad de Berkeley, se descubrió el primer elemento transuránico, el neptunio, de número atómico 93. A finales del mismo año, el profesor Seaborg formó parte de un grupo de investigadores que descubrieron el elemento siguiente, el plutonio. Explicó después sus propias investigaciones para situar los elementos transuránicos dentro de la tabla periódica, creando una familia, los actínidos, lo que quedó confirmado con el descubrimiento de los elementos cuyo número está comprendido entre 97 y 103.

Respecto a los elementos de números 104 y 105 comentó que en 1964 un grupo de investigadores en el Instituto de Investigaciones Nucleares de Dubna (Unión Soviética), dirigidos por Flerov, afirmaron haber descubierto un isótopo del elemento 104, al cual denominaron con el nombre de curchatovio. Las investigaciones posteriores para confirmar la existencia de este isótopo no han dado un resultado positivo. Por otra parte, en la Universidad de Berkeley, Ghiorso y varios colaboradores afirmaron en 1968 y 1969 haber descubierto isótopos del mismo elemento.

A continuación el profesor Seaborg describió estudios sobre la posible estructura electrónica de los elementos aún no descubiertos posteriores al 103, llegando en su descripción hasta el elemento 168.

Describió los métodos empleados para la síntesis de elementos transuránicos. Los actuales aceleradores parece ser que serán suficientes para sintetizar núcleos en la zona del elemento 114, pero no en la del 126. «Es necesario construir nuevos aceleradores o modificar los ya existentes —dijo— para alcanzar el centro de esta isla de estabilidad. En el momento actual los dos aceleradores más importantes dedicados a esta tarea son el acelerador lineal de iones pesados de Berkeley y los ciclotrones del Centro de Dubna. Se piensa modificar estos aceleradores para aumentar su potencialidad. En Francia y en Alemania también se están constituyendo aceleradores de estos tipos.»

RUEDA DE PRENSA

MADRID. (Pyresa.) — «Para 1980 los Estados Unidos producirán la mitad de su energía eléctrica en centrales nucleares. Es decir 150.000 (ciento cincuenta mil) millones de kilovatios. España intensificará para entonces su producción de energía nuclear hasta lograr los ocho mil millones», dijo ayer en una rueda de Prensa el Premio Nobel profesor Seaborg, descubridor del elemento plutonio, en la Embajada americana. Presidió este acto el embajador, señor Robert Hill.

En relación con otras preguntas que se le formularon, respondió que la colaboración entre los Estados Unidos y España en el campo del átomo, especialmente en cuanto a la construcción de fábricas de energía nuclear y centrales de isótopos, ha sido siempre excelente y con tendencia a incrementarse.

El profesor Seaborg resumió un viaje por diversos países de Africa, en el que ha tomado contacto con las gentes de más interés científico. Dijo que por la mañana visitó a los Príncipes Don Juan Carlos y Doña Sofía, antiguos amigos suyos; al Ministro de Asuntos Exteriores, señor López Bravo, y a la Junta de Energía Nuclear de Madrid.

ABC, Madrid, January 15, 1970

José Luis

Su Alteza Real el Príncipe Juan Carlos conversó animadamente con el profesor Seaborg después de su conferencia en la Academia de Ciencias

DON JUAN CARLOS RECIBIO AL PROFESOR SEABORG EN LA ZARZUELA

El químico norteamericano se entrevistó asimismo con los ministros de Asuntos Exteriores y Educación

El profesor Glenn T. Seaborg, presidente de la Comisión de Energía Atómica de los Estados Unidos y premio Nobel de Química 1951, visitó, a primera hora de la tarde de ayer, al Príncipe Don Juan Carlos, en el Palacio de la Zarzuela.

Asimismo, el profesor Seaborg se entrevistó con el ministro español de Asuntos Exteriores, don Gregorio López Bravo, y con el de Educación y Ciencia, don José Luis Villar Palasí, con los que mantuvo cordiales conversaciones.

Por la mañana visitó la Junta de Energía Nuclear acompañado por otros miembros de la Misión norteamericana que le acompaña. A su llegada al Centro fue recibido por el presidente del mismo, profesor Otero Navascués, y otros altos directivos.

En el salón del Consejo de la J.E.N., el profesor Otero Navascués explicó a los visitantes los trabajos que se están realizando en esta especialidad en España. El profesor Seaborg y sus acompañantes recorrieron detenidamente las instalaciones de la Junta de Energía Nuclear y mantuvieron más tarde un coloquio sobre el tema "El programa de reactores rápidos de los Estados Unidos".

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CIENCIA Y TECNICA JAN. 15 1970

EL PRESIDENTE DE LA COMISION DE ENERGIA ATOMICA U. S. A. DECLARA EN MADRID:

"NO CREO POSIBLE UN CONFLICTO ATOMICO MUNDIAL"

Por Ramón SANCHEZ-OCAÑA

EL doctor Gleen Theodor Seaborg, presidente de la Comisión de Energía Atómica de los Estados Unidos, y premio Nobel de Química en 1951, ha estado en Madrid. Su programa fue apretadísimo y sin transiciones de amplitud. A las siete de la mañana de ayer tomaba tierra en la base U. S. A. de Torrejón. Poco después hizo una detenida visita a las instalaciones de la Junta de Energía Nuclear. Después se entrevistó con el ministro de Asuntos Exteriores. Por la tarde convocó rueda de Prensa en la Embajada de Estados Unidos y a continuación pronunció una conferencia en el salón de actos de la Real Academia de Ciencias. Después se reunió con los miembros de la Junta de Energía Nuclear en una animosa cena. Y esta mañana, a las ocho y media, emprendió nuevamente viaje de regreso.

José Luis

El presidente de la Comision de Energía Aatómica de Estados Unidos dedicó, al terminar su disertación, un ensayo cnetifico a S. A. R. el Príncipe don Juan Carlos

Sin duda, el profesor Seaborg ocupa hoy uno de los cargos más importantes del mundo, de más responsabilidad, de más alcance. A sus órdenes están los programas atómicos americanos. A las órdenes de este hombre tremendamente alto, sonriente, expresivo y exclamador casi constante; de este hombre de manos largas y huesudas que las mueve como un pianista...

—Los planes deben ser el secreto más celosamente guardado del mundo...

—Nuestra misión es la dirección de todos aquellos trabajos y ensayos para el desarrollo de las aplicaciones pacíficas de la energía atómica, proyecto y fabricación de armas nucleares, etc.

EL DESCUBRIMIENTO DEL PLUTONIO

Todo empezó en 1937 en el centro de Berkeley, de la Universidad de California. El joven químico Glenn Theodor Seaborg, nacido en 1912 en un pequeño pueblo del Estado de Michigan, se dedicaba a la investigación. Cuatro años después conseguiría el puesto de profesor ayudante de la Facultad y la consideración plena por parte de todos. En 1942 se le reclama para el proyecto "Manhattan" para la fabricación de las bombas atómicas americanas.

—¿Cuál fue exactamente su participación en la creación de la bomba atómica?

—Creo que el descubrimiento del plutonio.

Lo dice con plena normalidad. El doctor Seaborg, padre de seis hijos, pese a todo, parece que pronuncia la palabra "atómico" con un sentido puramente pacifista.

—Y es que no creo en la posibilidad de un conflicto atómico mundial. Cada día se avanza más en las medidas que garanticen esa "estabilización" de potencias. La prohibición de pruebas nucleares y los tratados de no proliferación no tienen más que ese camino.

(Pero en el aire flota una duda: la de la necesidad. ¿Qué país, qué potencia renuciaría al empleo atómico ante una situación extrema?)

—Perdón, doctor: ¿la entrevista sostenida con nuestro ministro de Asuntos Exteriores, señor López Bravo, iba en algún sentido encaminada a comentar esa no proliferación?

—¡No! En absoluto. Fue una visita de cortesía, de amistad.

EL PREMIO NOBEL

En 1951 la Academia de Suecia concedía el premio al doctor Seaborg. Tenía entonces treinta y nueve años.

—¿Por qué fue, por qué trabajos concretos?

—Por mis investigaciones en el campo de los transuránicos —elementos más pesados que el uranio— y por el codescubrimiento del plutonio. Y digo codescubrimiento puesto que aunque participé en él, no fue obra exclusiva

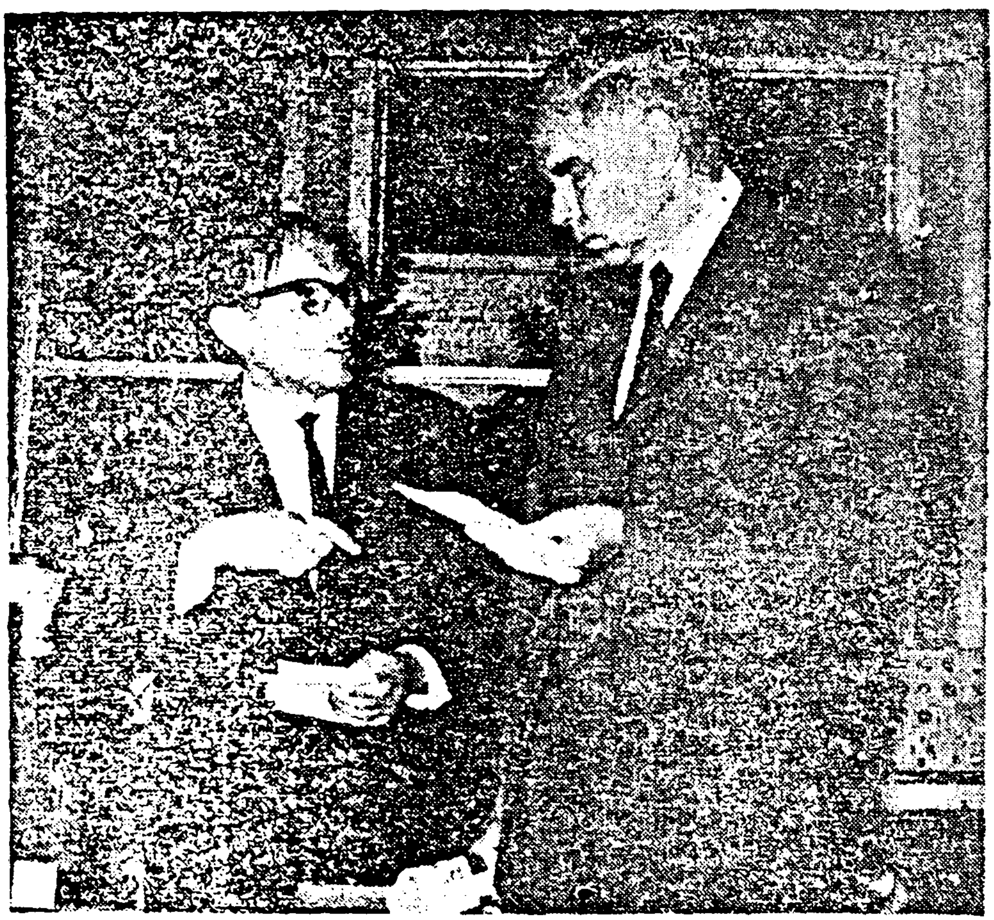
Daily Graphic 1/16/70

U.S. SCIENTIST VISITS MEDICAL SCHOOL

*** Dr Glenn T. Seaborg (below), Chairman of the U.S. Atomic Energy Commission, listening attentively to Professor B. Ringelhann, Chemical Pathologist of the Medical School, Korle Bu, during a discussion when the American visited the School.**

He was conducted round the various departments by Dr C. O. Easmon, Dean of the School.

Dr Seaborg, a Nobel Peace Prize winner in Science, was among a delegation of U.S. scientists on a visit to Ghana.



El Dr. Glenn T. Seaborg:

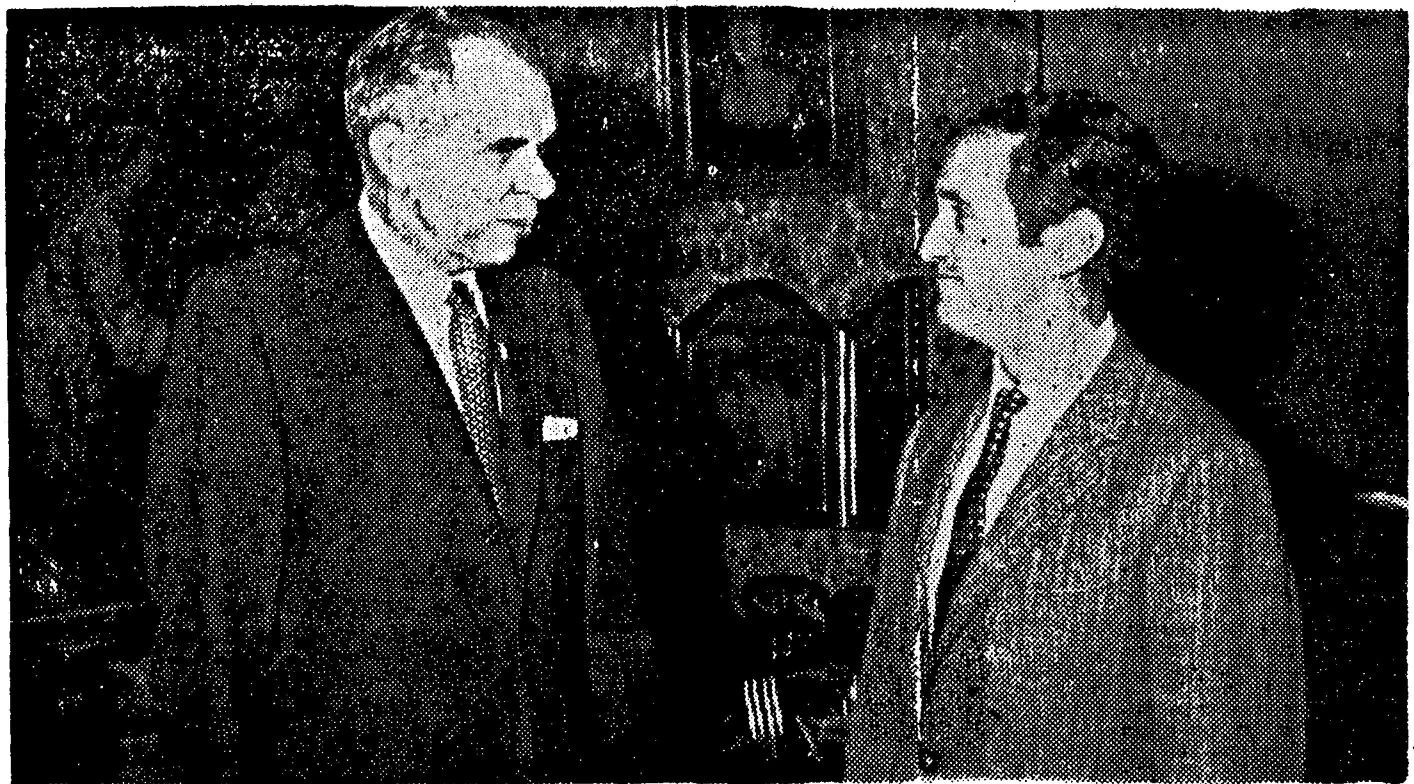
PREMIO NOBEL DE QUIMICA, 1951

ASESOR DE EISENHOWER

● CODESCUBRIDOR DEL PLUTONIO

«HONORIS CAUSA» DE 20 UNIVERSIDADES

PADRE DE SEIS HIJOS



Cifra

Dentro del apretado programa, el profesor Seaborg fue recibido por el ministro español de Asuntos Exteriores, señor Lópes Bravo. La visita fue calificada por el propio científico como «cortesía y amistad»

«LAS RESERVAS DE URANIO PUEDEN AGOTARSE SI NO SE EMPLEAN NUEVOS REACTORES»

Science, technology vs. irrationality

The sciences yield information about men and their universe. This data is used to modify the universe — and perhaps someday men themselves. But the upheavals in today's dynamic society demand changed *relationships* among men, as well as technological changes, says Nobel-prize winner Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission, in a Monitor interview with staff correspondent Neal Stanford.

Washington.

WHAT PART, IF ANY, IN YOUR VIEW, have the media played in creating a national attitude of pessimism and despair toward solving mankind's problems?

The rapidity of modern communications has contributed to that attitude. People today can see on TV in the evening the main events that have happened on that very day, and this of course is unique to the present time. It has never happened before. Also we are bombarded daily by the mass media's pessimistic and disheartening emphasis on such subjects as pollution, poverty, and the problems of controlling an exploding population. This tends to cause people to fall victims to negativism and despair.

Would you say that science and technology have advanced so rapidly and brought so many wonders for man's use that they are getting ahead of man's ability to assimilate them, use them, understand them?

Many people around the world are deeply concerned that science and technology have created a dynamic civilization, one that is producing change faster than our society can understand it or control it. Such change is producing ever-widening gaps—economic, social, and physical disparities—that are causing conflicts and crises ever more difficult to cope with. These gaps will continue to grow unless we recognize their causes and deal with them rationally. We can see all this vividly in the major challenges before us—in our efforts to establish world peace, in our dealings with environmental problems, in our work to control and feed the world's population, in our struggle to solve our urban problems and better organize our complex transportation and communications systems—and to carry out all this within political, economic and social systems that would respect human rights and recognize the importance of human dignity. That sounds like a tremendous order, but I think it is possible—eventually.

Is it possible that scientists as a group, because they grasp the great potential for the good of science and technology, are less pessimistic about the future of mankind than other people?

I know that a lot of scientists are less pessimistic, or maybe one should say more visionary, than other people. However many scientists suffer from a certain frustration that stems from the realization that so many of these problems could be solved if people would only apply the tools and the power of science, the tools that science can place at our disposal if we would only use them.

Why is it so difficult for scientists, who see the benefits possible from science, to get their views either before the people or understood by them in general?

The trouble is that the mechanism for putting science to work to solve our problems depends in most cases on the solution of political problems. Scientists can't do it alone. The help of the political leaders of the world is needed. You may have heard of the "club of Rome" which has been formed for the purpose of trying to call to the attention of the people of the world—particularly its political leaders—the situation that faces us as the result of the rapid advance of science and technology. This group is trying to mobilize world opinion, to lead people to proper actions that would enable us to master the changes that are taking place and to understand the possibility of harnessing the forces of science for the good of mankind. It has been suggested that the political leaders of the world's leading countries should form a sort of club with members getting together periodically to discuss these problems.

Is it your belief that the troubles we're having with air pollution, water pollution, and so forth are soluble or have they gone beyond our ability to solve them?

These problems are quite soluble through the application of science and technology. It's just a matter of solving the political and the economic and the social and the psychological problems that stand in the way of such a beneficial application of science and technology.

How do you go about getting the scientific solutions to our problems that you suggest are possible?

I think it is a matter of somehow making it clear to the people who are responsible for government that there is the possibility of scientific solutions to a number of problems facing us. This has been called by some the possibility of "technological fixes." But I don't believe these solutions can be applied until we've convinced a sufficient number of people as to the priorities involved, and this involves convincing people that we have to pay the economic price.

What would you today consider our greatest natural resource, our manpower, our physical resources, or our scientific and technological know-how?

I think that today our greatest resource is knowledge. I don't have in mind only scientific and technological knowledge, which are basic; but in order to put such knowledge to work we need to have knowledge on a broader scale, on a scale that involves and understands and realizes the political and sociological factors involved.

Some atomic energy scientists have come up with a fantastic proposal, which they call "the fusion torch," or control of thermonuclear power, that would do away with all waste. Is this more than a dream? Do you think it feasible?

The fusion-torch concept depends on our mastering what we call the fusion reaction. Fusion machines operating on a practical scale are some distance in the future. If we can master the fusion reaction, however, we have the possibility of actually accomplishing tremendous things, such as reusing our waste, almost any kind of waste.

In fact we can think in terms of an era when we can literally close the cycle of resource to man and back to resource. We can create something from the basic elements and use it as a product or service and then economically reduce it back to its basic elements for future use.

How long do you think it will be before we have controlled thermonuclear power?

I want to emphasize it is only in the development stage; it will require a great deal of work before it will be possible to have such a fusion reactor operating on a practical scale. People differ in their estimates as to how long this will take, but I would say it would be in the order of several decades.

In the last few decades we have seen some astonishing discoveries in science? Could you anticipate at least in what fields the next big revolutionary discovering would occur?

I can only surmise. My guess would be that the next most spectacular far-reaching or greatest advances will be in the field of the biological sciences, in the fields of the control of the genetic heritage of man, in the control of his personality and the psychological aspects of behavior of man, in prolonging the life of man, in increasing the well-being of man—his physical well-being.

Do you feel that scientists should become more active politically?

Well, I think scientists should get into politics. I do not think all scientists make good politicians. I'm not even sure that the average scientist makes a good politician, but I believe that in the scientific community there are many who have the potential to be good politicians. I would even like to see scientists as members of Congress, so they can participate in the day-to-day function of that important body.

But I should add that there are a number of congressmen who are becoming more and more knowledgeable of science, becoming increasingly cognizant of its potential.

To what do you attribute the present antitechnology and antirational approach to world affairs that seems to be spreading? Is it possible things are getting too big, too complex, for people to grasp, and they therefore become despondent and irrational?

I think it is due to a lack of understanding. Human history is becoming more and more a race between education and catastrophe. Dr. Michael Cozier, a French sociologist, has warned us to beware the temptation (difficult to resist) of arrogance or rationality; and he has stated that it was a kind of folly to assume that a rational view of the world based on the inevitability of scientific progress can cope with a fragmented, culturally diverse society full of complex emotional problems. I recognize his concern, but I would hate to see some of man's current irrational behavior become an excuse for acting and reacting on the basis of hate and fear and hysteria and ignorance.

You have suggested that human history is becoming more and more a race between education and catastrophe. Do you want to predict who is going to win this race?

Oh, I think we are. I think man will prevail. I think that education will win and that we can look forward to an increasingly better world in which to live.

NEW YORK TIMES, February 6, 1970

Seaborg Says Man Is Led by Science To Question Values

By NAN ROBERTSON
Special to The New York Times

WASHINGTON, Feb. 4—Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission, told Congress today that the age of triumphant science and technology was forcing man into a new philosophical era based on the "why" of living.

The Nobel Prize-winning chemist said that many scientists were beginning to ask, "What is being done with our discoveries?" rather than rejoicing in the discovery as an end in itself.

Dr. Seaborg expressed his belief that the "despair and negativism of the time" was a prelude to deeper and more positive thinking in which man would examine human values and goals. He said:

"I believe that one of the characteristics of the human race—possibly the one that is primarily responsible for its course of evolution—is that it has grown by creatively responding to failure."

He went on: "We have always experienced times when we have been dissatisfied, unhappy with ourselves and our conditions and lamented them profoundly before we took new steps to change them."

Man's growth in such eras seemed to have a momentum that carried it beyond the value of the times, he said, "and then, in conflict with ourselves and our surroundings, we had to sit back and rethink these values, reconsider our activities in terms of the quality of our lives and the directions they were taking."

Aid to Humanities Urged

Events and writings of recent years seem to indicate that "we may already be well into such an age" of soul-searching, according to Dr. Seaborg. The instruments of this self-examination are the humanities, he said.

Dr. Seaborg, the co-discoverer of plutonium and former chancellor of the University of California at Berkeley, was the first witness to testify today in favor of increased Government aid to the humanities.

The forum was a hearing before the House Select Subcommittee on Education, which is considering a bill that would double the appropriation this coming year for the arts and the humanities to $40-million, divided equally. The proposed budget for the Atomic Energy Commission, which Dr. Seaborg heads, is $2.5-billion.

Another witness, M. McNeil Lowry, vice president of the Ford Foundation, called Federal funds for culture "pathetically inadequate." He estimated that the Government would have to spend between $125-million and $150-million yearly "even to engage in a significant holding operation" for the arts alone.

He said that the national endowment for the arts was considering giving $3-million to symphony orchestras, while the Ford Foundation made $85-million available to 61 orchestras "just to give them the chance to fight for survival." Such a sum could by no means cure their chronic economic ills, he said.

'A Serious Limitation'

Aides at the Ford Fundhad hoped that five years after Congress established the National Foundation on the Arts and Humanities Federal funds would "vastly exceed" those of Ford and all other private foundations combined, according to Mr. Lowry.

"It is a serious limitation upon human resources that these hopes have not been realized," he said. "It is even more serious that neither the President nor Congress appears ready to push such an objective, an objective that is modest enough in the eye of history and even more modest when compared to identifiable needs."

On the other hand, only recently have the "people's representatives" given even token recognition to culture, Mr. Lowry said.

"However narrow, the way has nevertheless been opened," he said. "At a time when the Congress and the people grapple with the more and more complex fruits of materialism and technology, the Government's recognition of fundamental questions of value and creativity has surely a special importance."

Among the other witnesses at today's hearing was David P. Billington, professor of civil engineering at Princeton University. He said that a program there funded by the Government helped future-oriented technologists to study the past and learn how to build modern structures that were not only economical but "elegant," serving the needs of the people who occupied them.

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THE EVENING OUTLOOK, February 12, 1970

Man Of Achievement

Mrs. Al Herd (left), chairman of ARCS (Achievement Rewards for College Scientists), received at the science awards dinner with honored guest and speaker, Nobel Prize winner Dr. Glenn T. Seaborg, chairman of the U.S. Atomic Energy Commission, and Mrs. Saul Winstein, who introduced speaker, a close friend of the late Dr. Winstein. Dr. Seaborg's wife is a member of the Washington, D.C., chapter of ARCS but wasn't present.

—Evening Outlook Photos by G. Robert Smith

LOS ANGELES TIMES FEBRUARY 12, 1970

SPEAKING OF SCIENCE—Participating in ARCS science awards dinner are Niel Holmes, scholarship winner from Caltech; Dr. Glenn Seaborg, chairman of U.S. Atomic Energy Commission; Kathleen Todd, scholarship winner from Pomona College, and Mrs. John Alison, L.A. ARCS president. Scholarships totaled $86,500.
Times photo by Harry Chase

St. Louis Globe-Democrat
12A Fri., March 6, 1970

At the science symposium sponsored by Monsanto Co. Thursday are, from left, Dr. Thomas H. Eliot, chancellor of Washington University; Dr. Charles Allen Thomas, symposium honoree; Dr. Glenn T. Seaborg, chairman of the U.S. Atomic Energy Commission; Dr. Jean Mayer, of Harvard University, and Dr. Gerard Piel, publisher of Scientific American. —Globe-Democrat Photo

AEC Head Speaks Here

Science Linked to Quality of Life

The "positive power of science" must be reaffirmed to improve the "quality of life for most of mankind," Dr. Glenn T. Seaborg, chairman of the U.S. Atomic Energy Commission, said here Thursday.

Seaborg and other leading scientists and educators took part in a symposium honoring Dr. Charles Allen Thomas, retiring from the board of Monsanto Co. after 34 years as a top executive of the company.

THE SYMPOSIUM, at Stouffer's Riverfront Inn, was attended by about 600 civic, industrial, business and education leaders and 130 area college students.

Thomas, a former Globe-Democrat Man of the Year, was presented a mantel clock with chemical symbols instead of numerals by Charles H. Sommer, Monsanto board chairman, at a luncheon concluding the symposium.

Seaborg called for a "true interdisciplinary scientific approach, combining physical, biological, behavioral and social sciences, to improve the quality of modern life."

Like other speakers on the program, Seaborg stressed the necessity of halting pollution of air and water, as well as waste of natural resources. All these goals can be achieved by science, they declared, without impeding economic progress.

"Up to now," Seaborg noted, "the physical sciences have worked primarily to increase greatly man's consumption of natural resources with little consideration of their replacement and still less of the impact of their use and resulting waste."

He expressed the belief that this trend is changing, without resort to the "stop everything" demand being made by "frightened ultra-conservationists."

THE AEC chief pointed to nuclear energy as a potential source of electrical power that will replace current use of "fossil fuels" that are being used up at a dangerous rate. Also, he added, nuclear power plants could provide low-cost electricity and heat without polluting the air.

Research in fusion, another method of creating power, offers the promise of "providing us enormous amounts of energy, enough for millions of years, without producing radioactive ash, the fission products associated with today's nuclear power," he said.

Dr. Jean Mayer, Harvard professor and Presidential advisor on nutrition and health, spoke optimistically of technology's ability to prevent massive starvation in spite of the constant growth of the world's population.

Besides advances in agricultural methods that are improving crops, Mayer pointed to the development of methods to manufacture food from petrochemicals as a means of feeding millions in the future.

"AS ABUNDANT and cheap atomic power becomes available, oil and coal will increasingly be seen as raw materials for food and plastics rather than as fuel," he said.

Substitutes for pesticides and other chemical products harmful to life are being developed, Mayer said, just as all technology must be harnessed to help man achieve "the good life."

Chancellor Thomas H. Eliot of Washington University and Dr. Gerard Piel, publisher of Scientific American, also spoke briefly during the symposium.

Japan-US A-Energy Conference Opening

The second Japan-U.S. atomic energy conference will be held in Tokyo Tuesday with 20 Japanese and nine U.S. atomic energy experts attending.

Among the U.S. representatives attending the Tokyo Prince Hotel meeting will be Dr. Glenn T. Seaborg, Chairman of the U.S. Atomic Energy Commission, and Dr. C. Larson, member of the commission.

The Japanese delegation will include Shinichi Nishida, chairman of the Japanese Atomic Energy Commission and director-general of the Science and Technology Agency.

Observers believe that the discussion will center on the quantity of enriched uranium the U.S. will offer to Japan.

The U.S. so far has agreed to offer 161 tons of enriched uranium for a total of 13 new Japanese generators.

Japan, however, intends to demand more because of the expansion in atomic power generating capacity.

Mainichi Daily News,

Sunday, March 22, 1970

p. 4

Chairman Seaborg at Haneda Airport

NIHON KEIZAI, TOKYO SHIMBUN
Morning, March 22, 1970
p. 2

The Japan Times 3

Sunday, March 22, 1970

AEC Head Arrives For Conference

Dr. Glenn Theodore Seaborg, chairman of the U.S. Atomic Energy Commission, arrived here Saturday afternoon by NWA to participate in the second Japan-U.S. Atomic Energy Conference.

Dr. Seaborg

Dr. Seaborg is scheduled to visit EXPO '70 in Osaka today. He is to participate in the joint atomic energy conference as a U.S. delegate Monday and deliver a lecture at the third annual meeting of the Japan Atomic Industrial Forum Tuesday.

Three Japanese-language papers in their March 22 morning editions carried about 100-word articles reporting Dr. SEABORG's arrival at Haneda. Of these papers, NIHON KEIZAI and TOKYO SHIMBUN added, "Dr. SEABORG will visit EXPO on March 23. On March 24, he will represent the United States at the U.S.-Japan atomic energy conference. On March 25, he will deliver a special lecture at JAIF's annual meeting." The MAINICHI said that Dr. SEABORG will stay in Japan until March 26 and will visit EXPO, too.

K. Yasuda
AEC AM-EMB
TOKYO

Los Angles Times March 25, 1970

Seaborg Sees No Hint of Japanese A-Bomb

LA TIMES 3/25/70

BY DON SHANNON

Times Staff Writer

TOKYO — Japan would need three to five years to build a crude nuclear bomb and would have to break all its international agreements to do so, the U.S. Atomic Energy Commission chairman said Tuesday.

"And everybody would know they were doing it," Dr. Glenn T. Seaborg told newsmen.

Seaborg, who said, "We can be absolutely sure that this will not happen," gave his opinion in reply to a question. What was surprising was his time estimate—much longer than has generally been supposed necessary in a country where peaceful uses of atomic power are relatively advanced.

No Linear Accelerators

He explained that although Japanese scientists are competent in most branches of nuclear physics, they are weak in high energy physics because there are no linear accelerators here.

Seaborg and a new member of the commission, C. E. Larson, were here to discuss policy questions with the Japanese Atomic Energy Commission. One of his objectives, Seaborg said, would be to seek an acceptable solution to the problem of inspection under the nuclear nonproliferation treaty, signed by Japan last month with the reservation that the inspection terms must be satisfactory.

"I don't think it's the frequency of inspection that bothers the Japanese," the commision head said. "It's the amount of detail that inspectors will want."

Equality Sought

Seaborg said Japan is particularly concerned that its atomic industry will be in no way subjected to more detailed examination than the European countries belonging to Euratom, which has its own inspection system. The Japanese want complete equality to protect their trade secrets and ensure that the Europeans have no advantages.

With three atomic reactors built or under construction, using fuel supplied by the United States, Japan was inspected by U.S. atomic energy officials until 1962, when the task was delegated to the International Atomic Energy Agency.

Seaborg and Larson said IAEC inspection was being streamlined to intrude less and less into detailed operation.

The U.S. officials signed an $80 million contract with the Kansai Power Co. in Osaka Monday which will guarantee the supply of enriched uranium for the 28 to 30-year life of a new power reactor. Raw uranium of equal value will be supplied by Japan in return for the enriched fuel.

Japan has almost no uranium of its own but has reached long-term purchase contracts with Canada and other suppliers.

Thursday, March 26, 1970 The Japan Times

Aichi, Seaborg Hold Talks on N-Treaty

Japan has asked for United States cooperation to simplify and "equalize" procedures for the international inspection of nuclear facilities.

Foreign Minister Kiichi Aichi made this request when he discussed the ratification of the Nuclear Nonproliferation Treaty with Glenn T. Seaborg, chairman of the U.S. Atomic Energy Commission, at the Foreign Ministry, Wednesday.

Nuclear inspection is the major issue in the "safeguards agreement" concluded between signatories to the NPT and the International Atomic Energy Commission.

Japan hopes that inspection procedures in this country will be made as simple as those which apply to member nations of the European Atomic Energy Commission (Euratom).

Seaborg said it was evident that any international inspection should not obstruct the peaceful use of nuclear energy. The U.S. hopes that Japan's wishes regarding inspection procedures would be met, he added.

Also at the 30-minute meeting, Seaborg said that Japan's accession to the NPT would be vital to the effectiveness of the treaty.

Aichi replied that Japan would like to ratify the pact as long as it was convinced that the safeguards agreement to be concluded between Japan and the IAEA would be satisfactory to this country. Japan signed the treaty Feb. 3.

N-Power Meet Opens

Dr. Glenn T. Seaborg, visiting chairman of the U.S. Atomic Energy Commission, said Wednesday morning that Japan's planned nuclear power program of 40 million kilowatts by 1985 might possibly constitute the largest in the world outside the United States at that time.

He was speaking on "A World Outlook for Nuclear Energy" at the third annual meeting of the Japan Atomic Industrial Forum held at the Nihon Toshi Center in Tokyo.

He estimated that light water reactor systems outside the U.S. would total 100 million kilowatts or two-thirds of those in U.S. by the end of 1980. U.S. nuclear power capacity will reach 500 million kilowatts by the end of 1990, he predicted.

On peaceful nuclear energy programs, Seaborg said he believed that large scale nuclear desalting applications would be made in some of the heavily industrialized and densely-populated countries like Japan.

Referring to Japan's concerns about inspection under the nuclear nonproliferation treaty, he said that on the basis of direct U.S. experience, the International Atomic Energy Agency safeguards are not intrusive and will not interfere with operation of plants or the privacy of proprietary information.

He emphasized that safeguards are not so much for detecting violations as a means by which countries can demonstrate to the world that their peaceful nuclear programs are indeed peaceful.

About 500 Japanese and foreign nuclear scientists and industrialists attended the first-day session of the three-day convention.

In the afternoon session, Hidezo Inaba, president of the National Economy Research Association, Dr. Takashi Mukaibo, professor at Tokyo University, Shichinoshin Maeda, president of Fuji Electric Co., Ltd. and others discussed the theme entitled "Japan and Atomic Energy Development in the 1970s."

Korea ~~Herald~~

President Gives U.S. AEC Head Korean Medal

3/27/70

President Park Chung Hee yesterday presented to Glenn T. Seaborg, chairman of the U.S. Atomic Energy Commission (AEC), the Order of Civil Merit, Mugunghwa.

Seaborg

A Chong Wa Dae spokesman said the President awarded the order in recognition of Seaborg's contribution to the development of Korea's atomic energy program. Seaborg arrived here early yesterday on a two-day visit at the invitation of Science-Technology Minister Kim Ki-hyong.

President Park discussed at length with Seaborg prospects of using atomic energy for peaceful purposes, according to Kang Sang-wook, the presidential senior press secretary.

Meanwhile, U.S. Ambassador William J. Porter, who accompanied Seaborg to Chong Wa Dae, presented to President Park two grams of moon rock, part of three grams Washington donated to the Korean government. Minister Kim was also on hand.

Upon arrival at Kimpo International Airport, Seaborg told reporters that he is to confer with Korean atomic energy experts and government officials on the possibility of building an additional atomic power plant in Korea.

SAN FRANCISCO EXAMINER
Sports

Saturday, May 9, 1970

A Crucial in the Roast Beef League

Mark of the true athlete. When there's no room for any other game, he'll wrist wrestle the dinner guests. That's what happened in a jesting way last night at the testimonial for Joe Kapp (left) at the S.F. Hilton. His opponent is Glenn Seaborg, Atomic Energy Commission chairman and faculty athletic advisor when Kapp, Minnesota Vikings quarterback, was at Cal. Seaborg recalled those days: "When Cal lost and I went up to Joe in the dressing room and said, 'Joe, you played a fine game,' Joe would say, 'fine game, heck'." Only he didn't use heck. Refereeing the Indian wrestle is Kapp's Viking teammate, Carl Eller. Story on Page 26.

—Examiner photo by Mike Musura

SAN FRANCISCO CHRONICLE
Monday, May 11, 1970

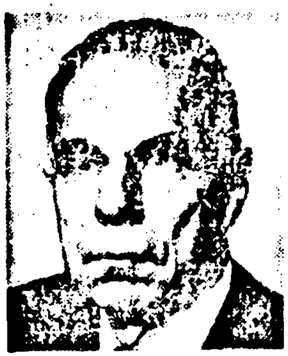
Sports Editor

How the Campus Was Quieted

Art Rosenbaum

DR. GLENN SEABORG was in San Francisco the other night for the dinner at the Hilton honoring Minnesota Viking quarterback Joe Kapp.

Dr. Seaborg is the chairman of the U.S. Atomic Energy Commission, a winner of the Nobel Prize in chemistry, discoverer and co-discoverer of plutonium and other nuclear energy sources.



Dr. Glenn T. Seaborg

He was also Chancellor at the University of California (1958-1961) when the football team with Kapp at quarterback won the conference title and went to the Rose Bowl.

It had been a rough week on the nation's campuses. Four Kent State students had been killed by National Guardsmen. Schools had been ordered closed. The varsity-alumni spring game at Berkeley, which was intended to coincide with the Kapp testimonial that would bring funds for recruiting, was cancelled.

"I am glad," said Dr. Seaborg in a private conversation, "that I am not the Chancellor now."

A BRILLIANT MIND, Dr. Seaborg's honors require almost a full column of small type in Who's Who. Unlike many absorbed deeply in research, he has always seemed able to extend his mental tentacles in dozens of different directions, giving and taking something from everything.

Discovering nine new chemical elements would have been honor enough, but Dr. Seaborg was also interested in the business of University operation, the life-style of students and, for diversion, the athletic program.

It was rather typical of Dr. Seaborg that he didn't simply go to the campus games to enjoy the ballet of sport, but allowed himself to be persuaded to accept the job of faculty advisor to the U.C. athletic department before his Chancellorship.

In the mid-'50s, though, he got involved in (excuse the nuclear expression) a bombshell.

From Seattle to Los Angeles, there were revelations of under-the-table payments to athletes. The Pacific Coast Conference had hired ex-FBI men to investigate the infractions. Penalties were meted out wholesale. The PCC met twice yearly, and the conventions were attended in force by the sporting press because this was juicy, headline stuff.

★ ★ ★

DR. SEABORG WAS, naturally, appointed spokesman for the PCC. It was his duty to sift and segregate the various charges and with various committees formulate the professorial language announcing the expulsions and suspensions. Then he would face the press and attempt to explain why certain kids would not be allowed to play football any more, or why certain schools had been suspended and could not be eligible for titles or Rose Bowls.

It was lousy duty. The odor of inequity was heavy through all those conferences. Alumni and coaches and school authorities had broken rules, but in order to establish some validity to the judgments, the student-athletes had to be punished.

"How well I remember," said Dr. Seaborg, "that I accepted the appointment of press spokesman only a few hours before I had to go out and announce that one school had been suspended three years. I believe we could have solved it all quickly if a certain faculty advisor had not institutional autonomy."

When the new AAWU — now Pacific-Eight — was formed, the "police state" of college athletics was abolished.

WASHINGTON POST 6/30/70

President Expected To Keep Seaborg As AEC Chairman

Dr. Glenn T. Seaborg is expected to be renominated as chairman of the Atomic Energy Commission sometime by President Nixon this week.

While Seaborg himself declined to comment on whether he would be renominated, sources close to the White House said the President would ask Seaborg to stay on as AEC chairman when his current two-year term expires at midnight tonight.

Chairman for the last nine years, Seaborg has been backed for renomination by Congress' Joint Committee on Atomic Energy and by the atomic power industry's two most formidable lobbying groups, the Atomic Industrial Forum and the Edison Electric Institute.

GLENN T. SEABORG
... staying on

There were rumors last month that Seaborg might not seek another term, but apparently he simply had not made his wishes known to the White House at the time.

It is also understood that the industry groups waited until last month to show their support for Seaborg.

A registered Democrat from California, Seaborg was brought in as chairman of the AEC by President Kennedy in 1961.

Two years ago, he was offered a five-year term by President Johnson, which he turned down. He accepted instead his current two-year term.

OAK RIDGER JULY 1, 1970

Seaborg Comment On New Term

Oak Ridger 7/1/70

The twin challenges of energy and environment are cited by Glenn T. Seaborg as reasons why he has accepted a new five-year term as chairman of the U. S. Atomic Energy Commission.

Seaborg's reappointment was announced Monday afternoon. He was not immediately available for comment, being involved in Congressional hearings. However, late Tuesday he made the following statement in Washington:

"I am pleased to have been reappointed as Chairman of the Atomic Energy Commission. My service in this position, under three presidents, has been a rewarding personal experience for me. The nuclear industry has seen tremendous growth during this eventful period.

"Of equal importance, however, are the exciting challenges ahead — a clean environment, the need to produce more energy for our people and to develop new sources of energy. I look forward to playing a part in achieving those goals."

Earlier Tuesday, an aide to the chairman had said that Seaborg "is accepting with great happiness" his nomination by President Nixon to the new five-year term which, if completed, would give him a total of 14 years as chairman.

The tall, Nobel prizeman in chemistry must still be confirmed by the Senate-House Atomic Committee in a hearing for which the date has not yet been announced. But indications are that confirmation would be quick according to Associated Press science writer Frank Carey.

Though relaying Seaborg's "happiness," the aide said Tuesday he himself could not say why Seaborg had, in effect, changed his position from that of two years ago.

At that time, when his previous five-year term neared completion, Seaborg accepted only a new two-year term, declaring, "I couldn't in good conscience accept a five-year term, for financial considerations and other personal reasons."

Seaborg's salary at that time was $30,000. It is now $42,500. (In Tuesday's news report on the Seaborg appointment his salary was erroneously reported as still being $30,000. Although that was the figure in 1968, new acts of Congress since that time have raised it to the present $42,500 figure.)

"No one here has been privy to his thoughts on that score," the aide said Tuesday in response to questions. "But two years is a long time in the life of a chairman of the AEC.

"There must have been mitigating factors, but he has made no statements about them. He's probably reserving any comment along those lines for the confirmation hearing."

Seaborg was appointed chairman of the commission in 1951 by President John F. Kennedy. Before accepting the job he had been chancellor of the University of California at Berkeley. It was there that Seaborg, as a young scientist, was one of the co-discoverers of plutonium — a discovery that played a key role in the development of the military and peaceful uses of atomic energy.

TRI-CITY HERALD JULY 8, 1970

Seaborg's Appointment deserved

We are happy to see Dr. Glenn T. Seaborg nominated by President Nixon for another five-year term as chairman of the Atomic Energy Commission.

Seaborg is quite a scientist and a real American.

Recently a national publication asked Dr. Seaborg, to answer the question: "What Does Patriotism Mean to You?"

Dr. Seaborg replied:

"Patroitism is a love of and a loyalty to one's land, its people and their highest ideals. But it is not a blind worship of any of these. It involves a love that recognizes weaknesses and a loyalty that is tolerant of imperfections, while it strives to overcome both and make its land and people an example for all mankind."

We believe his definition is typical of the high personal standards and attitude that has caused him to be appointed and reappointed to his position by three presidents, representing both political parties.

First named by President Kennedy in March 1, 1961, reappointed by Presidents Johnson and Nixon and now is renominated by Nixon for another five-year term.

Observers of the national scene report his nomination will be confirmed without dissention. Members of Congress trust him and respect him. He is non-political. He works always for what he regards as best for the nation and his performance in office has amply illustrated his ability.

He has tremendous personal prestige. As codiscoverer of plutonium and holder of the Nobel Prize he has achieved distinction that comes to few scientists. But Dr. Seaborg is a very humble man and a very dedicated man as well as a very efficient administrator.

America is fortunate to have such men in public office. Certainly we in the Tri-Cities, where we have had first-hand knowledge of Dr. Seaborg, can feel grateful that he presides over the agency that plays such a vital role in this part of the Pacific Northwest.

Examiner
(Cir. D 208,0?3
Sat. Eve. 167,359)

JUL 24 1970
Allen's P.C.B. Est. 1888

Seaborg Talks of Mars Trips Here

434

American scientists may flight - test a nuclear - powered rocket engine in the 1970s, Atomic Energy Commission Chairman Glenn T. Seaborg told a Commonwealth Club luncheon gathering in the Sheraton - Palace Hotel today.

Dr. Seaborg said the joint AEC-NASA Project Nerva — "nuclear engine for rocket vehicle application" — was making significant progress. Ground tests last year, he added, culminated in one test in which the engine was started 28 times and produced "almost four hours of operation at significant power levels and controllability demonstrations over a wide operating map."

'Trips to Mars'

Nerva, designed to develop huge boosters for trips to Mars and beyond, will be "our major energy source in space," he said and explained:

"All Nerva effort is now being applied to the development of a 1500 megawatt engine with its 75,000 pounds of thrust for flight testing in the late 1970s or early 1980s.

"Nuclear fuel is the only source of energy that is compact and long-lived enough to make feasible extended trips."

Space Stations

Development of nuclear power for space will enable the launching of "huge space stations, supporting perhaps up to 50 spacemen and spacewomen," Seaborg said, and deep space probes lasting for years.

Nuclear rockets use the heat of a reactor to turn liquid hydrogen into a stream of gas which produces the rocket's propulsion.

The Nerva rocket under development, Dr. Seaborg told the luncheon guests, will have a "specified impulse value" — the relationship of thrust to pound of propellant flow — "at least twice those of the best chemical rockets today."

THE WASHINGTON POST Monday, Aug. 17, 1970

Conference Finds Nuclear Power Safe

By Victor K. McElheny
Special to The Washington Post

UNITED NATIONS, Aug. 16—Nuclear power is both safe and inevitable, its backers continually assured a week-long international conference here on the environmental impact of atomic electricity.

The conference, which has just ended, was sponsored by the International Atomic Energy Agency at the invitation of Dr. Glenn T. Seaborg, the chairman of the U.S. Atomic Energy Commission since 1961.

With Seaborg as its keynote speaker, the conference developed into a sustained counter-attack against environmentalist critics of nuclear power.

The speakers said that by the year 2000 the United States and the rest of the world would be getting about half their electricity from nuclear power plants, including advanced "breeder" types.

This will happen, they said, not only because of the need to save on the price of coal, oil and gas, or to cut down pollution from burning them, but also because alternative supplies—such as tar sands, oil shale, water power, solar power, tidal power and volcanic steam—all fall far short of meeting predicted demand.

Seaborg said huge blocks of electricity may eventually be transmitted thousands of miles through ultra-cold superconducting cable or even sent across the oceans via satellites. Electric power demand is expected to be five to six times larger by year 2000 than today.

M. King Hubbert of the U.S. Geological Survey estimated that more than 13 per cent of the world's available oil has already been used up and that 90 per cent of it could be gone as early as 2029.

Coal supplies might last until 2300 or 2400, Hubbert said, but water power, which handles only a few per cent of man's need now, is likely to fade when many dams start salting up. Solar power would demand many square miles of panels for even one power station, and volcanic steam would give out within a century of intensive use, he said.

Dr. Karl Z. Morgan, of Oak Ridge National Laboratory and the senior member of the International Commission on Radiation Protection, emphasized the safety of nuclear power plants, although he urged that they continue to be built away from population centers.

Morgan conceded a point to Drs. John Gofman and Arthur Tamplin of the Atomic Energy Commission's laboratory in Livermore, Calif., without naming them.

It would cost the U.S. nuclear power industry nothing to stiffen its restrictions on releasing low-level radioactivity ten-fold, Morgan said. Gofman and Tamplin, who have been at odds with the commission over radiation standards, proposed this last year.

The average yearly dose to each American from operating nuclear facilities today is about 0.85 millirads, or half of one per cent of the overall limit of 170 millirads set by the Federal Radiation Council.

By contrast, Morgan said, the use of X-rays and other radiation in medicine gives an average dose to each U.S. man, woman and child of 55 millirads, a much higher figure than in other countries.

BALT SUN 8/30/70

Bradbury Given Fermi Award

Sun 8/30/70

Los Alamos, N.M., Aug. 29 (AP)—Dr. Glenn Seaborg, chairman of the Atomic Energy Commission, presented the Enrico Fermi award today to Norris Bradbury, retiring Los Alamos Scientific Labortary director.

Dr. Seaborg praised Mr. Bradbury, an atomic bomb pioneer, for "competent leadership and dedicated personal effort."

The presentation at Los Alamos civic auditorium capped a 40-year career for Mr. Bradbury, a physicist who retired Tuesday after 25 years at the helm of the famous laboratory where nuclear weapons were born.

Presidential Approval

Mr. Bradbury, and his wife Lois listened as Dr. Seaborg read a letter from President Nixon, who approved Mr. Bradbury for the award and $25,000 cash grant.

"Your brilliant and enduring contributions to the field of nuclear energy have earned you the pride of all your fellow citizens and the admiration of countless others throughout the world," Mr. Nixon's letter said.

9/11/70

The Mining Journal, Marquette, Mich.

C-C Hosts Dr. Seaborg At Luncheon

ISHPEMING — Dr. Glenn T. Seaborg, chairman of the U.S. Atomic Energy Commission, was guest at a noon luncheon given Thursday by the Greater Ishpeming Chamber of Commerce in the Mather Inn.

Seaborg, a native of Ishpeming, is a world-famous scientist who was awarded the Nobel prize in chemistry. He headed the group at the University of Chicago's metallurgical laboratory which was largely responsible for Project Manhattan during World War II.

Seaborg was accompanied by one of his sons, Stephen, who is a sophomore at the Davis campus of the University of California.

John F. Edmondson, president of the chamber, presented Seaborg with an honorory membership in the organization. A similar presentation was given him by Charles E. Sanders Jr., president of the Ishpeming Diplomats.

Henry L. Seitz of the Diplomats acted as master of ceremonies during the luncheon. The famous scientist was asked to comment on people who claim that the AEC has not made sufficient progress in developing peacetime uses of atomic energy.

Seaborg replied that such people are "simply uninformed." He added that the AEC has recently published a detailed booklet explaining dozens of peacetime uses of atomic energy. "As an example," he said, "atomic energy is now being used in much of the equipment left on the moon by our astronauts."

Sam M. Cohodas, celebrating his 75th birthday, spoke briefly and commended Seaborg on his many achievements in science.

—Star Photographer Ray Lustig

Nobel Prize winners (from left to right) Dr. Glenn T. Seaborg, Dr. Hannes Olof Aflven and Dr. Julius Axelrod chat at a reception given for Nobel Prize holders at the Swedish Embassy last night.

Nobel Prize Elevating

Wash. Star 11-7-70

11-7

By DUNCAN SPENCER
Star Staff Writer

Dr. Julius Axelrod, the Rockville, Md., scientist who won the 1970 Nobel prize for his work on nerve transmission said last night that getting the prize was "like being made a cardinal."

Far from diffident about the award he shared with an Englishman and a Swede Oct. 15, Axelrod still was on a euphoric plateau, enhanced no doubt by the company of two other Nobel Prize winners, Prof. Hannes Alfven of Sweden, the 1970 winner in physics, and Chairman Glenn Seaborg of the Atomic Energy Commission a 1951 winner, at a reception at the Embassy of Sweden last night.

Axelrod, 58, was dragged by fame from the obscurity of his lab at NIH and now finds everyone in the world wants to be his friend. The whitehaired scientist, whose wife hates parties and did not accompany him, brought along four of his young lab assistants.

He is known as a lively and engaging character and a scientist whose hunches have been uncanny. He worked in obscure positions without a doctorate for much of his career.

"They finally discovered him," one of his co-workers said.

Swedish Ambassador Hubert de Besche was honoring Prof. Alfven, who is visiting Washington (for a conference) from La Jolla, Calif., where he works at the University of California's San Diego branch. Axelrod and Seaborg, who is of Swedish lineage, shared the attention of the guests.

Both Axelrod and Alfven at first refused to believe they were winners of the prize. Axelrod was at his dentist when the news arrived. "It was completely unexpected," he said.

Alfven, asleep at his home in La Jolla when the call came through from Stockholm, did not hear the phone at first, and then told his wife Kirsten, "Don't answer, it's too late."

But his wife persisted: "I am a woman and can't stop answering the phone," She explained.

Mrs. Alfven is herself a sociologist and the two have written a book on the problems of modern life.

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editors hear AEC chairman

antidote to doom fears urged

By WILLIAM HELTON
Advertiser Staff Writer

The press must learn to balance its predictions of environmental doom with reports of progress, Glenn T. Seaborg, chairman of the Atomic Energy Commission (AEC), said here yesterday.

Seaborg said the press has a vital role in creating a public attitude that "will sustain and direct this nation in a time of great psychological need." He spoke at the Associated Press Managing Editors Convention at the Ilikai.

"Without exaggeration, let me say that by its effect—by the efforts of its public education—the country's news media may well determine the course of history," he said.

Seaborg, a Nobel Prize winner who helped discover

see editorial
". . . in the nuclear age"
page A-16

plutonium and several other elements, said that a forecast of doom can become a "self-fulfilling prophesy.

"They (the public) can see it is an inevitable future created by events beyond their control—by the momentum of history or by a technology that has 'taken over.'

"ON THE OTHER hand, a people who know what knowledge and power are still in their hands and growing, imbued with an optimistic and positive view of life, can use such doomsday projects as a healthy warning and an impetus to correct the course of society," he said.

If the public has the facts, Seaborg said, it can respond to predictions that the world is coming to an end by saying, "'The hell it is,' and roll up their sleeves to do what is necessary to make sure it doesn't."

Seaborg told the editors that they must work to create a "climate of hope," as well as "tell it like it is.

"In a world where the atom has been split, the people must be united. You can help us do this. Please try," he said.

SEABORG SAID it was not possible to wait until scientists know all the possible hazards of nuclear energy before using it to help clean up the environment.

"We do not have that choice," he said. "Life is a moving, dynamic set of circumstances in which if we do not act in one way, we are acting in another.

"If we do not dare to live, to innovate, to grow—we die. The one choice we do not have is to do nothing," he said.

Seaborg said the nation's scientists are turning to nuclear energy because "soon we will not be able to do without it." He cited a diminishing supply of present power sources, such as fossil-fuels.

THE ALTERNATIVES to nuclear power, Seaborg said, pose far greater hazards, especially air pollution.

If air pollution could be reduced 50 per cent in major American cities, Seaborg said, a newborn baby would live three to five years longer.

He said that the death rate from lung cancer would be cut by 25 per cent, and diseases from heart and circulatory disorders by 10 to 15 per cent.

While emphasizing that the effects of nuclear radiation should be carefully studied, Seaborg said that much of the fear today has been the result of misunderstood statistics.

IN ANSWER to a question, Seaborg said that reports

Asked when and if the next underground nuclear test would take place at Amchitka Island in the Aleutians, Dr. Glenn T. Seaborg, Atomic Energy Commission chairman, said yesterday, "No, I couldn't say."

that the AEC's maximum safe radiation dosage could result in thousands of deaths each year are misleading. He said such predictions are based on the assumption that all 200 million people in the nation would receive that amount.

"Actually, if only one person received it, the plant would be shut down," he said. "Rather than 200 million people receiving the maximum allowable dosage, not one person in the United States receives that dosage."

WASHINGTON POST 12/4/70

Thant Names Seaborg To Head Atomic Parley

12-4

Washington Post Foreign Service

UNITED NATIONS, Dec. 3 —U.N. Secretary General U Thant announced today the appointment of Glenn T. Seaborg as president of the fourth international conference on peaceful uses of atomic energy.

Seaborg is the chairman of the U.S. Atomic Energy Commission. The atomic energy conference is scheduled to be held in Geneva next September.

Seaborg told correspondents the conference will cover nuclear power generation as well as nuclear explosions for peaceful purposes such as mining, radioisotopes and nuclear means for distilling sea water. He said that by the year 2000 nuclear-powered generating plants will account for one-half of the estimated 2 billion kilowatt generating capacity in the United States.

He nevertheless predicted a decline in the rate of increase in electrical consumption and said needs would have to be balanced against damage to the environment. Seaborg indicated that nuclear-fueled generating plants cause less pollution than fossil-fueled plants.

Thant also disclosed that Israel blocked his proposal to send a special representative to the Middle East in 1967 after Egypt had demanded the withdrawal of U.N. troops and blockaded the Strait of Tiran. Egyptian President Nasser accepted the proposal.

Israeli Ambassador Yosef Tekoah commented in reply that the U.N. had "failed dismally to prevent Egypt's acts of war which brought about the 1967 hostilities."

Thant's remarks were in a speech to news media representatives attending a Stanley Foundation seminar. He vigorously defended his own and the U.N.'s record against what he said had been a tendency to make him a scapegoat for troubles about which major countries and U.N. bodies had failed to act.

NEW YORK TIMES

December 26, 1970

A Committed Scientist

Glenn Theodore Seaborg

By WALTER SULLIVAN

One of the most critical decisions in the race to produce the first atomic bomb was whether to fuel it with uranium or the newly discovered synthetic element, plutonium. On Dec. 6, 1941, eve of the Japanese attack on Pearl Harbor, three leaders of the atomic project discussed the problem, in low voices, over a lunch at the Cosmos Club in Washington. They were Dr. Arthur H. Compton, Dr. Vannevar Bush and Dr. James B. Conant. Dr. Bush and Dr. Conant said the plutonium approach was virtually hopeless. The chief problem, after plutonium had been synthesized by neuton bombardment of uranium, would be to extract the plutonium from the other materials, all highly radioactive and hazardous.

Man in the News

A scientist who believes in the value of the humanities.

Industry had no experience of such operations said Dr. Bush. Dr. Conant, himself one of the nation's leading chemists, added that virtually nothing was known of the chemistry of this new element.

Dr. Compton then told of his conversation with a brilliant young chemist named Glenn Theodore Seaborg at the University of California in Berkeley.

Competent Young Chemist

"Seaborg tells me that within six months from the time the plutonium is formed he can have it available for use in the bomb," Dr. Compton said Dr. Conant's reply, according to the former's account, was:

"Glenn Seaborg is a very competent young chemist, but he isn't that good."

Dr. Conant was wrong. Dr. Seaborg was brought to the University of Chicago to head the bomb project group responsible fo. developing a plutonium separation process and he was successful. The bomb dropped on Nagasaki, Japan, in 1945, was fueled with plutonium, whereas the one that ha. devastated Hiroshima a short time earlier was a uranium bomb.

In 1951 Dr. Seaborg shared with Edwin M. McMillan a Nobel Prize in Physics for his leadership in the synthesis of elements heavier than uranium, the heaviest naturally occurring and relatively stable element. Thirteen of these "transuranium" elements have now been produced, most of them for the first time at Berkeley.

Since 1961 Dr. Seaborg has been chairman of the Atomic Energy Commission, and now he is likely to become president of one of the largest scientific organizations in the world, the American Association for the Advancement of Science, which begins its annual meeting here today.

Bitter Dispute on Post

The post has been largely honorary. The president is only active for one year, beginning a year after his election by the organization's 530-member Council. However, Dr. Seaborg's nomination led to a bitter dispute within the leadership of the A.A.A.S.

Some members of the association's Board of Directors have argued that since he heads a major—and to some, controversial — Government agency, he should not also direct a private organization that prides itself on its independence.

Specifically they cited the f ct that the A.E.C. was under attack for allegedly allowing excessive amounts of radiation to escape into the environment and a committee of the A.A.A.S. had been asked to look into such charges.

The council's mail ballots have been cast, and the results will be announced next Wednesday. It is generally assumed that Dr. Seaborg will win, for the only other candidate is Dr. Richard H. Bolt, an acoustical engineer of distinction but far less well-known than Dr. Seaborg.

However, the dispute typifies the confrontation between political activists within the organization and those who would keep it purely scientific. The program of the meeting in Chicago is peppered with sessions on issues that are socio-political as well as scientific, such as population growth, environmental quality, and crime and violence.

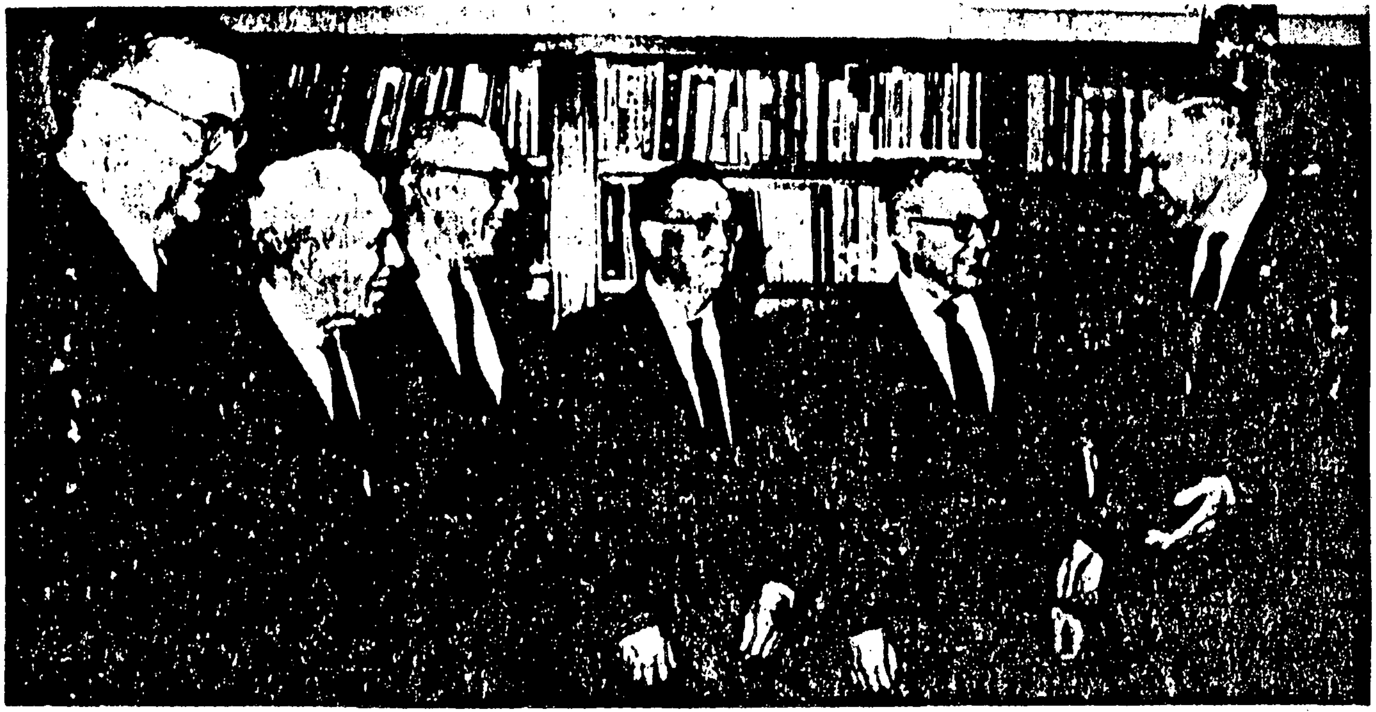
Aloof From Controversy

Few men in positions as powerful as that of A.E.C. chairman have remained as aloof from controversy as Dr. Seaborg. While enemies of nuclear weapons development or atomic power programs hurl invectives at the commission, the 68-year-old scientist himself is usually spared.

On his visits to the Soviet Union to negotiate agreements on cooperative research he is greeted, not in the manner of most visiting bureaucrats, but as a Nobel laureate who can lecture to Russian scientists on a subject close to their own hearts —The synthesis of new elements.

Dr. Seaborg and his wife, the former Helen L. Griggs, have six children. Dr. Seaborg was born in a small Michigan mining town, but was largely educated in California, where he finally became chancellor of the University's Berkeley campus.

The Post Register
Idaho Falls, Idaho
March 8. 1971



SECOND DISTRICT CONGRESSMAN Orval Hansen, who was appointed last month to the Joint Committee on Atomic Energy, spent a full day recently in briefings at Atomic Energy Commission headquarters at Germantown, Maryland. Pictured from left to right Robert E. Hollingsworth, AEC general manager; Wilfrid E. Johnson, AEC commissioner, Clarence E. Larson, commissioner; James E. Ramey, commissioner: Rep. Hansen; and Glenn T. Seaborg, AEC chairman.

RICHMOND, VA.
NEWS LEADER

E - 119,238

~~APR 6 1971~~

Transurianium Elements: 'Infinite Possibilities'

DR. GLENN T. SEABORG

BY JANIS FRASER

Atomic research has developed radioactive-powered heart pacemakers and completely artificial hearts which have a much longer lifetime than materials powered by other sources, the chairman of the U.S. Atomic Energy Commission has said here.

Dr. Glenn T. Seaborg, chairman of the commission since 1961, told about 200 junior high school science teachers and administrators at a conference at the University of Richmond yesterday the new power sources have "infinite possibilities but take many years to produce."

He was talking about the transuranium elements, synthetic elements which have been produced through research since 1940 and which are "a very important source of power."

These elements, Dr. Seaborg explained, are developed by the bombardment of atoms of natural elements against each other, "often one atom at a time by great perseverance and patience."

Dr. Seaborg, a Nobel Prize winner, who was on the team of scientists who discovered plutonium, spoke during a conference for the teachers sponsored by the Thomas Alva Edison Foundation and Virginia Electric and Power Co.

The 13 known transuranium elements, he said, are desirable because they are not affected by heat or light for energy. They are used, for example, in satellites to transmit information from the dark side of the moon.

Another advantage, he noted is that batteries used to power pacemakers now have to be replaced every two or three years surgically, but radio-active pacemakers may last the natural lifetime of the individual.

And, he said, the new pacemakers, which have been used in humans in France and England, are not susceptible to rejection by natural processes in the body.

DELAYED MEANS

Earlier yester, one of a series of speakers from across the country, told the teachers much controversy among experts has delayed means of combating air, soil and water pollution.

The speaker, Dr. A. Joel Kaplovsky, chairman of the department of environmental sciences at Rutgers University, said any approaches toward pollution control must be multifaceted and interdisciplinary.

"During the past two years," the professor said, "We have been showered with an inordinate amount of rhetoric about the environment. We who've been in it all along have had to back off a bit because the goals and timetables of the 'newly conceived' are often unrealistic."

He emphasized, however, the solutions will come from scientific research, not merely public education and political activity.

The conference, which ended today, included other lectures on the teaching of science, space, ecology, engineering, nuclear energy, genetics, and oceanography.

THE OAK RIDGER, April 14, 1971

USSR Nuclear Officials To Visit ORNL Thursday

A ten-man Soviet delegation, accompanied by Glenn T. Seaborg, U.S. Atomic Energy Commission chairman, and AEC Commissioner Clarence E. Larson, will spend a half-day Thursday touring facilities at Oak Ridge National Laboratory as part of a two-week tour of similar U.S. nuclear installations.

The delegation will be met at McGhee-Tyson Airport in Knoxville by S. R. Sapirie, manager of the AEC's Oak Ridge Operations, and by others Thursday morning.

The Soviet delegation will eat lunch at ORNL while being briefed on the lab by Alvin M. Weinberg, ORNL director, and by Roger Hibbs, president of Union Carbide Nuclear Division. Then the Russian scientists will tour ORNL's High Flux Isotope Reactor, Trans-uranium Research Laboratory, and Oak Ridge Electron Linear Accelerator.

After dining at the Holiday Inn, the delegation will remain at the inn overnight and then depart Friday morning for Chicago to tour Argonne National Laboratory and other facilities.

Seaborg announced today that the Soviet scientific delegation will tour unclassified U.S. nuclear installations during the next two weeks. The tour, beginning in Oak Ridge and running through April 28, will involve activities devoted to the peaceful uses of nuclear energy and is part of a reciprocal arrangement going back to 1959.

The delegation will be headed by Chairman Andronik M. Petrosyants of the USSR State Committee on Atomic Energy. The tour will include a number of atomic energy research sites and commercial nuclear power reactors. The group also will visit facilities at Argonne, Batavia, and Morris, Illinois; Idaho Falls, Idaho; Santa Susana and La Jolla, California; Las Vegas, Nevada; Platteville, Colorado; LaGoona Beach, Michigan; Waterford, Connecticut; and Upton, Long Island, New York.

A Memorandum on Cooperation in the Peaceful Uses of Atomic Energy, specifically providing for unclassified exchanges between the USAEC and the USSR State Committee on Atomic Energy, was renewed in Washington on Feb. 10. The Memorandum on Atomic Energy is an annex to the overall U.S.-USSR Exchanges Agreement for 1970-1971 which was signed in Washington the same day.

The first exchange of visits between U.S. and USSR atomic energy leaders took place in the fall of 1959, when Professor V. S. Emelyanov, head of the USSR Main Administration for Utilization of Atomic Energy, and John A. McCone, chairman of the U.S. Atomic Energy Commission, signed a memorandum Nov. 24 in Washington providing for a program of reciprocal exchanges in the field of the peaceful uses of atomic energy between their respective countries.

At the invitation of Chairman Petrosyants, Seaborg headed a group of American scientists in May 1963, which visited Soviet nuclear installations. On that occasion, Chairman Petrosyants and Seaborg signed a new Memorandum on Cooperation in the Peaceful Uses of Atomic Energy.

Chairman Petrosyants will be accompanied on the tour by A. G. Meshkov, Deputy Chairman, SCAE and Director, Main Directorate for Atomic Generating Installations; N. A. Prozorov, Deputy Chairman, SCAE; A. A. Logunov, Director of Institute of High Energy Physics, Serpukhov; V. I. Subbotin, Deputy Director of Institute of Physics and Power Engineering, Obninsk; B. A. Semenov, Deputy Chief, Division for International Relations, SCAE; F. M. Mitenkov, Professor, Gorkiy Polytechnical Institute; N. I. Yermakov, Section Chief, State Combined Design Institute; V. F. Gordeyev, Chief of Section, SCAE, and V. F. Menshikov, Interpreter, Division of International Relations, SCAE.

In November 1963, Chairman Petrosyants headed an 11-man group of Soviet scientists on a reciprocal tour. Seaborg visited the Soviet Union again in September 1969 and has also accepted an invitation to visit the USSR in August 1971 for a tour of nuclear installations similar to the tour which the Soviets are now undertaking.

Over the years, there have been reciprocal exchanges by teams of U.S. and USSR scientists and engineers in such nuclear disciplines as biology and medicine; controlled thermonuclear reactions; solid state physics; nuclear reactors; radioactive waste disposal; high energy physics, and medium and low energy physics.

The Oak Ridger

23RD YEAR—NO. 62—PHONE 482-1021

OAK RIDGE, TENNESSEE 37830, THURSDAY, APRIL 15, 1971 PRICE 10 CENTS

Russian Officials Arrive—

A 10-man Soviet delegation arrived at the McGhee-Tyson Airport in Knoxville this morning. The Russians lunched at Oak Ridge National Laboratory and toured ORNL's facilities this afternoon. They are staying at Holiday Inn overnight and leaving Friday morning. Pictured above are, left to right, A. G. Meshkov, deputy chairman of the USSR State Committee on Atomic Energy (SCAE); S. R. Sapirie, manager of the U. S. Atomic Energy Commission's Oak Ridge Operations; A. M. Petrosyants, SCAE chairman; Glenn T. Seaborg, AEC chairman, and B. A. Semenov, deputy chief, SCAE Division for International Relations.

—News-Sentinel Staff Photo

WELCOMED—Andronik M. Petrosyants, chairman of a Soviet scientific delegation, center, was welcomed at McGhee Tyson Airport by Sam H. Sapirie, manager of Oak Ridge AEC Operations, left, and AEC Chairman Glenn T. Seaborg. The delegation flew from New York in an Air Force plane for the Oak Ridge visit, first in a U. S. tour.

SEABORG WASHINGTON STAR, July 21, 1971

AEC Chairman Resigns

7-21-71

Seaborg Quits After 10 Years As AEC Chief

By JEREMIAH O'LEARY
Star Staff Writer

The White House today announced the resignation of Dr. Glenn T. Seaborg as chairman of the Atomic Energy Commission.

At the same time, President Nixon said he will appoint James R. Schlesinger, assistant director of the Office of Management and Budget, to replace Seaborg as AEC chairman.

The White House also said the President intends to nominate William Offutt Doub of Maryland to be a member of the AEC to succeed the late Theos J. Thompson for a five-year term expiring June 30, 1976.

The chairmanship of the AEC pays an annual salary of $42,500. Doub, as a member of the commission, would receive $40,000 a year. Both appointments are subject to Senate confirmation.

Schlesinger, a 42-year-old native of New York City, joined the administration in February 1969 as assistant director of the Bureau of the Budget. When the bureau was reorganized as the Office of Management and Budget, Schlesinger served as acting budget director. He has responsibility for budget aspects of national security and international programs.

Before coming to the White House, Schlesinger was director of Strategic Studies at Rand Corp., in Santa Monica, Calif., while at Rand, he was consultant to the Bureau of the Budget on atomic energy matters.

Doub, 39, is a native of Cumberland, Md., and a graduate of the University of Maryland School of Law in 1956. A resident of Baltimore, Doub has practiced corporate law since 1957, most recently as a partner in the law firm of Niles, Martin and Wilmer.

Doub was appointed chairman of the Maryland Public Service Commission in 1968, a post he still holds. Last year he was named by President Nixon to the President's Air Quality Advisory Board. He also is a member of the Executive Advisory Committee of the Federal Power Commission, and vice chairman of the Washington Metropolitan Area Transit Commission.

Seaborg was appointed chairman of the AEC by President Kennedy in 1961 and subsequently was reappointed by Presidents Johnson and Nixon. He also held advisory posts under Presidents Truman and Eisenhower.

From 1958 to 1961, Seaborg was chancellor of the University of California at Berkeley. He is on leave from the university as a professor of chemistry.

During World War II he headed the group of scientists at the metalurgical laboratory of the University of Chicago which devised the chemical extraction processes used in the production of plutonium for the Manhattan Project—the code name for the development of the atomic bomb.

Seaborg won the Nobel Prize in chemistry in 1951 at the age of 39. Among his major scientific contributions were discovery with several colleagues of a number of rare elements, including plutonium.

Seaborg said he will return to his professorship at Berkeley, but left the timing of the resignation up to Nixon.

Nixon, in a letter to Seaborg, expressed special regret at his resignation and said he hopes Seaborg still will represent the United States in an AEC trip to the Soveit Union this fall to inspect nuclear power facilities, and on autumn trips to Geneva and Vienna.

DR. GLENN T. SEABORG

JAMES R. SCHLESINGER

WASHINGTON NEWS 7/22/71

Dr. Seaborg's resignation

News 7-22

IN accepting the resignation of Glenn T. Seaborg from the Atomic Energy Commission, President Nixon described the man exactly when he called him a "world famous chemist, scholar and administrator" who has made a special contribution to the use and understanding of the atom.

Dr. Seaborg has been chairman of the AEC since 1961 — 10 of the commission's 25 years. Of the four who have headed the agency, he is the only scientist.

His scientific discoveries (plutonium, for instance) have been prodigious. Scholar he is beyond question — Nobel Prize for physics in 1951, for instance. His extended tenure as chairman of the AEC — appointed by President Kennedy, reappointed by Presidents Johnson and Nixon — indicates not only his administrative skill, but his ability to stand above partisanship and the bureaucratic infighting which is rife in Washington.

Dr. Seaborg has been more than a sound public official. His whole course has been steered toward making the world a better place to live in. He never let his enthusiasm for the possibilities of atomic energy overcome his scientific knowledge of the problems which go with it. His sense of balance never has been tilted.

He ran his big agency tautly, with a minimum of contention, and still, with his extraordinary vision, maintained a broad perspective on the whole future of energy as a means of human progress.

Chemical & Engineering News,
August 23, 1971

People

AEC citations go to four scientists

Four scientists who in the early days of atomic energy made outstanding scientific and engineering contributions to the U.S. nuclear programs have been cited by the Atomic Energy Commission. Each was given a citation, a plaque, and $30,000 by **Dr. Glenn T. Seaborg,** AEC chairman (center). They were (left to right) **Eugene T. Booth,** v.p. of Laser, Inc.; **Aristide V. Grosse,** director of Germantown Laboratories, Inc.; **Alfred O. Nier** of University of Minnesota; and **John R. Dunning,** former dean of applied science and engineering at Columbia University.

THE CHRISTIAN SCIENCE MONITOR Wednesday, September 8, 1971

More energy needed, but . . .

Seaborg warns of A-road pitfalls

By Robert C. Cowen
Staff correspondent of The Christian Science Monitor

Geneva

Mankind is undergoing an evolutionary development in which it must make increasing use of energy to live happily on our small planet.

It cannot turn back the clock to a time when our environment took care of itself. It cannot opt out of this development without destroying civilization and putting the natural environment into an accelerated decline.

This, says Dr. Glenn T. Seaborg, is why mankind needs atomic energy. But at the same time it must be alert to the pitfalls that increased use of the atom could entail.

As president of the fourth Atoms-for-Peace conference, Dr. Seaborg has unbounded enthusiasm for the atom. Yet in discussing this with a small group of reporters, he noted:

- Environmentalists are right to stress the dangers inherent in atomic power plants. But these are more manageable than the health and environmental dangers of burning coal, oil, or gas.

- Advanced countries are right in pointing out that developing nations can profit from judicious use of atomic power. But they should pay less lip service to this and do more to help these nations realize the atom's benefits practically.

- Thermonuclear fusion, making electric power by controlling hydrogen fusion reactions akin to those of the hydrogen bomb, can indeed meet man's energy needs in the long run. It looks more promising than ever today. But it's a mistake to think this could do much to help in this century. Trying to move into fusion too quickly could raise unnecessary environmental dangers.

Safety issue stressed

Dr. Seaborg feels strongly about the safety issue concerning atomic power plants.

As retiring chairman of the U.S. Atomic Energy Commission, he feels he has been misunderstood as maintaining that atomic power is "inherently" safe. It definitely is not, he said.

Environmentalists are concerned that atomic power can involve release of small amounts of radioactive material, that it runs a remote risk of malfunction that could release dangerous amounts of such material. And they are concerned about handling and storing the radioactive wastes that are produced.

These are legitimate concerns, Dr. Seaborg said.

"My point is that these dangers can be contained. I have thought a great deal about this. I think the risks are manageable. I can't say the same thing at all for fossil fuel plants."

In terms of pollution, in terms of health risks from such things as poisonous metals or sulfur compounds in fossil fuel exhausts, these plants offer a much greater and less well understood threat than do atomic installations, he indicated.

Main source of future

In the long run, Dr. Seaborg, like many other atomic experts, expects hydrogen fusion to become a main source for electric power. Its heavy hydrogen fuel can be taken without practical limit from earth's waters. It should offer less risk of radioactive pollution than plants relying on nuclear fission.

Knowing the work in this field around the world, he thinks laboratories are on the verge of a scientific breakthrough. They should by 1980 be running controlled fusion devices in the laboratory. But it will take two decades or more beyond that to develop practical power plants.

Some environmentalists have been looking to such plants to lower the risks of radioactive pollution fairly soon. Dr. Seaborg thinks this is a mistake.

The early fusion plants will handle a lot of radioactive tritium. This will present a risk. Even if it were sensible to play down development of nuclear fission plants and concentrate on pushing fusion, men could get more radioactive risk than they bargain for by moving ahead too quickly.

However, Dr. Seaborg doesn't think this sensible in any case. The prospects of rapid fusion development are too uncertain. Mankind's immediately foreseeable energy needs are too large to take such a gamble.

Nuclear fission has its risks. But if these are faced squarely, without fear, they can be contained, Mr. Seaborg contends.

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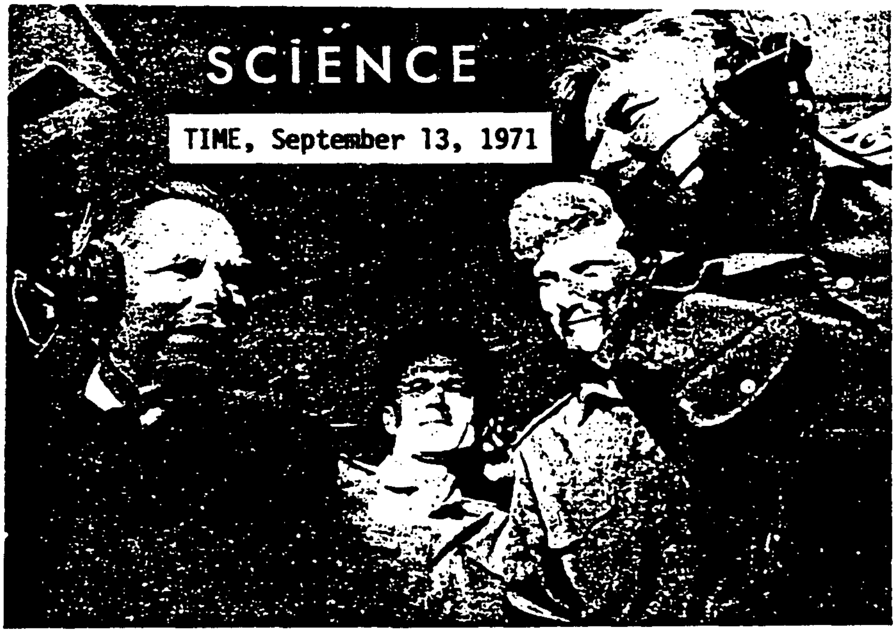


SEABORG (LEFT) WITH CREW IN COCKPIT OF KOSYGIN'S JET

A friendly and fruitful exchange.

Sharing the Atom . . .

Despite the bombast and hostility that have characterized relations between the U.S. and the Soviet Union during the past decade, a remarkably friendly and fruitful exchange has been quietly going on between scientists of the two nations. Glenn Seaborg, the retiring chairman of the Atomic Energy Commission, has now revealed how the scientists have not only grown to trust each other, but have also shared detailed information about their countries' nuclear capacity—almost to the last atom.

Physicist Seaborg is just back from Russia, where he headed a delegation of ten visiting U.S. scientists. The group, in checking out eleven key Soviet installations,* covered 6,000 miles —all in Premier Aleksei Kosygin's private TU-134 jet. The scientists often stayed up until dawn talking shop with their Soviet counterparts, with Seaborg, as he has throughout his reign as AEC chief, pushing hard for the pooling of information.

During Seaborg's journey, his hosts demonstrated the surprising versatility of the Soviet nuclear program for peaceful purposes. Russian scientists, for example, used one detonation to create a reservoir in a dry riverbed to catch the torrential spring runoff; the crater walls produced by the same blast served as a restraining dam. Soviet oilmen triggered another nuclear blast to revive the oil flow from a field previously believed to have run dry. Most surprising to Seaborg was a Russian technique of subduing runaway oil- and gas-field fires by atomic explosions. On two occasions 30-kiloton bombs deep beneath the surface succeeded in sealing fissures that fed the flames by carrying natural gas to the surface.

Future Soviet nuclear projects, Seaborg says, are even more ambitious. The Russians are considering blasting a deep channel that would divert water from the Pechora River to the nearby Kama River, which flows into the Caspian Sea. That link-up, engineers anticipate, would increase the amount of water supplied to the Caspian Sea, which has dropped nearly ten feet in the past 35 years, affecting docking facilities, caviar-producing sturgeon and even the local climate.

Dammed Strait. By far the most controversial atomic scheme proposed by Soviet planners is the damming of the Bering Strait, the 55-mile-wide stretch of water between Alaska and Siberia. "This would be highly beneficial for Siberia," according to Seaborg, "because the cold Arctic waters bathing the eastern coast would be replaced by warmer Pacific water. Eastern Siberia might then be opened up to agriculture." Prospects for a Bering dam are dim, however, because it would span international waters and require the approval of other nations. That approval, especially by the U.S., is unlikely: the cold water would have to go somewhere, and Western scientists fear that the southerly flow of frigid water to the eastern U.S. would increase, possibly producing a drastic drop in temperature throughout the Atlantic States.

Seaborg foresees increased collaboration between American and Russian scientists on other projects, but his personal plan is to retire to California this fall to teach—and to resume the search for superheavy elements that won him a 1951 Nobel Prize. He hopes also to continue his campaign to dispel the growing notion, especially evident on college campuses, that science is intrinsically evil. "What is ironic," he says, "is that the very things the young people want to change can best be done through their understanding and mastering of technology, of making technology their servant."

* The tour followed a visit in April by a group of Soviet physicists to nuclear installations across the U.S.

. . . And a Link-Up in Space

Echoing Glenn Seaborg's anticipation of U.S.-Soviet collaboration in atomic research, NASA officials announced that the two nations were planning a joint space mission that could come as early as 1974. The most likely first step, Americans and Soviet planners decided, will be to dock an Apollo spacecraft with a Russian space station similar to the Salyut now in orbit. Following this, the space scientists envision a link-up between a Soyuz spacecraft and an American Skylab scheduled for launch in 1973.

The first general agreement to pool space age hardware and know-how came in Moscow last October. Since then, the two nations have agreed to adopt lighting systems and color codes used by the Americans, and have chosen the nitrogen-oxygen cabin atmosphere preferred by the Soviet Union. In addition, both sides have decided upon new docking hardware different from the kind now used by either.

The astronauts themselves seem happy with the idea of training with the Russians for a joint mission. Apollo 15 Commander David Scott recently told the National Press Club that he already knows six Russian cosmonauts, and that communication is never a problem among pilots. Said he: "I'd be glad to fly with them anywhere."

A Boost for Bevatron

A conservatively dressed man with graying hair strode unflinchingly to the target area of one of the world's most powerful nuclear particle accelerators last week and donned a molded plastic mask. At a signal, the accelerator beam was switched on, and nitrogen nuclei, traveling at almost the speed of light, flashed into his temple through a hole in the mask. At first nothing happened, even though the beam struck his optic nerve, behind the retina. For the next pulse, however, his head was moved so that the beam passed through his retina. "Hey, there's one!" he shouted. "Hey, there's a whole constellation!"

Physicist Edwin McMillan, 63, Nobel laureate and head of the Lawrence Berkeley Laboratory in California, had seen in his own lab the same flashes of light that astronauts see in space when their eyes are closed. Furthermore, he said, the experiment showed that atomic particles were causing the flashes —not through impact with the optic nerve or passage through the eye fluid, but by penetrating the retina itself.

McMillan's excitement went beyond the light experiment. Hundreds of technicians, engineers and scientists had worked since March at modifying the Berkeley Bevatron—which was designed for experiments with high-energy protons—to accelerate even heavier particles: nitrogen ions. As a result, McMillan announced at a press conference last week, nitrogen nuclei had been boosted to 36 billion electron volts, the highest energy level ever attained for such heavy particles in a laboratory.

Bare Nuclei. What the Bevatron apparatus had really done was create a kind of homemade cosmic ray, a big step in bringing the universe down to earth. Like cosmic rays from outer space, the particles shot through the Bevatron are really bare nuclei of atoms—in this case nitrogen—that have been stripped of their electrons and accelerated to tremendous velocities. By shooting these tiny bullets into a plastic target rich in hydrogen atoms, the Berkeley team was able to dissect the laboratory-produced cosmic rays. The collisions fragmented the nitrogen nuclei into every element lighter than nitrogen in the periodic table. By analyzing the results of this and similar experiments, physicists hope to bolster their meager store of knowledge about not only the atomic nucleus but also the pulsars and supernovae in which cosmic rays are thought to be born. "It opens up a whole new way of studying nuclear structure," said Berkeley Physicist Harry Heckman.

Scientists have no lack of chores for a machine with the capabilities of the Bevatron. Biophysicists, for example, are optimistic about using heavy ions, or other particles that can be made from these ions, to combat cancer, acromegaly (a rare disease in which facial features, hands and feet thicken) and Parkinson's disease. Unlike X rays and gamma rays, heavy particles do not damage healthy tissue on their way to a tumor; they do most of their deadly work only after reaching it. (Before the modification of the Bevatron, heavy ions could not be accelerated enough even to penetrate the skin.) In addition, scientists may some day create stable, superheavy elements by bombarding uranium with heavy ions. To bring this goal closer, Berkeley is now developing its one-two punch, connecting the Bevatron with another atom smasher, the Heavy Ion Linear Accelerator, 550 ft. away, to achieve even higher energy levels.

Children's Goldfish. Word of the successful test of the Bevatron spread quickly from "the Cave," a tiny experiment room behind the accelerator. By last week, a team of NASA experimenters had already arrived from Houston to plan additional optical tests that should help clarify the process by which the eye forms visual images. A packet of seeds arrived from Germany and was duly irradiated to test for genetic changes; one excited scientist even thrust his children's goldfish into the beam to see if they reacted—they did not. Bleary-eyed scientists stayed up round the clock to test everything they could think of—including (with proper precautions) themselves. Explained one of them: "Who needs sleep at a time like this?"

NEW YORK TIMES 9/26/71

Seaborg Favors Change in Nuclear Safety Control

By WALTER SULLIVAN
Special to The New York Times

GENEVA, Sept. 15—The responsibility for assuring safety in the use of nuclear energy should eventually be transferred from the Atomic Energy Commission to some other agency, Dr. Glenn T. Seaborg, former chairman of the commission, said today.

However, in a wide-ranging interview in which he looked back over his 10 years in the post, he said that such a shift would be "a little premature" at this time.

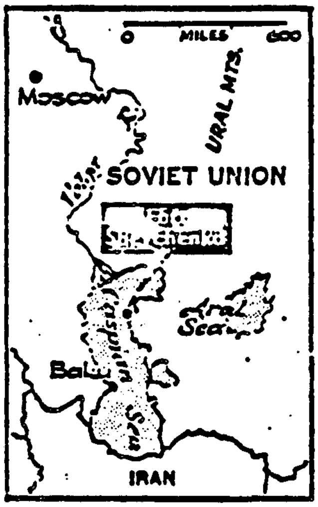
He had been asked whether doubts as to the commission's impartiality in judging such matters as locating reactors could be removed by assigning the role to another agency.

He replied that, for the present, the engineering expertise available to the commission makes it the best-qualified agency for the job. He argued as well that the licensing and regulatory branches of the commission were relatively free of the influence of those branches that promote the use of atomic energy.

Role in Two Parleys

Dr. Seaborg was replaced last month by James R. Schlesinger, an economist who had served in the Bureau of the Budget and then in its successor, the Office of Management and Budget. Dr. Seaborg served as chairman longer than any of his predecessors and, as a Nobel laureate in physics, he is the only scientist to have held the job.

He now plans to return to the University of California, Berkeley, to continue his work on the synthesis and identification of elements that are heavier than uranium. However, he is winding up his Government career by taking part in two conferences in Europe.



The New York Times Sept. 16, 1971

He is currently president of, and heads the American delegation to, the Fourth International Conference on the Peaceful Uses of Atomic Energy, which ends here tomorrow. He then goes to Vienna to lead the American delegation next week at the annual membership meeting of the International Atomic Energy Agency.

Visited 9 Soviet Cities

Dr. Seaborg has just returned from a Soviet tour in which the Russians provided him with a special plane. He thus was able to visit nine Soviet cities in 10 days, including Fort Shevchenko, which he believes may prove to be the prototype of future atomic centers. The city of 60,000 people is in an arid region on the eastern shore of the Caspian Sea and is dependent on a desalination plant for water.

At present the plant is gas-fired, but by early next year a demonstration fast-breeder reactor is to take over part of the enegy-producing task. Such atomic power plants, which manufacture more nuclear fuel than they consume, are the goal of a high-priority American development program set forth in President Nixon's recent message to Congress on energy.

The first commercial plant of this type is not expected to be operational in the United States until 1985, although a demonstration plant may start up sooner. The complex at Fort Shevchenko will produce both electric power and fresh water.

Dr. Seaborg was also impressed by the novel cooling system of a new atomic power plant near Leningrad.

It is completely redundant. That is, there are two independent systems of water piping so that if one ruptures there will not be sudden overheating, melting and escape of radioactive material in the reactor.

Being able to assure the avoidance of such a melting is one of the chief challenges in reactor design.

More than probably any other American official, Dr. Seaborg has been received in the Soviet Union almost as a hero. This seems to be partly because of the enthusiasm of Soviet scientists for his early work in producing new heavy elements, in which they are also active, and partly because he named one of those elements for Dmitri Mendeleev, the Russian who classified the elements into a so-called periodic table.

By the end of this century, if breeder reactors have begun producing large amounts of plutonium, the amount of it in the United States will have reached about a million kilograms, Dr. Seaborg said. Five kilograms are needed to provide the explosive for a nuclear weapon.

Other nations will also be producing plutonium, and this has led to fears of a black market in the material. Dr. Seaborg conceded that no inspection system could guarantee against some plutonium diversion. However, he said that he thought the projected system could be strong enough to deter a potential violator. New techniques for detecting such material are being developed, he said.

However, in a talk later in the day, he expressed concern over prospects for the inspection system, which will be operated by the International Atomic Energy Agency.

Nonatomic signatories to the treaty to prevent the proliferation of nuclear weapons were expected to agree on inspection procedures before the enforcement provisions go into effect next March, but none of the major powers have done so.

Space Plan Outlined

GENEVA, Sept. 15 (UPI)—The United States announced today plans to send nuclear-powered space probes to the outer planets in the next five years.

Details of the program were given to the United Nations "atoms for peace" conference by Milton Klein, head of America's Space Nuclear Systems office.

Mr. Klein said that the first mission using a nuclear reactor to provide on-board electricity needs would be sent to Jupiter in 1972.

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