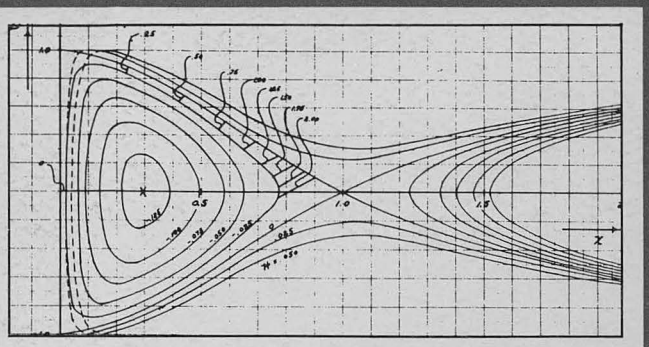

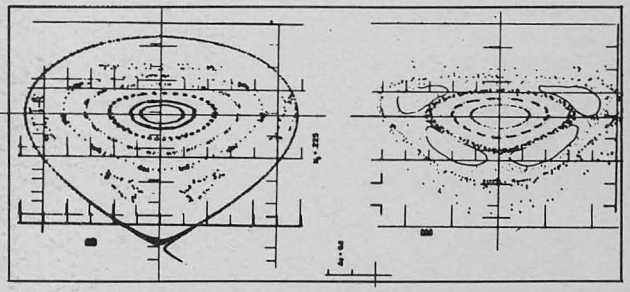

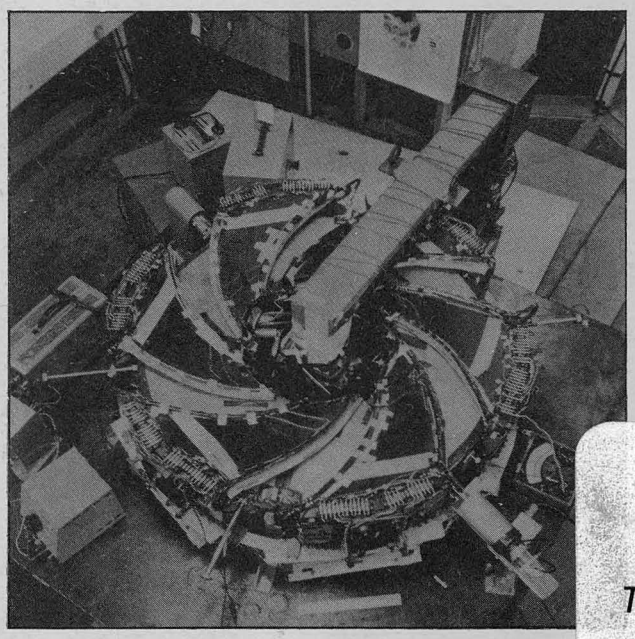

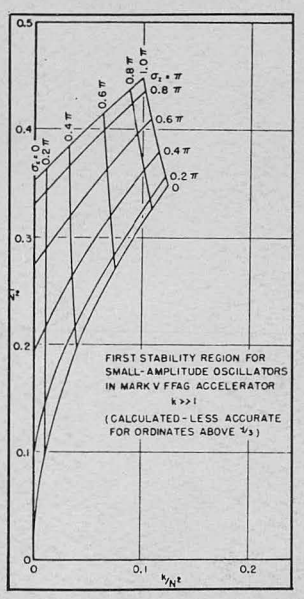

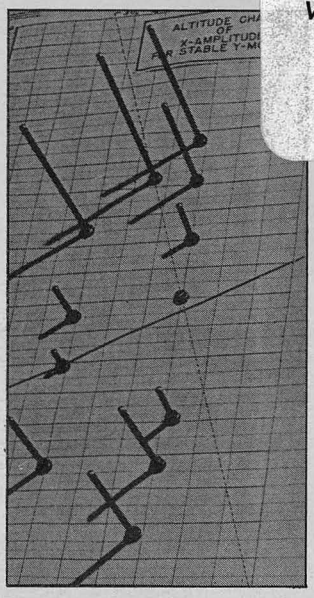

PUB-616
Volume I
September 1987

Selected Works of L. Jackson Laslett

Lawrence Berkeley Laboratory
University of California
Berkeley, California 94720

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

DISCLAIMER

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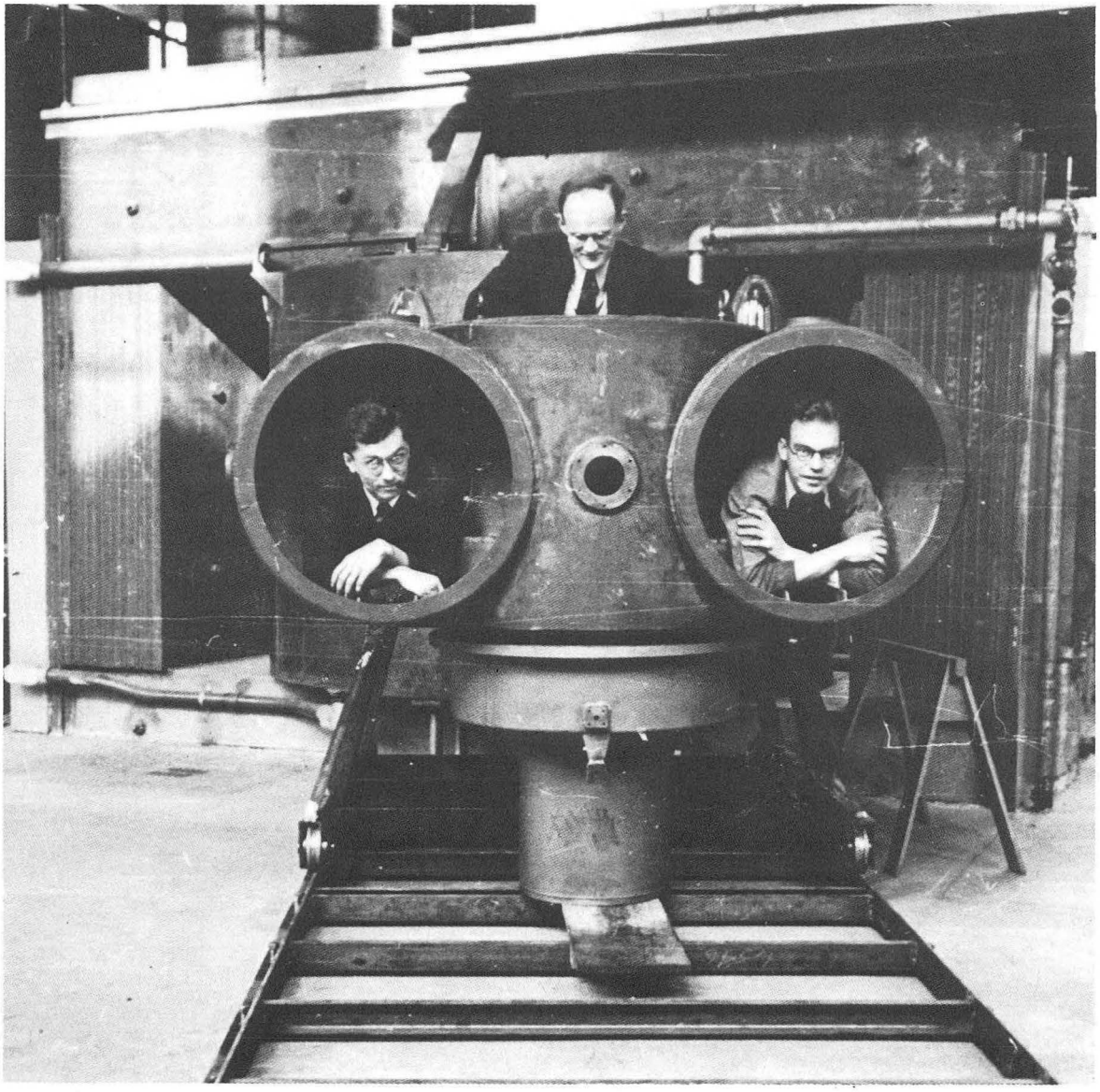

L. Jackson Laslett (left), Robert Thornton (top), and John Backus (right) posing in the dee-stem tank of the 60-inch cyclotron before it was assembled.

THE CYCLOTRON ALPHABET

A *stands for atoms, all shiny and new;*
B *is the beam which busts them in two.*
C *must be cyclotron, which keeps the lab warm -*
D *suggests duants, now built on a form.*
E *is for Ernest, who makes the thing go.*
F *should be filaments, as Don ought to know.*
G *stands for grids, which sometimes melt thru -*
H *is the Hell which is caused when they do.*
I *means intensity -- our first main objective;*
J *= Jo - in no way defective.*
K *recalls Kinsey ("Where is my heel?").*
L *are the leaks (in the upper can seal?).*
M *must mean mice, whose smell makes us moan;*
N *stands for neutrons, of moment unknown.*
O *are the oscillators, which go on the bum;*
P *is the pulling which then must be done.*
Q *is unknown (but the cyclotron has it) -*
R *could be range (or radio-static).*
S *now is store-room, a creation of Jack's -*
T *can't be tidyness, for this the lab lacks.*
U *means Uranium, whose transmutation we seek.*
V *stands for vacuum, like L stands for leak.*
W *is for wax, which we smear on like fools;*
X *hides the unknown location of tools.*
Y *is for you to fill in for your pleasure -*
Z *is the zany who put this together.*

October 1936

L. Jackson Laslett

Professor L. Jackson Laslett with other MURA people in 1955 at Ann Arbor. From left to right: H. Richard Crane, Donald Keret, Kent Terwilliger, Keith Symon, and Lawrence Jones.

Foreword

L. Jackson Laslett's career parallels the development of accelerator physics as a separate scientific field and the growth of Lawrence Berkeley Laboratory. Coming to Berkeley in 1933, he was one of the earliest members of Ernest O. Lawrence's Radiation Laboratory. After more than 50 years and official retirement in the Spring of 1987, he is still very productive, working on problems for the Superconducting Super Collider, the Advanced Light Source, and the Heavy Ion Fusion accelerators.

The first of these three volumes is a modest collection of various memorabilia and vignettes for L. Jackson Laslett, provided by his many friends and colleagues and especially his wife Barbara, in the form of photographs, poems and personal letters with anecdotes. It will be precious to all those with special regard , admiration and love for him. In the second and third volumes, we have tried to collect a few significant and selected scientific articles of Laslett spanning over five decades. The size of the collection is a reminder of the prolific nature of his scientific activity. An equally impressive amount of Laslett's scientific work has been omitted from this collection for the sake of economy.

A significant fraction of Laslett's career was spent at the Midwestern Universities Research Association (MURA), then centered at Stoughton, Wisconsin. Section 1 in the second volume collects a selected number of his significant and pioneering work on single particle dynamics in accelerators performed at MURA. Section 2 demonstrates his persistent interest in magnets and magnetic field computations. Sections 3, 4 and 5 contain articles on the electromagnetic interaction of charged particle beams with various surroundings, the coupling impedances that result from it and the coherent collective instabilities that arise from such interactions. These

works originated from the days when Laslett was associated with the Electron Ring Accelerator (ERA) studies at Berkeley (and slightly before) and continue until today with his involvement in the Heavy Ion Fusion (HIF) activities. One can find some of the pioneering studies of coherent beam instabilities and beam-wall interactions in storage rings and accelerators in these sections. Section 6 contains some of his recent work on transport of intense beams for heavy ion fusion applications. Some of his original hand-written internal notes have been preserved and presented as such as an illustration of his fine script and ability to create a finished manuscript with the first draft. Section 7 illustrates Laslett's love for intriguing problems in nonlinear dynamics. The subject is fashionable in particle accelerators today, but Laslett was one of the first few who identified storage rings and accelerators as being ideal testing grounds for concepts and conjectures in long-term stability of nonlinear dynamical systems. The first article in this section provides his first and lucid exposition on the subject. Finally in Section 8 we have collected a few of Laslett's very early works on experimental nuclear spectroscopy and other topics showing the breadth of his career. This section also contains one of the very first papers pointing to the idea of intersecting colliding beams as the way to go for higher energy collisions in particle physics.

The selected works in these volumes on the approach of his 75th birthday could be viewed historically as part of the record of physics and accelerator developments or pedagogically as clear and original expositions of many topics of current interest. But perhaps most importantly, they show a breadth of interest and ability that have long been inspirational to his many friends and co-workers.

S. Chattopadhyay

Berkeley, September 1987 *A. Faltens*

Acknowledgement

The completion of this large document owes a great deal to the superb coordination provided by Bob Masterson and Loretta R. Lizama of the Technical Information Department of the Lawrence Berkeley Laboratory and the painstaking work undertaken by many of their colleagues there, namely, Mary Lou Cordova, Valerie Kelly, Alice Ramirez, Connie Silva, Ivy Thompson, and Jean Wolslegel. Sincere thanks are due to Ralph C. Dennis for the illustrations and the cover and to Doug Vaughan of the Accelerator and Fusion Research Division for his expert editing advice. Laslett's friends and colleagues at Wisconsin from his old MURA days have contributed significantly by providing valuable material from that period to be included in this collection. Our sincere thanks to all of them. Joy Kono and Olivia Wong of the Advanced Accelerator Studies Group also provided valuable information on Laslett's publications and helped in some of the typing. Finally, a note of thanks to the Accelerator and Fusion Research Division Directorate of the Lawrence Berkeley Laboratory for supporting this endeavor all the way through, both in spirit and financially.

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Lawrence Berkeley Laboratory
1 Cyclotron Road Berkeley, California 94720
(415) 486-4000 • FTS 451-4000

A FEW THOUGHTS FOR JACKSON LASLETT

AT THE TIME OF HIS RETIREMENT

Dear Jackson:

Well here I am, in a unique position to write some thoughts summarizing the memories of about thirty years within the space of a page or so. It is unique because I had the opportunity to play the roles of solicitor of the letters appearing here, and collector of them as they came in. What a wonderful experience! However, by now most of what I had in mind to write has been said, sometimes by several others, and often in better ways than I might have found. So what is left for me to add?

Because I have had this wonderful experience of reading what everyone else has written, perhaps I can put a different perspective on the collection of their memories than any one of them might have done. I feel as if I had been given a guided tour through someone else's private home, including not only the "public rooms" but also some of the personal living quarters. For each room of your life in which you have spent time there have been fast and firm friends to describe your activities in it and the way in which you shared that time with them. Unlike some people we know, you seem to be always exactly the same person in every room. The threads of your personality and intellect seem to each friend to be of the same character, quality, and style, whether they comment on your life in the Old Radiation Laboratory in 1934, on your interactions with them in 1987 at the Lawrence Berkeley Laboratory which developed from it, or on any of the many rooms in the house of your life where you resided in between. And it is clear that each regards you as a very special friend.

I will try to develop the idea that from these letters one picks up bits of personal lore (Jacksoniana?), beyond the formal "bio-bibliographic" facts, in every room:

ROOM	FACT	LORE
Cal Tech	Jackson is a student. 1929-1933	He is a cross-country runner, who can count laps right even when others can't.
Berkeley	Jackson is a graduate student. 1933-37	He puts lots of glyptal on vacuum leaks. Some of his apparatus is soaked with oil. He writes great limericks and poems.
Denmark	Jackson builds a cyclotron at Bohr's lab. 1937	He has motorcycle adventures in Sweden. He has to break ice from an English wash basin in the morning.

Iowa State	Jackson is a physics professor. 1950's	He patiently repairs the missing spots in his colleagues' knowledge of physics.
Office of Naval Research	Jackson represented the ONR in the Cornell synchrotron upgrade. 1950's	He solved many problems about its design, salvaging R.R. Wilson's "romantic and intuitive ideas".
Ann Arbor	Jackson commuted to MURA to help develop new accelerator concepts. 1955	He always had a pocketful of pencils. He did "1 1/2 board calculations", "2-board" ones, etc.
Washington, D.C.	Jackson founded the AEC's High Energy Physics Program. 1961	The "Laslett style" charmed everyone -- Joint Committee on Atomic Energy, Bureau of the Budget, President's Science Advisor, -- (on and on)
U.C. Berkeley Physics Department	Jackson taught physics at Berkeley. 1963?	"I have used what he taught me to make a living ever since."
Lawrence Berkeley Laboratory	Jackson is a senior staff member. 1963-	"-- running three computer terminals with two hands--"
The Berkeley Tennis Courts	Jackson is a regular and avid tennis player.	On missing a shot he never says "Damn!", but rather "Your shot was great!" If a partner is late he will say "I'm a little early; sorry!"

One period not commented on much by others is the years in the 1960's, Jackson, in which you and I shared the responsibility of teaching the graduate course in analytical mechanics at Berkeley. For me this was an exciting time, during which you would show up nearly every week with a fresh batch of suggested exercises for the students to try. These exhibited a wide range of features which were quite new and very challenging. During our discussions I always learned a lot, even though the topic was one I had taught several times before and had thought I knew quite well. Many others have written in one way or another about your inborn interest in teaching what you know to others around you in whatever context was suitable, but always with a gentle touch and great consideration for those who were learning. How fortunate we all have been!

I have strongly the feeling that the depth of our interactions in physics, as well as in friendship, has intensified steadily over the most recent several years. I have tried to do collaborative work with many people, but never with one who succeeded so well in making me feel (whether rightly or not) that my help was welcome and that my efforts were of value. I am sure that this trait of yours lies close to the heart of the reason why those who have written feel a special kind of appreciation for your role in their lives. From all I have heard this trait also was present in the atmosphere of the early Rad Lab in the 1930's, but with the present larger and more impersonal organization it

is now less common. None of us who have benefitted from this facet of your personality will ever forget how important it has been to us and how grateful we are to you for providing it.

Dave

David L. Judd

MRS. E. O. LAWRENCE
111 Tamalpais Road
Berkeley, California 94708

Dear Jackson:

For the real old timers like you and me (I arrived on the Berkeley scene a scant year before you did) it now seems absolutely incredible that fifty-four or -five years have passed since we first experienced the excitement and camaraderie of the O.R.L. Of course, you were always one of the team, while I was just a fascinated onlooker, but I'd be willing to bet that you sometimes reminisce about those good old days as enthusiastically as I do.

The first thing I noted about those early lab crews was the amazing degree of equal opportunity they enjoyed. Though that phrase had not been coined as yet, I think it expresses very well the spirit of the Rad Lab in the thirties: equal opportunity to get yourselves and your lab coats dirty right alongside of the "boss" while putting in outrageously long hours in the process; equal opportunity for the newest recruits and the most experienced veterans to offer suggestions and have them seriously considered during those anxious huddles over leaks and other malfunctions; equal opportunity to share in the triumphs as well as in the frustrations.

Like me, other wives, when the young scientists managed the time to acquire them, soon found themselves occupying ringside seats at lab special events, often at strange hours before, after, or even instead of a rare night out at the movies. Perhaps some resented these unscheduled lab visits but I think most of us, certainly including Barbara who was already a bona fide "member of the family", got almost as big a kick out of new discoveries as our hard working husbands did. I expect you dedicated people who stayed in the thick of it still get plenty of excitement at L.B.L. but I doubt that the wives still share the fun and the headaches as we all did in O.R.L. days. That's the price of progress I suppose, but didn't we all have great times together?! And don't forget all those crazy but wonderful celebrations at DiBiasi's or on the shores of Tomales Bay!!

So now they tell me that you are retiring and I find that hard to believe. No doubt it will be a very busy kind of retirement and I hope your activities will be exactly what you and Barbara have been looking forward to all these years, assuming that you ever had a free moment to think about the future.

May all your memories of Rad Lab days be happy or amusing ones! Whatever you choose to do-- ENJOY !!!

With warmest good wishes to you both,

Sincerely,

Molly

REMINISCENCES BY BARBARA LASLETT

Ernest Lawrence's office was upstairs in Le Conte Hall. I had my typewriter and the telephone in an anteroom where graduate students and visitors chatted among themselves about the latest developments in physics while waiting to see the great professor and director of the Radiation Laboratory. Most of their time and the Director's, however, was spent in the small gray frame building across the way from Le Conte. There students and faculty and others visiting from universities in this country, Europe and Japan worked all day and sometimes far into the night around the infant cyclotron.

All was not constant labor, however. Don Cooksey, second in command, would sometimes arrange a Sunday excursion to Marin County and the beach, where we had a picnic lunch, raced along the sand, and dived through the ice cold surf. Even there, much of the conversation was in the language of physics. Sometimes a special dinner was planned at DeBiasi's restaurant where departures and arrivals were celebrated amid good food and good talk. And there were always unauthorized coffee breaks at the Student Union lunch counter, and sandwiches at noon under the trees in Faculty Glade.

Jackson and I often took off after a day's work for the hills and watched the lights come on to the west after an early sunset. Ed McMillan called us the "eternal pedestrians."

One evening in 1937 the Lab crew said goodbye to Don Herst and Jackson at the old S.P. depot on University Avenue. Don was on his way to England and Jackson to Denmark on a Rockefeller Fellowship to work under Niels Bohr. From Denmark came letters throughout his stay, describing people, scenes, work, travels, adventures. The letters, full of humor as well as information, were passed happily from hand to hand. The Rockefeller Fellowship expired at the end of a year and Jackson was granted on Oersted Fellowship to enable him to continue at the Institute.

In November, 1938, however, Jackson returned home because of the death of his mother. After a stay with his father in Pasadena, he came to Berkeley and resumed work again at the Radiation Laboratory. In late February we were married. We had not settled into our new apartment when word came from Ann Arbor that there was an opening for an instructor in the Physics Department. We were on our way.

Mrs. Edwin M. McMillan
1401 Vista Road
El Cerrito, California 94530

April 4, 1987

Dearest Jackson,

We (Ed, Elsie, Barbara, Jackson) must all be Methuselahs, as it's hard to know when we did not know each other; even before we were married! There were years, yours in Ames, when we lost close contact. Like any cycle, here you and Barbara are giving us such joy by your visits since Ed's many physical troubles. It proves what I like always felt; good, rich friendships do not die. We bless you both.

We cannot imagine your retirement years dragging. Each of you has so many things you do well. You will enjoy more time for each other, and more time for the three children and the grandchildren. Thy cup will run over with love, joy, and activities.

Ed and I are with you in spirit and send our love to you and your family.

Ed and Elsie

Dear Jackson and Barbara:

It seems a brief forty-five years ago when we joined you for a memorable vacation on Cape Cod. As we recall, sun and water were at their best, and showy mallows were blooming in the marshes. But all else was overshadowed by leisurely discussions of Berkeley days and the events that followed them.

The photo of you and Lars on the beach renews fond memories.

Welcome to the circle of happy retirees.

Jean Hugh

Jean and Hugh Paxton

Los Alamos

Professor
STEN von FRIESEN
Kulramsvägen 5 E
223 67 LUND
Tel. 046 - 11 62 05

A few of many happy moments with L. Jackson Laslett

I met Jackson Laslett for the first time fifty years ago. In 1937 Manne Siegbahn, my professor of Uppsala, moved to Stockholm to build and run the first Swedish Research Institute for Nuclear Physics at the Academy of Sciences. He decided that he would need a cyclotron there and asked me to join him in Stockholm to build it. I accepted this stunning offer with great pleasure and was sent to USA to find out how. Siegbahn wrote to his friend F.K. Richtmyer at Cornell and asked his advice, which was: "Send him to Cornell. M.S. Livingston is here running the world's smallest working cyclotron, so this is a good place to start." I got there in the middle of March 1937 and learnt how to tune the oscillator squeezing coils by means of wooden tongs and other exotic and useful things from Ben Moore and Marshall Holloway. After a couple of months I moved on to Mecca, the old Radiation Lab in Berkeley.

When I arrived Don Cooksey took care of my worldly needs, housing me, among other things, in a cottage where Maurice Nahmias lived. Nahmias had asked for a European to talk to in "this awful country with its poison oak, poison ivy, and deadly rattlesnakes". One day we made the famous excursion to the desert in Nahmias's twenty-five dollar car together with Lorenzo Emo. Jackson knows all about it.

Don Cooksey gave me all the best blueprints and descriptions of existing coming cyclotrons. He showed me places of interest and anything I might like to see. He impressed me a bit when he said once when we were going to a party: "Ten minutes, I'll just change suits and cars".

I was put to work in Ed McMillan's group and got to know the people at the lab very quickly. In this way I made a number of lifelong friends, foremost among them Jackson Laslett. One day when we were standing on the floor discussing some suggestion by Ernest Lawrence we heard a voice from the sky, his voice. "It's actually not all that dumb, let me explain." I decided on the spot never having a communciation system quite like that in any lab of mine.

I returned to Stockholm to take up my new job on September 1st 1937. Jackson went to Niels Bohr's institute in Copehagen where he worked with, among others, Otto Frisch. Bernard Kinsey and Harold Walke returned to Liverpool. Don Hurst went to Cambridge and Hugh Paxton had gone to Paris. I took part in the "Paxton for Paris party".

The cyclotroneers in Europe formed a close group and held frequent meetings to discuss technical problems. When we felt like it we could always find a suitable reason to get together, such as HF-oscillators, ion sources, bringing out the beam and so on.

Jackson was my closest neighbour and we visited each other frequently. Once I brought him on my motorcycle to my summerhouse to Lake Bolmen in Smaland. I happened to take a wrong turning in the middle of a wild wood, which once formed the border between Sweden and Denmark. Then suddenly we were surrounded by a number of sunburnt men with close cropped hair dressed in gray. We had strayed into a camp of well behaved murderers serving their life sentence as lumberjacks and ditch diggers. There was just one guard without any visible arms. The arrangement was based on mutual trust and the rule that anyone caught at an attempt to escape lost this privilege and was put back in jail. Jackson and I got away safely.

About ten years later, when Jackson was at Ames and I had moved to the University of Lund, I got a letter saying that Jackson and Julian Knipp were on their way to Sweden and would I, please, pick them up at Stockholm Airport. I did, and when we had been driving for an hour or so they asked "Is it far to go?" "Not really," I said,

"just about 360 miles." They had not looked Lund up on the map and Jackson, who could have seen Lund from Copenhagen across the Öre Sound, had been too busy to look that way. This gave me an opportunity to show them a good deal of Sweden.

We went to England immediately after Christmas 1937, where Jackson and I stayed with Bernard Kinsey's mother and aunts in Purley in Surrey south of London. It's hilly country and we had to push Bernard's old Austin up steep hills. We had both lived in vacant students' rooms in winter and broken the ice in the pitcher in the morning. Jackson and I shared a room and found it a bit chilly but not particularly so. When we raised the blind in the morning we found the window wide open. There was snow on the ground. We spent New Years Eye with physicists at the "Arts and Letters Club" close to Piccadilly Circus. At midnight we actually saw a typical English scene, a man trying to pinch a policeman's helmet. The policeman said: "You mustn't do that, Sir." The man did not belong to our party.

On one occasion, when we visited Cambridge, Jackson and I learnt that Don Hurst's degrees of B.Sc., M.Sc., and Ph.D. at McGill were not recognized at Cambridge. This meant that Don was not allowed out at night after 10 p.m. One night, when we had seen Don safely back with his landlady, two of the proctor's men accosted us in the street and asked: "Are you members of this University, Sirs?" Jackson answered: "Thank God, No!" Jackson denies this blankly. Here two reliable men's words stand against each other. You'll have to take your choice.

My time at the Radiation Laboratory ran from 1933 to 1936, when I left to go to Liverpool. Jackson, I think, left Berkeley in 1937. So I believe that I am right in saying that we overlapped by about two years.

My first recollections of Jackson at that time was his capacity to fix leaks with glyptal, a commodity of universal application at that time, the salve for all such troubles. Since leaks were always occurring, Jackson must have had his work cut out to fix them. Then he had a certain affiliation to transformer oil. I don't remember the details of this noteworthy characteristic, but I am sure Reggie Richardson or Art Snell, could fill in with the details. Jackson was also very proficient in putting procedures and personalities of the laboratory into zany rhymes. I have a copy somewhere here in my office at home but I cannot find it. (I should have had it framed years ago). Didn't Molly Lawrence quote parts of it at a dinner in Oakland some years ago, celebrating the fortieth (?) anniversary of EOL's invention of the cyclotron?

On leaving Berkeley in 1936, I went to Liverpool to set up a cyclotron for Chadwick, while Jackson, a year later, did the same thing in Copenhagen, and Sten von Friesen in Stockholm. We met again, with Walke, in the fall of 1937 in Copenhagen. Of that occasion, I have distinct recollections of walking along Lange Linie with him; snacks with him in the lunch room of Bohr's institute, embellished with hard boiled eggs and the delikatessen from the shop down the road, which the Danes do so well; and finally a most memorable dinner with him at the Jakobsens'. The following day I left by the night train for Stockholm, with Walke and Frisch. Worried at the thought of leaving an overcoat hanging up in the corridor outside my sleeping compartment, I asked Frisch about it. He replied: "Don't worry; nothing is ever stolen in Sweden". How times have changed!

Jackson and Sten came to England in January, 1938, following that meeting. For reason which I forget, we convened in London. In my naivete, (which in those days was beyond belief), I took them to a night club, which bored them, and then put them up for the night at my mother's house in Purley, south of London (with her permission, of course). Those were the days when 60 degrees was considered too warm to be healthy. The window of their room was open all night, and both, I am sure, will remember the ice on the wash basin the following morning. Sten, on that occasion, remarked sardonically that no Swede could possibly survive a winter in England.

I don't remember when next we met. But meeting with Sten from time to time in England, Sweden, and more recently in Texas, that old association has never been forgotten. Whenever two of us met, we would sent a postcard to the third. Of course, I have seen Jackson and Barbara many times, usually at their delightful house on Cragmont, a few yards down the hill from the Thorntons'. What a lovely place to retire to! I wish them as happy a retirement as my own.

Bernard B. Kinsey (5/27/87)

Bernard B. Kinsey

TRIUMF
Vancouver, B.C.
Canada
May 14, 1987

Dr. L.J. Laslett
Lawrence Berkeley Laboratory
One Cyclotron Road
Berkeley, CA 94720

Dear Jackson:

I have very pleasant memories of you as a fellow graduate student at the Old Radiation Lab in the period 1933-37. Under E.O.L.'s charismatic direction we all worked eagerly on general Lab problems and on our own individual research. This activity would usually draw to a close soon after midnight -- and then we would retire to the attic of the Lab for a fast game of badminton followed about 2 AM (or later) by Joe, the janitor, who would serve us all tea! (and maybe cookies)

Also I remember that you introduced me to the Chinaman's restaurant on University (East of Shattuck) where we could get dinners, either Chinese or American, for 25 cents. At this time I became anemic and John Lawrence, concerned about possible radiation effects, had me consume lots of iron. So that first radiation scare was all your fault! I also remember you shivering with cold as you took readings on your Lauritsen electroscope in the middle of the night when you were determining the absorption length of gamma radiation.

In later years I had many rewarding contacts with you in the mid-west and when you were at ONR -- but it was the graduate days that were special.

Reg Richardson

Cornell University
Floyd R. Newman Laboratory of Nuclear Studies
Newman Laboratory
Ithaca, NY 14853-5001
607-255-

Telex: WUI 6713054
Telefax: 607-255-7116

May 19, 1987

CONTRIBUTION ON THE RETIREMENT OF L. JACKSON LASLETT

Jackson Laslett is well known for his pioneering contributions to the art of particle accelerations. Let me remember here how he helped to build the first strong focusing synchrotron at Cornell University in the early fifties. Jackson was spending a year or so away from Iowa doing a citizenly stint as Head of the Nuclear Physics Branch of the Office of Naval Research which was funding us.

We had submitted a proposal (probably one page) to convert our 300 MeV electron synchrotron to a one BeV machine. Jackson was supposed to be the hard-boiled bureaucrat who would decide how much we should get (it was about $200,000). Now, Jackson is hardly your everyday bureaucrat -- to put it mildly. In the course of coming to a judgment, he became wildly enthusiastic about the many quite difficult accelerator problems, for example, resonances and synchrotron radiation. My plans for the accelerator were largely romantic and intuitive. I think Jackson was horrified, but enticed by the romance. What he did was to go carefully through the whole design, correcting my mistakes, and creating solutions to problems I had ignored. He did all this in such a happy style that I enjoyed our conversations tremendously -- even saved up problems for our "house out of house" theorist.

Now, as everyone knows, Jackson is the soul of honesty and responsibility. Yet I think he compromised himself everso slightly with the Navy by all the help he gave us. If so, I for one am forever grateful. The damn thing did work, and his technical contributions were indeed important -- but the fun that he contributed, that was important too!

Bob Wilson

310 West 106th St.
New York, NY 10025
April 30, 1987

Dr. L.J. Laslett
Lawrence Berkeley Laboratory
1 Cyclotron Road
Berkeley, CA 94720

Dear Jackson:

Welcome, Jackson to the happy regime of retirement! It's a pleasure to assure you that retirement "is everything it ought to be and nothing that it oughtn't, oh". From my experience, you can play at physics on your own schedule, go sailing and fishing, take piano lessons, reread the classics and travel with no time limits imposed by official vacation schedules.

More seriously, you are in the special and rather unusual position of being able to look back with deep satisfaction on a career replete with important reputation for being the ideal consultant to whom to bring difficult problems with assurance of a capable and sympathetic response.

I am sure that your fertile mind will not hesitate in its pursuit of knowledge; and certainly your associates will continue to depend on you for aid and advice.

My best wishes for many years of happy retirement.

John Blewett

Lawrence Berkeley Laboratory
1 Cyclotron Road Berkeley, California 94720
(415) 486-4000 • FTS 451-4000

May 15, 1987

Dr. David L. Judd
UCB - Physics Department
LeConte Hall
Campus

Dear Dave:

I'll just say a word or two about my early memories of Jackson, and then call attention to two of his prewar poems. When I came to Berkeley, in 1936, with a Ph.D. from Chicago, and absolutely no experience in Nuclear Physics, I found Jackson at the Lab, as a graduate student, and with a good paper on the radioactivity of Sodium-22, in press. He was a year and a half younger than I was, so I was impressed.

One day in 1937, Felix Bloch came up from Stanford, and proposed that someone at Berkeley could show that the neutron had a magnetic moment. Felix had noticed that the scattering of neutrons in iron, cobalt and nickel was much higher than in the neighboring elements, and suggested that if these elements were heated above their Curie points, the excess cross sections would disappear. Jackson took up the challenge, and I remember his set-up at the 27-inch cyclotron, with gas-oxygen flames heating up iron bars, with transformer oil dripping all over his set-up. Felix's idea didn't pan out, but Jackson gave it his best shot.

Then Jackson went off to Copenhagen, to build a cyclotron, and then to various mid-western universities. We worked together in radar, at MIT, during the war, and then I lost track of Jackson until he returned to Berkeley as an accelerator theorist.

I've always remembered his poem, in limerick format, about direction cosines. Here it is, and I think it is very clever, and vintage Jackson.

Lambda, mu and nu
Are directional cosines, who,
Though each less than one,
When squared form a sum,
Which when doubled is equal to two.

And as poet laureate of the Old Radiation Lab, Jackson wrote the fine alphabetical poem, of which the following is a Xerox copy.* I could explain all the murky references, but that would be like having to explain a joke to someone. It brings back happy memories to me, as it would to anyone who worked in the wonderful old wooden lab on the campus. So, as Bob Hope would sing, Jackson, "Thanks for the memories."

*See page iii

Luis W. Alvarez

LWA/jrb
804T

UNIVERSITY OF WISCONSIN-MADISON

DEPARTMENT OF PHYSICS

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May 22, 1987

Dr. L.J. Laslett
Lawrence Berkeley Laboratory
One Cyclotron Road
Berkeley, CA 94720

Dear Jackson:

I'm glad to have the chance to add comments of appreciation at this time of your retirement.

If anyone should want to know about the details of early cyclotrons in Lawrence's lab, he can find this information by asking you, who were there then! You helped Lawrence to generously spread the cyclotron art by going to Denmark carrying Berkeley's know-how to help build Bohr's cyclotron. When the great idea of phase focussing was discovered, you participated in building the early synchrotrons at Iowa, Cornell, and elsewhere, as well as in helping our government handle their growing interest in patronizing the accelerator field. I remember your coming to the University of Illinois for the Navy to grill me with questions about how to raise the current in betatrons by orders of magnitude. You were very early in on such considerations that have become so active recently.

Later, when it was clear that strong focussing along with phase focussing provided possibilities for synchrotrons to go into the GeV range, you were in the middle of exploring the possibilities with the MURA group. For a period in that development and at great personal inconvenience, you commuted from Ames, Iowa, to Ann Arbor, Michigan, by train for the weekly two or three day concentrated session on particle accelerator theory and design. That was a time when the CERN and the Brookhaven proton synchrotrons in the 30 GeV range were committed to construction and the potentialities for the next generation of accelerators were on the minds of physicists.

At this time ideas arose rapidly and frequently, and principles for focussing and handling particles were being generalized and explored in many forms.

Your role was singular and essential at this point, and it was impressive to watch you! Among the numerous forms and configurations of potential focussing, acceleration, and beam handling schemes, many of which were wild and which were transient in the minds of participants, you were able to sort them out. With your authoritative reduction of fancy to basic fact and to real possibilities, judged from dimensions, sizes, weights, and, of course, the unbending laws of physics, you did it. If Nature was poised to humiliate us by teaching us what her laws would not allow, it was you who beat her to it by steering us in the correct direction beforehand.

Another event in which you were an important participant was the conversion of accelerator design from "hard" modeling to computer modeling in the early 1950's. Your pioneering "feckless five" code was one of several you exercised revealing the topological complexities of phase space trajectories for coupled motion in non-linear force fields with periodic coefficients. Such topological questions have become a lively subject in this day.

It has continued to be true that you know the whole business with all the fine points needed to make particles stay where they belong in our real world machines with all their perturbing conditions. Can't we have a clone or a print-out? But I'd rather have Jackson!

With best wishes for your retirement,

Sincerely,

Don

Donald W. Kerst
Professor Emeritus of Physics

STANFORD UNIVERSITY

STANFORD LINEAR ACCELERATOR CENTER

Mail Address
SLAC, P. O. Box 4349
Stanford, California 94305

May 5, 1987

Professor Jackson Laslett
Lawrence Berkeley Laboratory
1 Cyclotron Road
Berkeley, CA 94720

Dear Jackson:

I am told your retirement is impending but I can hardly imagine that it is very real. Our paths have crossed on innumerable occasions both when you were in government and outside. You were our patron saint while ONR was still supporting the High Energy Physics Laboratory at Stanford. You then shifted to AEC and founded its High Energy Physics program, and then we had many common interests in beam dynamics and miscellaneous other accelerator physics subjects. I remember one occurrence which you may well have suppressed: during one of my visits to Washington you took me on a hike to the falls of the Potomac in a driving rain storm, and in recollection I think it is somewhat miraculous that neither of us broke our respective necks.

Accelerator and High Energy Physics owe you a great deal and I hope you will continue to be highly productive.

With best wishes and personal regards,

Wolfgang K. H. Panofsky

IOWA STATE
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May 26, 1987

Dear Jackson:

It has come to my attention that you are about to retire. I sincerely hope that you and Barbara will enjoy your retirement as much as Ruth and I have enjoyed ours. I suppose that you and Barbara now will be doing some of the things you have wanted to do for a long time. I then predict that before long you will be saying "I don't understand how I had time to work".

The other day on campus I drove down the street that contains many of the Ames Laboratory buildings. I noticed that on the light posts they were hanging large posters that were saying- "Ames Laboratory - Forty Years of Energy Research". I couldn't help but think of 1947, the year in which I received my Ph.D. degree. Did the energy research at the Ames Laboratory begin with your research at the Laboratory?

I have often thought of the physics research I did under your guidance. I was most fortunate to have you for my research professor. Your many helpful suggestions were most important in helping me complete my research thesis. I was also most grateful for the opportunity of being able to continue in the research area of beta-ray spectrometry. The research was most helpful during my entire career in education-yes, even as president of a college. You made a very significant contribution to the physics program at Iowa State University.

Ruth and I have also appreciated very much the relationships we had with your family, particularly when both families were living on Marston Avenue. As you know Ruth was Godmother to your daughter, Helen.

So again, many thanks for a very fine relationship that has meant so much to me during my entire career in education. Have an enjoyable retirement.

Greetings to you and Barbara from Ruth and me.

Sincerely,

Erling N. Jensen

Erling N. Jensen
Professor Emeritus

REMINISCENCES OF JACKSON LASLETT

Jackson and I have been part of a Sunday tennis foursome for over two decades. During this time it has been cumulatively something like hundred-person foursome, if you count all the fellow players we've had--players with varying levels of tennis acumen, seriousness, and noise levels, and also a staggering geographic diversity.

During all these years, a lot of things have changed. We've gone through the yippies, hippies, yuppies, and me-generation types. We've added years to our lives, our children have grown up, and some unexpected things have happened. Yet those Sundays with Jackson have had a wonderfully constant quality; they have been fundamentally and remarkably unchanged.

Jackson is still as agile and quick as ever. He still beats me by the same score. He is still as plisky as ever. When he hits an especially "mean" shot, he still holds his finger up to his mouth, looking bemused, with something of a naughty-but-pleased little-boy look, saying, "Oops! did I do that!?" (The bemusing is indeed amusing because of the incongruity between a hard, offensive, strategically-placed winning shot, and the gentle, mild-mannered Jackson we know and love.) And Jackson can still play while suddenly getting inspired to ponder, straight-faced, such serious philosophic and philologic problems, as "was that shot offensive or offensive, Or "What do you call a fellow* player when it's a she?"

Of course, it is the constancy of Jackson's set of elemental, decent values that I really cherish. His loyalty, his understated modesty, his quiet caring, always there if I need a friend, always able to sense what he can do--softly, thoughtfully--to make someone feel good. The constancy of his special blend of respect, sweetness, and hilarity.

One thing, though, has changed. Jackson now calls me Gladys, whereas for the first decade of our association he called me Mrs. Sessler (it occurs to me that it never

occurred to me to call him Dr. Laslett). Which reminds me of a comment Esther Schroeder made when she was a member of our fluid foursome: "Jackson is one of the last of the old-world gentlemen."

And so he is. Not, of course, in an effusive or obvious way--that's not Jackson. His chivalry comes quietly. Like a whisper. But in time all those whispers reinforce each other. And after a while they resonate and cause this swell of devotion we feel for Jackson (Jackson, I hope this doesn't embarrass you.)

When, for example, Jackson picks me up Sunday mornings, he is always on time. When I am not ready, which is frequently the case, Jackson will say, "Oh, forgive me. I'm sorry I came a bit early." Or, I've noticed (it's taken me a while) the difference between what Jackson says when he misses a ball and what I say.

Me: "damn!"

Jackson: "Oh, that was a great shot of yours!"

The only expletives I've ever heard from Jackson on the court are: 1) "Caramba," (Spanish) and 2) "Oy Gevalt" (yiddish). When we change sides and he hands someone the tennis balls, he may bow slightly from the waist and say the Danish "Vaersogo" (if you please).

Jackson, in his enjoyment of the English language takes delight in pointing out solecisms. Some years back, after I had fallen off a ladder and had to tell him I'd miss some of our tennis, he discovered and quoted this newspaper article: "Somewhere in the United States there is a woman falling off a ladder every 3 minutes." Jackson added: "Someone should find that woman and tell her to be more careful."

When Jackson and I go for a walk, he will merrily recall some advice from his coach at Cal Tech: "When you run uphill, lean forward, use gravity to pull you uphill."

In the very early 1970's when I worked on Building 50, Jackson and I were enchanted in discovering that we could communicate with each other from our different

Somewhere in the United States
There is a Woman falling off a Ladder
Every 3 minutes ---

Someone should find that Woman
And implore her to be more careful!

* * *

I'm very glad you found a way
That we could play this Holiday.
With rain before, and more to come,
I wondered what could now be done!
It's also nice you found the time
To honor our Saint Valentine,
Because I really wanted to
Exchange some Tennis shots with you.

buildings, via teletypes. It became not unusual for the people who shared the teletype I used to find messages keyed in by Jackson the previous evening. These were usually tennis-related, such as his "10SNE1?". Or there might be a birthday or holiday greeting. Here is one that I happened to have saved: (see previous page)

You can imagine what a ray of light these notes could shed on an otherwise dark, cluttered "ready room," back in that almost-forgotten era when we still loaded boxes of 1000 Hollerith cards down the dumbwaiter, hoping that both the dumbwaiter and the computer would function, that our cards would not get chewed up, and dream that when we got our "output" back 8 or so hours later, we might miraculously have put in a bug-free run. When the dawn of interactive programming burst forth, Jackson delighted in the new-found on-line, do-it-yourself control and power it gave him.

"Jackson Laslett" is almost synonymous with "modesty." He has always eschewed praise (for himself) and the limelight. A few years ago, Jackson told me he'd miss a week of tennis because he had to go to a conference in Sardinia. When he returned and I asked him about his trip and the conference, he talked mainly about an oil refinery and oil-storage tanks (that was related to some work I was doing then). He said little about the conference. Later, I met Ernest Courant. Ernest mentioned that he had been a conference in Sardinia and it was wonderful. When I said, "Oh, Jackson was at the conference, he exclaimed, "Oh, Jackson! He was the star of the conference!"

Of course, I can't leave Barbara Laslett out of this. If you ever want to be perfectly certain that, at any time of any day, you will call someone and hear the most cheerful, welcoming voice, just pick up the phone and call Jackson. Barbara will answer with her usual cheery, singing hello, and then give a cheery, singing "Jackson, it is _____." She will even do this unflinchingly when I call Jackson during a downpour before a scheduled game (after all, you never can tell!). "Jackson" (the same cheery voice, no hint of how silly this all is), Gladys wants to know if it's raining."

Material things and sartorial standards have not had an exalted ranking of things important to Jackson. That's OK. But Jackson, I was so glad when you replaced your old blue car with your VW Rabbit. The seat cover of the driver's seat had gone. I had gotten afraid that we might lose you as you kept sinking deeper and deeper into the springs, till you were scarcely visible. And your light-blue sleeveless sweater--the tattered one with all the holes. I once asked you where and when you got it. You said, "Oh I've always had it," and that, of course, you'd keep wearing it. (I'm glad because I associate it with nice memories.)

Jackson, by now I feel that, like your light-blue sweater, we've "always had it". And even if it ever happens that, like the sweater, we start to get a bit tattered with age and wear, I think we'll always keep up our tennis and the special fun times that go with it (maybe gravity will help pull us along?).

Gladys

Vignettes About LJL — Andy Sessler

1. I first met Jackson Laslett in Ann Arbor in the late summer of 1955. I had been invited by Don Kerst to spend that summer with MURA, my first experience with MURA following my first academic year at Ohio State University. Jackson, who was then a professor at the Iowa State University, had been "sent" to Brookhaven for the summer to learn first-hand about accelerator physics at BNL.

We had spent the summer with all of us (about 20 physicists) working on FFAG. We were single in our purpose, and although we developed many wonderful things along the way (just that summer: formulation of the Hamiltonian theory of particle motion, non-linear resonances, RF theory and RF stacking, etc.), all efforts were devoted to developing the FFAG concept.

When Jackson came through Ann Arbor, on his way back from Brookhaven and to Iowa, I was one of the few MURA people still around as the summer meeting had already ended. Jackson was very impressed with his Brookhaven stay and said, rather strongly, that MURA should cease its fascination with FFAG and propose a "simple" AG machine.

I was struck with his observation for none of us had even thought at that level. And Jackson was, of course, correct; MURA, as we all know, didn't follow his advice, surely to its detriment. The ability to see far, and to wisely judge what actions one should take, is an ability Jackson has in full measure; I learned of this trait in our very first conversation.

2. From January to September in 1956 I took leave from Ohio State and joined the MURA central group, which consisted of just a few, most of whom were on leave from various midwestern universities. The group consisted of Frank Cole, Jackson Laslett, Nils Vogt-Nilsen, Tihiro Ohkawa, Jim Snyder and Don Kerst.

The MURA offices were in a small house, on the second floor, near the University of Illinois campus. Jackson and I shared one room. To be more specific, the room was tiny, our desks faced opposite walls, and one would bump the other, getting up or down, if one wasn't careful.

Jackson, 15 years my senior, was a tremendous educational force; so much of what I know about accelerators was learned from him during those few months. He taught me, for example, about analytic perturbation methods and we applied them to non-linear resonances. That required extensive analysis which we did on movable blackboards. We would fill up one side, flip it over, and continue on the other side. Mistakes, or loss of memory, involved flipping back. There was much flipping of blackboards. Often we needed to borrow a board from the next room. Jackson would categorize calculations as "2 board ones", "1½ board ones", etc.

We had a secretary and Jackson felt we had to keep her busy. This involved a tremendous amount of writing, especially later when MURA moved to Wisconsin, and only Jackson and I were left behind. Thus the two of us were forever writing MURA notes so as to keep the secretary busy. Probably Jackson already had the habit of extensive writing, I don't know, but I certainly learned it from him and to this day I am grateful to him for teaching me the importance of "putting things down".

LJL cont.

During that time, in Illinois, we became interested in the long time stability of nonlinear dynamical systems. In fact we talked about the subject to Ernie Courant's brother-in-law, Joergen Moser, long before the KAM theorem was developed. Jackson encouraged me in the use of the largest computer then available, the Illiac, for such studies. We developed transformations (to speed up the computations) and then ran for about an hour: only 50,000 itterations! Under Jackson's careful tutelage I learned about numerical computations, how to check them, when to believe them, etc. To this day I am beholden to him for his marvelous training.

In the summer of 1956 MURA moved to its permanent home in Madison and Jackson and I were left in Illinois so that MURA could continue to do calculations on the Illiac. (There was no computer in Madison.) So as to maintain contact with the group, it was decided that we would spend each Monday in Madison. That way we could report on results and be given new things to study: a lot of responsibility for two guys, and since I was rather irresponsible, Jackson, must have been very responsible. I'm sure he was.

We learned (I didn't learn, so maybe Jackson learned) that the University of Illinois had an airport and small planes which could be hired. Soon we were doing that for our trips to Madison; it was more convenient for us than going commercially. The pilots loved it for after delivering us they had the whole day to enjoy the beaches and water sports of Madison. The only problem was coming back. Going was okay in these small, single prop, planes which seated 4 (pilot included). We would take turns having the front seat where the visibility was good and one could closely watch the pilot in action. Coming back was a different story, for in the midwest, in the summer time, almost every day thunderheads would develop. These we flew around, but usually there was lightning all around us and we were bouncing about a good bit. When we finally got to Urbana the pilot would "buzz the field", someone would turn on the landing lights and we would come around again and land. Maybe it wasn't Jackson's idea, but we sure had a lot of fun.

During that time we had one baby (1 year old), and Gladys had a second while we were there, Jackson and Barbara were friendly and helpful to us. That friendship has remained; Gladys and Jackson have been tennis partners for decades.

3. This story may be apocryphal, but it is a good story anyway and it shows what people think of Jackson. The location is Cornell, and the time is in the early 60's, more or less. Cornell was building an electron synchrotron and had been having great trouble "running it in"; it just wouldn't work. And, to make it worse, the project manager, Jackson Laslett, was going to arrive any day.

When Jackson did visit he was taken in to see the machine. One went through a maze (for radiation) which opened into a large room in which the accelerator was situated. Jackson looked about and remarked that one quadrant of the machine looked longer than the other three! Impossible, but a tape measure was brought out. Unbelievable, but the one he had noticed was one foot longer than the others; one foot within a hundreth of an inch, but one foot longer! And people went by that quadrant hundreds of times a day; it was right in front of one as he came out of the maze. Once the quadrant was shortened the machine worked fine...

LJL cont.

4. When Jackson went to the AEC in the early 60's there was no Division of High Energy. He started that Division and then convinced a member of MURA, whom Jackson had first met when this chap was a graduate student at Purdue and working at MURA for his degree, to come to Washington. Thus Bill Wallenmeyer became the second director of the Division of High Energy Physics; a position Bill still holds today.

5. After his tour of duty at the AEC, Jackson came to LBL (in large measure due to my efforts on both sides). Jackson was involved in the resistive wall work which Kelvin Neil and I did. In fact, Kelvin and I worked for two or three years on that subject, finally getting it to the point where we needed some complex electromagnetic calculations. We went to Jackson, who solved it (and my memory may not be exactly correct) in a weekend.

This was not the only time he performed complicated electrodynamic calculations. I used to refer to him as "my electrodynamic computer". Give him a problem and he would come in the next morning with a pile of papers: calculations, diagrams, numerical examples! It was unbelievable.

6. In 1966, SLAC first turned on and they immediately experienced "pulse shortening". I got involved, and with Jackson's electrodynamic calculation of the transverse impedance of the SLAC cavities, we could explain the effect and suggest cures. We never wrote this work up, although we told the SLAC people all about it. Phil Morton wrote it up for us (as an internal note). A complete theory was published by Panofsky, Helm, Loew, and Miller, but the work indicates the power of Jackson's calculational ability.

7. While in London, at the Office of Naval Research, Jackson carried on a heavy correspondence. Just with me, alone, there were many letters of calculations. In fact, to this very day I have a whole box of letters, going back to those years, marked "LJL Correspondence". It was remarkable that while heavily burdened with administrative work, Jackson "made time" to keep doing, and keep active in, physics. It was a lesson not lost on me; it stood me well in later years when I too became heavily involved with administrative work.

8. Jackson's ability to calculate was impressively presented in his calculation of the impedance of clearing electrodes. I carried this work around for almost a year, studying it at various free times, before I began to understand it.

In the ERA days, 1968-1973, Jackson made more contributions than I can remember. I think it is correct to say that that project wouldn't have happened without his contributions.

9. Jackson has always been a widely-read person, keeping up with scientific developments in a variety of scientific fields. He noticed, in Science, that radar measurements of the rotation of the planet Mercury disclosed that it did not always present the same face to the sun (as had been previously thought, even as I had been taught in elementary school). Jackson realized that accelerator physicists could make a contribution to this subject and we wrote a note for Science.

LJL cont.

For many years afterwards I received preprints from astronomers and solar dynamics types; with one small paper (we never did any further work) we had entered a new field. I like to think Jackson would have done as well in that one, as he has as a particle accelerator theorist. In fact, he started out as an experimentalist, so he has already changed fields once.

10. When Dieter Mohl was visiting Berkeley in the early 70's we became involved in ion-electron instabilities. Jackson, as always, supplied all the electrodynamic calculations and, in addition, lots of insight. Furthermore, he pointed out the relevance of our work (done for electron rings) to other machines such as the Bevatron.

11. Perhaps more than anything I am struck, have always been struck, with Jackson's manner. He is a member of "the old school", a true gentleman and a true scholar. They don't "make them that way anymore", which says something about these days.

A CELEBRATION OF JACKSON LASLETT

Frank Cole, Fred Mills, and Lee Teng

This is the occasion of Jackson Laslett's retirement from Lawrence Berkeley Laboratory (although surely not from science) and it is possible that it might be judged appropriate (to turn a Jacksonian phrase) to celebrate his contributions to the science of particle accelerators and to all of the people like us who have been fortunate enough to work with him and know him.

Jackson's contributions to science are so many and so varied that it astonishes anyone who tries even to list them. Jackson's contributions from the MURA years include work on strong focusing from the early days, on the basic concepts of FFAG, on slow beam extraction, on the use of computers in computing particle orbits both with differential equations and with algebraic transformations, on the use of computers in calculation of electromagnetic fields, on nonlinear motion, on many-particle effects like the Laslett tune shift and the original work on collective instabilities, and on the design of specific accelerators (e.g.,the spiral sector "Illinois" model). In the Berkeley years, he has moved further ahead with all of these fields and has made significant contributions to others, such as the propagation if intense beams. In every one of these fields, Jackson's work has carved out a new way of solving the problem at hand and shown a new area of work. In every one of the areas above, there are people who make their whole careers in following and expanding on this work. This corpus of scientific work has left an indelible Laslett mark of clarity, imagination, rigor, and quality on the entire field of particle accelerators.

This great body of work has been done by no narrow individual. Jackson has been a treasure as a colleague, with unfailing good humor and care for others. His deep feeling for honesty and justice have always been a model to all of us. In difficult times, we have been the beneficiaries of wise counsel both on scientific matters and on relations with other people.

An additional joy to us all has been the warmth and caring of Barbara, who has carried on her own splendid teaching career while being a true friend to us all. Our lives are richer for knowing Barbara and Jackson and we look forward to many more years of good health, activity and friendship for them.

Frank Lee Fred

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The Harrison M. Randall
Laboratory of Physics

1 May 1987

Dr. L. Jackson Laslett
Lawrence Berkeley Laboratory
Building 47-112
1 Cyclotron Road
Berkeley, California 94720

Dear Jackson,

We have learned of your forthcoming retirement at Berkeley and want to take this occasion to wish you all the best for your future retirement years. I cannot honestly think of you as retired, but indeed as standing at a blackboard, pipe in hand, explaining some pretty point of physics to colleagues, students or myself. It is at times like this that I remember back to the years in the mid-fifties, when you came regularly to Ann Arbor to work on the old MURA ideas with Don Kerst, Terwilliger, Keith Simon, myself and sometimes others. Your insights were always valuable and your detailed calculations set many wild ideas aright as a result of careful attention. As I recall, you were also at Brookhaven that very first summer in 1953 when we went through our tutelage with Hartland Snyder, Ernest Courant, Ken Green, and others. The MURA days were indeed an exciting time for me as a young physicist, but they would have been less valuable as instruction were it not for the careful work and the attention to rigor that you brought to those discussions and that learning experience. I've not had a chance to see much of you in recent years, as I have become a more traditional high energy experimentalist, and indeed more recently, an administrator, while you have gone on to continue your distinguished and scholarly attention to the subtleties of particle accelerator physics.

Once again, congratulations, best wishes for your future, and I will always remember the interesting times we had with you in those earlier years.

Very sincerely,

Larry

Lawrence W. Jones

LJ:ttf

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The Harrison M. Randall
Laboratory of Physics

13 May 1987

Dr. L. Jackson Laslett
Lawrence Berkeley Laboratory
Berkeley, CA 94720

Dear Jackson,

My very best wishes to you on your retirement. I have extremely fond memories of our working together in the 1950's - it was an exciting period, when we were right at the forefront of the accelerator field with ideas pouring out. The pre-MURA period was particularly enjoyable, when we had our work sessions at Michigan and visited the labs of all our collaborators. I can recall, at these Michigan discussions, your concern that the physics be clearly worked out and understood - you were very well organized and attempted to get some of your clarity of thought to brush off on those of us who were more helter-skelter. Your organization carried over to your presentations - I can still remember your preparing the blackboard by covering it with chalk and spreading it around so that subsequent erasures wouldn't leave any marks. And when we were working, there was no possibility of lack of writing equipment - your shirt pocket was filled with sharpened pencils. Your research contributed substantially - your detailed analyses and precise computer calculations determining stability limits and magnetic field configurations were a particularly important part of the work of the group.

A few years after this period, you were at the Atomic Energy Commission and responsible for the High Energy Physics program; I recall your visiting Michigan to look over our contract's work. I also recall a visit you made to Brookhaven, where I was working on an experiment. You turned loose your impressive powers of persuasion to get me to the AEC for a couple of years. I was tied up and could not accept, but I still remember how effective your presentation was - my arm took a week to get straightened out again.

You have continued to do excellent physics over the years - I keep seeing references to your work. I cannot imagine you stopping, even with retirement.

With deep regard,

Kent M. Terwilliger

University of Wisconsin - Madison
Department of Physics

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1150 University Avenue, Madison, Wisconsin 53706
Telex: 265452 UOFWISC MDS

April 29, 1987

Dr. L.J. Laslett
Lawrence Berkeley Laboratory
1 Cyclotron Road
Berkeley, CA 94720

Dear Jackson:

I was surprised to learn of your retirement. I had not expected you ever to retire, and am still not sure that I believe it. I wish I could be there to confirm it with my own eyes and ears.

I still remember with pleasure the old MURA days, and how we were entertained by your sly humor, and amazed by your dedication to your work. I regard your announced retirement more as evidence that you have not lost your sly sense of humor than that you are giving up your dedication to your work.

I enjoyed my own opportunity to collaborate with you on orbit problems. You were continually turning up puzzling phenomena, usually resulting from your considerable insight into what particular orbit computations would prove interesting, often with consequences of great depth, and always requiring us to work hard to gain an insight into what was behind them. I now have more computing power on the desk in front of me than we had in the IBM 704 which filled a room in the old MURA garage on University Avenue in Madison! It is remarkable what you were able to accomplish with that machine, which at the time seemed quite wondrous.

Mary Louise and I send our best wishes to you and to Barbara. We wish we could be there.

Keith Symon

Keith Symon

IOWA STATE
UNIVERSITY

Vice President for Research
Dean, The Graduate College
201 Beardshear Hall
Ames, Iowa 50011

Telephone (515) 294-4531

May 19, 1987

Dr. Jackson Laslett
Lawrence Berkeley Laboratory
Berkeley, CA 94720

Dear Jackson:

It was wonderful seeing you again during our trip to San Francisco in January. We were pleased that you and Barbara seem to be in physically good condition and happy in your environment. I envy the view you have through your dining room window!

Our visit with you helped me recall our early days in Ames when you served as my mentor as I struggled to make the transition from graduate student to faculty member. You seemed to realize (charitably) that I was the product of a three-year post-war graduate education. Much was missing in my physics curriculum. During my relatively short stay at Indiana University I felt pressure to do research so that the department reputation could be reestablished. What little I got in basic physics theory was superficial and fragmented.

I was grateful, as we shared an office in Link 123, that you patiently explained to me how to solve problems in Smythe and the intricacies of electron motion in the synchrotron. I admired (and still do) your deep understanding of electricity, mechanics, mathematics, and all the ingredients necessary to understand physics phenomena.

I shall never forget those long but eventful nights when we worked until the wee hours at the Synchrotron building. The midnight snack of popcorn and your constant good humor made the time pass rapidly and made me glad that I came to Iowa State.

As I wind down through my last year I am grateful that my early association with you and others in the Physics department gave me a good start on a faculty career. I hope that my mind will be as active as yours and that I will have time to learn more about fractals and chaos so that I can better understand the ideas you shared with me just recently.

Suzy and I send our love and best wishes for your retirement.

Very truly yours,

Dan Zaffarano

D. J. Zaffarano
Vice President and Dean

DJZ/bg

LABORATORY Energy & Mineral Resources Research Institute
Iowa State University | Ames, Iowa 50011

April 29, 1987

Dr. L.J. Laslett
Lawrence Berkeley Laboratory
1 Cyclotron Road
Berkeley, CA 94720

Dear Jackson,

I wish you well in your retirement. But, Jackson, retiring? Hard to believe! What I remember most about you, besides our enjoyable, weekly tennis bouts and your ability to work twelve hours a day, starting later each day until you almost slipped around the clock, is your thoroughness in research. Two examples come to mind. One, late at night, sitting in the control room of the now defunct Iowa State synchrotron, in 110° heat, we were pondering some difficulty we were having with a photon calorimeter. "You know," you said, "the recording needle of the Brown recorder is not measuring charge, its measuring some voltage within the recorder. Let's analyze the circuit -- where's the instruction manual?"

The other example relates to your method of proofreading. After completing a manuscript on resonant beam extraction from A.G. synchrotrons you insisted on going to a lecture room (late at night, of course) that had blackboards on all four walls. Each assertion in the manuscript was followed by a derivation of the subsequent result quoted in the paper. We filled up all four walls several times before finishing our "proofreading."

Sincerely,

Charlie

Charles L. Hammer

CH/lks

Beam Research Program
Lawrence Livermore National Laboratory

May 12, 1987

Dr. L.J. Laslett
Lawrence Berkeley Laboratory
1 Cyclotron Road
Berkeley, CA 94720

Dear Jackson:

When I first met you back in the late 1950's your occupation was teaching, in particular teaching E&M. I had taken all the E&M physics courses at Berkeley, but I learned more from a few months working with you than out of any book or lecture. I have used what you taught me to make a living ever since. The Laslett-Neil-Sessler collaboration made the early 1960's a very productive time for us, and especially rewarding for me.

Sincerely,

Kelvin Neil

KN:bbr
0477R

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Upton, Long Island, New York 11973

(516) 282- 7989
FTS 666-

Office of the Director

June 2, 1987

Dear Jackson:

Never thought that Jackson Laslett would retire - still don't believe it, but Dave Judd said it was so. Said you were coming in every day, however, which made me feel better.

I thought back to 1961 and our interception that brought you to Washington instead of Brookhaven from ONR, London. How wonderful it was to have you come in at that crucial moment and head up the AEC's high energy physics program. SLAC, MURA, the ZGS, CEA and PPA were all in various stages of construction or being hatched. As it turned out, MURA never hatched but that's another story.

What appeared in Washington in July, 1961 was something I'll call the "Laslett Style." It is best described as quiet, thoughtful, never upset or angry, considerate, incisive, reasonable and reasoning - rather different than most Washington styles. It charmed and impressed everyone - the Joint Committee on Atomic Energy, the Bureau of the Budget, the President's Science Advisor, the AEC General Manager, several Laboratory Directors and the regular staff of the Division of Research.

Those two years, 1961 - 1963, set the stage for high energy physics for the rest of the 60's and much of the 70's as well. You brought in Bill Wallenmeyer and you labored with the Ramsey Panel and the proposed 200 Bev machine. You also labored with electron storage rings but only your panel had the foresight to see this need a decade or more before "the community" supported the requirement. Speaking of sight - I'm reminded of a return flight from the West Coast to Washington that you and I made - probably in 1962. We were somewhere over the Midwest at 39,000 feet and I heard you say softly, "My Gosh, my house needs painting." (At that time you still owned a house in Ames.) I knew that you were "eagle eyed" but I was impressed.

I think you know how pleased I was then and am now to have had the good fortune to work with you during those years in the early 60's when your presence made all the difference in the

quality of this Nation's high energy physics program. Now that you are "retired", I strongly recommend that you come back to Washington and "shepherd" the SSC through what surely will be a "white water" trip with many rapids, a waterfall or two, and lots of hidden boulders.

My affectionate regard,

Herb

Herb Kinney

For the past ten years Jackson has been my neighbor in Building 47 at LBL as well as a colleague on the 200 BeV, ERA, ESCAR, and HIF projects over the past 23 years. During all of this time, and doubtless during the preceding years, he has been a first rate gentleman and a workaholic scientist of the best kind. Typically, he would be bent over his teletype terminal from early morning to about eleven at night, without time out for lunch or dinner, for an average of some 14 hours per day during the work week. Because the computer system functioned better on weekends than during the week, he was at work most weekends also. If, on a Friday afternoon, one of the rest of us mentioned some problem to him, chances were good that it would be worked out as a finished note by Monday morning. This life-style used to be practiced by some graduate students and by the members of Lawrence's group in the 30's and 40's, who, for example, would ask for a Saturday morning off to get married, but is very rare in the modern world. This dedication is even more remarkable when one folds in the fact that he had been an administrator in the early days of the AEC, and given up "power" to return to full time scientific work.

Far from having a one-track mind dedicated to physics, Jackson also manages to keep up with a wide range of interests in literature, reading, as a guess, one or more books per week and remembering their contents to a remarkable extent. Once, after our local public television station had shown the German movie "M", with Peter Lorre, we talked about it for a few minutes as people do about some recent event before it came out that Jackson had not seen the movie the previous night, but in 1937 or thereabouts, when it was released. Other than exceptional innate abilities, the other possible explanation for some of these things might be his drinking lots of coffee. Tennis, also, has an important part in the overall scheme of things, with signing up for the courts right at noon on Fridays for the coming weekend being an important activity.

An example of his physics capabilities might be gleaned from an incident I remember from our ERA days. At that time, the electron beam intensities were severely limited by various instabilities, the resistive wall being one of the prominent ones. By the 1970's this subject was well known among the theorists, but since there is some time before the frontiers of research actually find their way into operating accelerators, there was a good deal of uncertainty about what one could or should do to help matters, and consequently I tried to read some of the literature from other labs about the problem. After pouring over one particular paper, I thought that the analysis was questionable, and went over to Jackson to consult him about the paper. After listening to me for a couple of minutes, he scanned the abstract and instead of reading the paper said, "This doesn't look too difficult. I guess we could work it out in an hour or so if you have the time this evening." Starting at around 4 P.M., he started to work out the problem in question analytically, then went on to a 300 line program which solved the equations and plotted the results, finishing up at 11 P.M. with the correct results. In short, he could work out these problems in about the same time most of the rest of us could read them, usually finishing up with a nicely written note which could have been published if he had so desired.

Among his favorite activities was interactive computing, whereby subsequent steps were guided by previous results. Because of the 20 or so parallel users at any one time on this system, there would be a pause of a few seconds to a minute between a request to the main computer and the computation. During this epoch, he found that he could run two completely different problems simultaneously, by using a swivel chair between two teletype terminals. After a while, this became sort of routine, and he started a third multiplexed activity by working on yet another problem on a clipboard on his lap. When I described this activity to Winfried Herrmann, who was visiting with us at that time from the Max Planck Institute in Garching, he seemed concerned and asked, "And tell me, is Jackson still all right?"

Not all of his problems were equally difficult or challenging. Some of them were subtle, like the episode when he discovered that the computer he was using had difficulty multiplying by 1. Since Jackson usually carried out his calculations to 8 decimal places, and sometimes remembered the results to as many figures, he would notice small discrepancies in them. In tracking down one of these, he dicovered that even multiplying or dividing by one were not completely accurate, and if done in sequence would not get one back to the starting point. Now, who else would have thought of that?

Among his intellectual pleasures was a good scientific dispute with a near-equal. With most colleagues he would very patiently explain the steps of his reasoning and educate them as he went, but occasionally, there would be the equivalent of a chess game, with complicated equations on the board followed after a few minutes by the solution, with no intervening steps but an answer that was different than that arrived at by the other person. The few times that this occurred, there was no acknowledged defeat or victory, just two different ways of doing a problem with two different solutions. But he practically never made an error.

Andy Taltens

It will always be unbelievable for me that a scientist like L. Jackson Laslett will start to relax from work. Already some 16 years ago, when I spent a wonderful half year with the LBL electron ring accelerator group, I got immediately deeply impressed of his high efficiency of work. Once at an evening we talked about a difficult scientific problem, and since it was late we promised to think about it occasionally. Probably we could continue to talk about it the next morning, he said, but he would be about half an hour later because he wanted to play tennis. The next morning, however, I found a 30 page manuscript on my desk, in which Jackson gave the solution of the problem in complete generality including all relevant formulae and examples with high precision, accurately and clearly written down. And indeed, Jackson had played tennis that morning. Everybody got the impression (but the LBL friends knew about it already) that we normal mortal people wouldn't even be able to read through such a manuscript that Jackson thought about, applied the relevant formulae and wrote it down in his handwriting that looks like printed.

But this high scientific output was normal, and this was a new experience for me. And obviously Jackson doesn't neglect all his other interests. I enjoyed talking about these with him and his family several times at their beautiful home or during his Europe trips where he expressed his interest in historical places and Bavarian style of life (although I had difficulties to explain the bavarian bread "with music" - a bread with sausage and lots of onions - to him) and demonstrated to be an excellent mountain-climber in the Alpes.

All good wishes to Jackson and his family for many happy and healthy good years from all former Garching electron ring members and our families!

Uwe

(Uwe Schumacher, Max-Planck-Institut
für Plasmaphysik, 8046 Garching
near Munich, Fed. Rep. of Germany)

May, 1987

Congratulations to a long time tennis pal

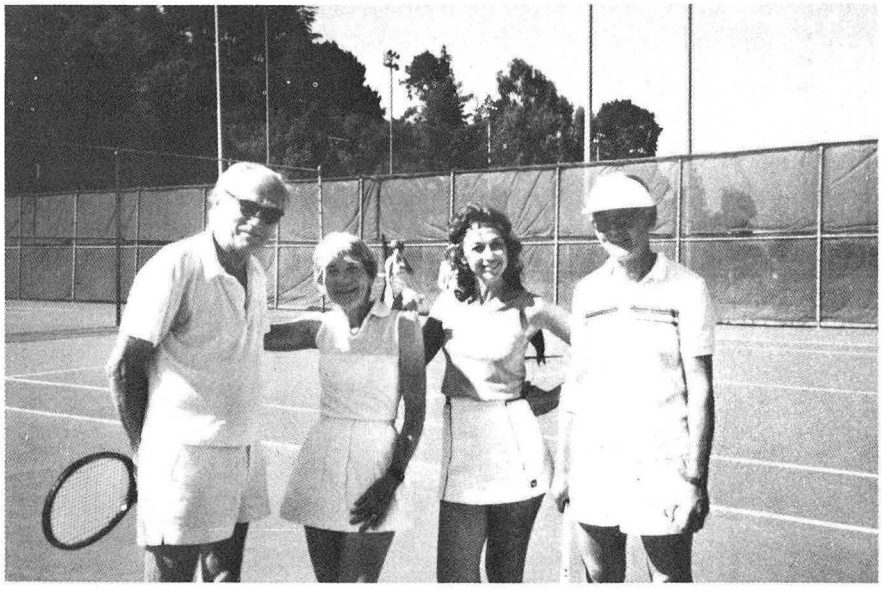
Jackson, I am honored indeed to have a small part in your retirement celebration.

This note is a testamonial to your devotion to our favorite game -- tennis. As well as I can recall we have been signing up Friday noon for a Saturday or Sunday game at Strawberry Canyon for at least a dozen years. Back then we often played both days for two hours -- now we consider ourselves lucky to play for a couple hours once a week. We (Gladys, yourself & Kate) have been fortunate in having some great "fourths" down through the years -- Don Abe, Hideo Sasaki, the MacDonalds, Dick Diamond and when really desperate Harry has obliged.

You have been a supportive, appreciative partner and a feisty, foxy opponent. I look forward to many more weekends of competition before the call of the beanbag chart and the soup pot cut short our fun.

See you on the court next Sunday.

Kate Heckman



Continuous Electron Beam Accelerator Facility

12070 Jefferson Avenue
Newport News, Virginia 23606
(804) 875-7800

May 27, 1987

Dear Jackson:

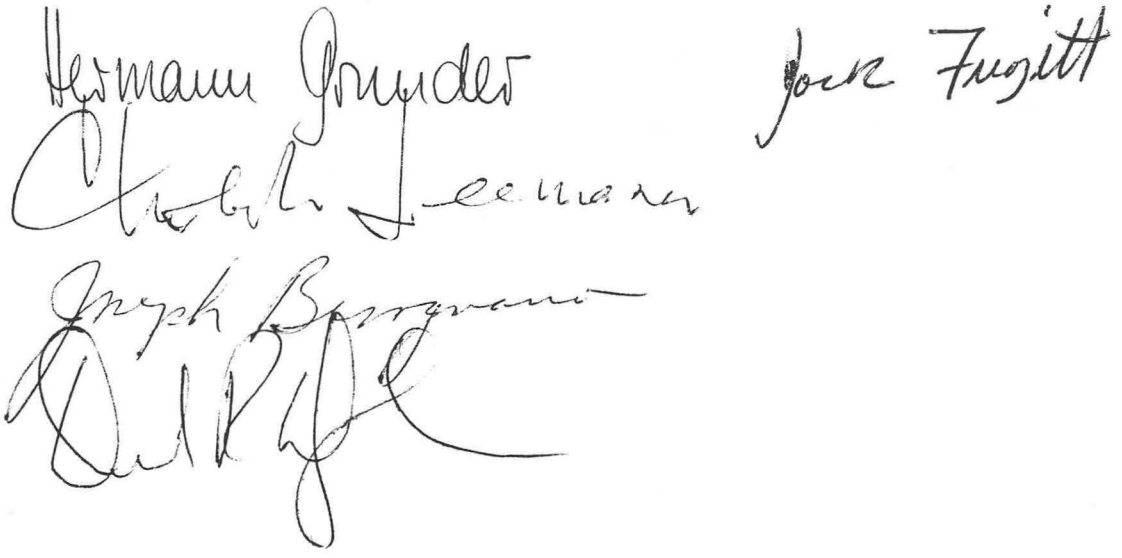
Congratulations on freeing up more time to study stochastic systems (including the nonlinear ball-racquet interaction).

We take this opportunity to thank you for introducing us to:

- Stochastic cooling simulations
- Long term stability of dynamical systems
- Canonical integration
- Collisions of eigenvalues in the complex plane
- Stochastic layers
- Relaxation
- Bifurcations
- Zillions of decimal places
- Bessel function identities
- Homoclinic points
- Coherent synchrotron radiation
- Running three terminals with two hands
- Quitting smoking

  and
- Many a good story

Best wishes from the LBL expatriates at CEBAF



May 11, 1987

Dear Jackson,

What does one say to a person upon retirement? Should I say "Good-bye"? ..... "Good luck"? ..... "Bon Voyage"? I think I should say "Have a good weekend, see you on Monday".

We have spent a lot of time together over the past five years. We have had innumerable discussions, shared many thoughts and enjoyed working together on a variety of problems. This period has truly been very special to me. The majority of the work we have collaborated on has been in electromagnetics. I am sure that the two topics that we have, in retrospect, been the proudest of are the concepts of applying boundary conditions to differential equations solved numerically by relaxation as well as multipole free "ends" for magnets.

Guided and inspired by the SSC project we have applied these computational techniques to electromagnetic problems while keeping them general enough so they can be used in other areas as well. I can still feel the excitement when, each time, after many months of discussion, debate, intense head scratching, heavy mathematics and innumerable hours of programming, a highly theoretical concept was actually proven to work successfully.

You have been a colleague, a friend, and a teacher. Your have shown me how to understand science in a deeper way than I ever thought possible. I will always admire your vision and mathematical skills.

I wish you the best of health and many more productive years.

Shlomo Caspi

Shlomo Caspi
Lawrence Berkeley Lab

May 11, 1987

To Jackson Laslett On His Retirement

I think I can truly say that it has been my privilege to work with you the past few years. I've benefitted from your advice as well as marvelled at your ingenuity during our joint ventures; you set an example I would hope (alas, only hope) to imitate. We've explored a range of mathematical topics together, including "chaotic" functions and the mysteries of floating point calculations, but our principle domain has been electromagnetic field calculations. Much has been said about the struggle with theoretical concepts, etc., but I recall with particular fondness your guidance on the practical problems of designing the SSC dipole cross-section, where so much depended on that very unusual version of "Blackjack" we played.

Best wishes,

Mike Helm
Lawrence Berkeley Lab

Lawrence Berkeley Laboratory
1 Cyclotron Road Berkeley, California 94720
(415) 486-4000 • FTS 451-4000

May 26, 1987

Dr. L. Jackson Laslett
Advanced Accelerator Studies Group
Accelerator and Fusion Research Division
Lawrence Berkeley Laboratory
University of California
Berkeley, CA 94720

Dear Jackson:

Congratulations on your retirement! I would like to take this opportunity to express my deep respect to you and my appreciation for your guidance during the past nine years here at the Lawrence Berkeley Laboratory. You have always been a great inspiration to me from the day I joined the group to the present day, as I struggled to learn and tried to become an accelerator physicist.

I may not be of any worth for describing your scientific work but I can't help reminding myself some of the exciting things that I learned from and shared with you. First thing that comes to my mind is the Single Beam Transport Experiment. During this period, I learned from you how to integrate the envelope equations and how to look at particle motions in the beam. I learned from you how beams will go unstable in the third order mode, et cetera. I can't stop admiring you for the beautiful quadrupoles that you designed. Thanks to you the experiment turned out to be a great success. What an excitement when we discovered that the semi-Gaussian distribution is more stable than the Kapchinskij-Vladmirskij (did I spell it right?) distribution!

Your pioneering work on the longitudinal dynamics started a new chapter on induction linacs. Your insight and creativity were thought-provoking for a student in the field like myself and laid a ground work for designing the next experiment, MBE-4, the worlds first current amplifying linac!

The imprints you have made here are far too great to describe and too many to enumerate. I believe your devotion to science, the elegant style of doing science, and willingness to help others will be a model for the future generation and will be remembered for a long time to come.

Congratulations again on your retirement, Jackson!

Sincerely yours,

Charles Kim

Charles Hongchul Kim

CHK:jnk

47-112
Lawrence Berkeley Laboratory
1 Cyclotron Road
Berkeley, CA 94611
May 27, 1987

Dear Jackson,

Good wishes to you on the occasion of your retirement!

It is difficult to imagine the Accelerator Theory group or Heavy Ion Fusion or Magnet Design or, I am sure, any number of other programs at LBL without your contributions and guidance. I came to LBL to work because you and others of such high stature in the physics community were here. It has been a wonderful opportunity to work with you and learn from you. Along with many others I appreciate your ability to do any problem that is important for our program with analytical and computational skill and lots of sense, in half the time it takes most people to start to think about the problem. It has also been wonderful for me to find a senior theorist who will use a computer! Thank you for your help, example, and good humor. I certainly hope that like many at LBL you continue to work with us after your retirement, but I certainly want to wish you happiness in all the other many interests I'm sure you will pursue outside of LBL, now that you have the time.

Good wishes and good luck.

Sincerely yours,

Christine M. Celata

Christine M. Celata

Lawrence Berkeley Laboratory
1 Cyclotron Road Berkeley, California 94720
(415) 486-4000 • FTS 451-4000

June 4, 1987

To My Friend Jackson:

I especially enjoyed your account of cross country running at Cal Tech; thirty years later at the same institution I suffered through some embarrassing moments in that sport. You described a two mile event at Paddock Field in which an official miscount of the quarter mile laps sent the rival team into a premature sprint towards the finish line, which in reality lay a full half mile ahead. This kind of error happens more often than it should, but it is also an opportunity for the thinking type of athlete. You proved that the mathematical accuracy and cunning judgment which is your professional mark also holds up under the conditions of oxygen debt and psychological turmoil that appear in the late stages of distance racing -- yielding victory!

Best regards,

Ed Lee

EL:jnk

To Jackson

Oh Jackson, Oh Jackson, what wilst Thou doeth now?
For after retirement, you surely won't just bow!
You'll hop around the tennis court, or jog on a long trail,
Spend time with your family, get caught up on your mail!

Perhaps you'll just enjoy the sun, and sit and think and think
Of all the great experiments you did to solve the link
Between what's seen and what's unseen by physicists galore,
Or even research for a while and other realms explore!

To you, our friend of long, long years (they number 54!)
We raise a toast, and-there is even more —
With love we join your friends to say,
"Oh, Jackson, Oh Jackson, a Hip, Hip, Hip Hooray!"

Affectionately,
Ernie and Tobby
Tyman

5/28/87

L. Jackson Laslett

L. Jackson Laslett retired from the Lawrence Berkeley Laboratory on March 1, 1987. He was a Staff Senior Scientist in the Accelerator and Fusion Research Division and had achieved 23 1/2 years of meritorious service to the Laboratory and the University.

His service to the Laboratory and the University spans a much longer time than the 23 years. Prior to 1937 and again in 1939 he worked in the (then) Radiation Laboratory on the Berkeley Campus for E.O. Lawrence on development, operation and use of the early cyclotrons. He was one of the pioneer Berkeley-trained cyclotron physicists who carried cyclotron technology to other laboratories in this country and abroad. In his case, first to the Bohr Institute in Copenhagen then to the Universities of Michigan and Indiana. He was a leading accelerator physicist in the MURA organization which laid the foundations of modern accelerator science in the late 1950's.

In the decade before returning to the Laboratory in 1963, he held important positions with the Office of Naval Research and the Atomic Energy Commission.

He returned to Berkeley in 1963 as a Senior Physicist in the Lawrence Berkeley Laboratory. Most of his work since then has been in the theory of particle beams and plasmas applied to the most advanced and novel accelerator concepts. His work has been prodigious as evinced by his list of reports and publications. He has been an inspiration and a teacher to younger professionals and to his colleagues because of his extensive experience and mastery of his field, his wise judgement and his gentle manner.

The University and the broader physics community has been well served by him and the expectation is that the relationship will continue after his retirement.

Edward Lofgren

Lawrence Berkeley Laboratory
1 Cyclotron Road Berkeley, California 94720
(415) 486-4000 • FTS 451-4000

July 29, 1987

Dr. L. Jackson Laslett
Building 47, Room 112
LBL

Dear Jackson:

As head of the Accelerator and Fusion Research Division, it is fitting that I offer a few words of congratulations on the occasion of your retirement.

On the other hand, it is somewhat presumptuous that I do so. Your contributions to this laboratory, and to accelerator science in general, far transcend the scope of this division. Indeed, they considerably predate both its existence and the earliest recollections of its current head.

On the other hand, I am well-placed to observe the pervasive influence you have had--and continue to have--on today's crop of young physicists, in every field touched by accelerator theory. I see, and I share, a profound respect for the body of work that has emerged from more than 50 years in the business, as well as a deep personal respect for the man who has produced it.

You may have retired, but I look forward nonetheless to your continued service as guru and mentor.

With best personal regards,

Yours truly,

Klaus

Klaus H. Berkner
Associate Director and Head
Accelerator & Fusion Research
Division

Lawrence Berkeley Laboratory
1 Cyclotron Road Berkeley, California 94720
(415) 486-4000 • FTS 451-4000

August 1987

Dear Jackson,

Impressed now for many years at your boyish enthusiasm for physics and your love of discovery, I never imagined that one day you would retire. And indeed, some months after that happening, I see that you continue to be eager to keep your hand in and produce creative physics in the fraction of time you now spend with the HIFAR group. The output of your part-time activity is so great, however, that many a distinguished scientist would be proud to claim it as his full-time oeuvres.

The start-up of the Electron Ring Program (ERA) brought us together for the first time in early 1968. Those were exciting days for all of us as we took on the huge task of trying to bring about the dream of collective acceleration. Just as well, perhaps, that we didn't at that time suspect the full magnitude of the problems. I was continually amazed at the startling speed with which you put together code after code to solve the problems of the pulsed compresser field and the complexities of resonance crossing, and later, the issue of collective instabilities. Your intimate feel for collective behavior dated back a decade before this (at MURA) -- for which you are justly famous.

A few short years after the ERA program had ended -- a circumstance I regret, since eventually, the Russian group showed that the ERA could make an attractive accelerator for heavy ions -- we were together again on Heavy Ion Fusion, and ready to enter deeply into collective territory yet once more. Again, Laslett codes and results and immaculately penned reports appeared overnight again and again, as if by magic, and gave us answers on a broad spectrum of problems -- beam dynamics, collective instabilities, three-dimensional quadrupole design, are just a few. Your work was a major contribution to the birth of the new sub-field of space-charge-dominated beams. The world will need fusion energy fairly soon, and your remarkable fertility and insight have helped enormously to provide a solid basis for what, I feel sure, is the best approach to fusion power.

I feel very honored to have been so long your colleague. Now that you can spend more time out of the Lab, maybe you can perfect that mean game of tennis you play. Who knows, I may still be able to persuade you to take up swimming, too?

Good luck,

Denis

Denis Keefe

DK:sm

LAWRENCE BERKELEY LABORATORY
TECHNICAL INFORMATION DEPARTMENT
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