

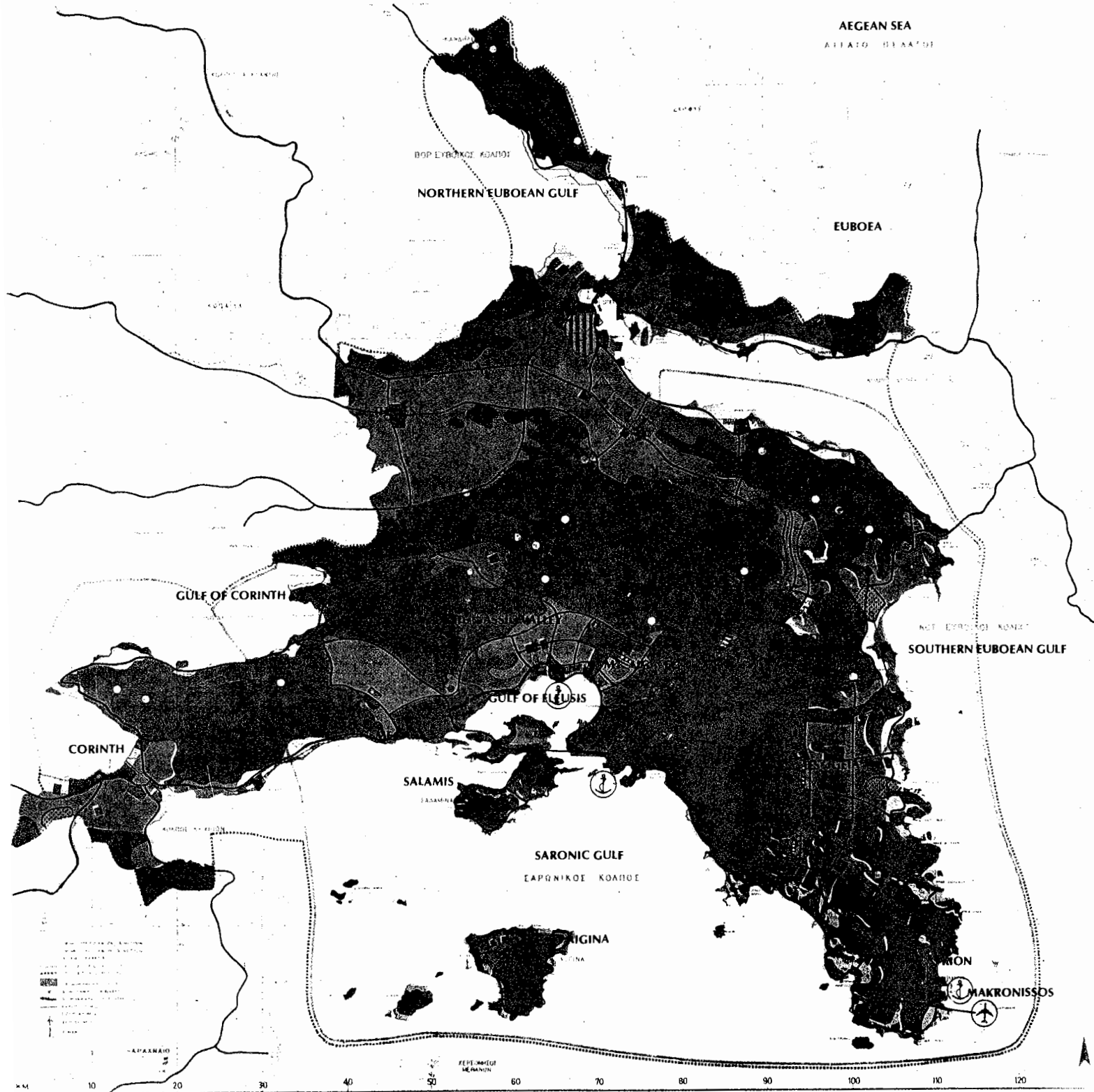
ATHENS:  
THE URBAN ECOLOGY OF TRANSITION  
FROM "DEVELOPING" TO "DEVELOPED" STATUS

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The present metropolitan region of Athens is the Nomos of Attica, the inner boundary. It is quickly attaching the peripheral cities of Corinth, Thebes, and Chalkis, however, so the long-range planning includes them and their immediately dependent commutersheds. (Source: *D. A. Review*, January 1977.)

## ATHENS: THE URBAN ECOLOGY OF TRANSITION FROM "DEVELOPING" TO "DEVELOPED" STATUS

Richard L. Meier

The urban ecology of Athens was studied very early. Explorations in its constitution and its inner workings laid the groundwork for studies elsewhere in the world, both by myself and by more than a score of others. C. A. Doxiadis insisted upon a holistic treatment, coining the term *Ekistics*. He pulled together an international team to consider the characteristics of the globally integrated City of the Future ("*Ecumenopolis*"), and another to consider the levels of organization and integration that evolve in urban community (called the Human Community Study, or HUCO). These efforts began in Athens in 1960 and continued for more than a decade. Although general understanding was sought, applicable anywhere in the world, specific points were treated, and controversies resolved, by referring to the Athens of that time.

In 1960 Athens was universally viewed as a developing metropolis, neither the strongest nor the weakest, but rather quite typical of the class. Approaching 2,000,000 population, it pulled a nation of almost 8,000,000, rooted in rural tradition, into a modern mode of living. Therefore it contained strong components of both, but a majority who were finding their path through the transition. Most of the attention centered upon family and national politics. Numerous missteps were made in the subsequent two decades, but Athens seems to be finding a reasonably stable relationship with its neighbors and its environment. At the time Greece is joining the Common Market, Athens seems to be establishing itself in the lower tier of fully developed world metropolises.

Athens of today provides a very useful contrast with Third World metropolises. It

constitutes what people in those cities feel they could become over the next two decades or so. If Athens could graduate into the circle of productive and civilized great cities, the leading citizens of these other urban agglomerates are confident that the transition can be repeated in their case.

But the path that Athens took is no longer available to other parts of the world. It was able to take advantage of ultracheap energy for two critical decades. It also depended upon a culturally acceptable means of postponing marriage, applicable to the poor as well as the middle class, so it was not swamped by landless people flocking to the edges of the city and squatting on open land. Because cheap energy is invisible and taken for granted, the preconceptions of educated professionals in Greece and elsewhere regarding transitions in metropolitan development are expected to be faulty.

Although developed, Athens must still find a way to move toward a resource-conserving structure, resilient against disturbances from both inside and outside. Step by step Athens must find a new economic base that enables it to maintain or improve its rank among the great cities, and it must solve its own environmental conflicts, which threaten the quality of life already achieved. Many local professionals are pessimistic, because they perceive many more problems than politically feasible solutions. Outsiders with perspective recognize that change in Athens is spasmodic and uneven. Many problems are somehow resolved, but then new and more complicated ones develop.

This analysis of Athens's urban ecosystem is addressed primarily to those new problems and challenges that are not yet a direct public concern. Some sub-issues, such

as solar energy, are being discussed, but virtually no action is being taken. The people of Athens have neither the organizational capacity nor the financial resources to become anything more than followers in this and most other necessary transformations over the next several decades. The present controversies about pollution in all its forms, for example, will be greatly modified by forthcoming fuel scarcities, so they have little long-term meaning. Those arguments about what should be done to improve the terms of trade are rendered obsolete even more rapidly by the monopoly pricing of OPEC and the fluctuations of the business cycle. Thus it is most useful to identify more fundamental planning problems, especially those which emerge from current observations and ecological analysis.

The income level per capita for Athens in current U.S. money now exceeds \$5,000 per year. This figure is deduced from the estimate presented in "Foreign Economic Trends . . . GREECE," June 1980, prepared by the U.S. Foreign Service, Department of State, in Athens for Greece as a whole. GNP per capita is calculated for Greece to be \$4,560, and the average industrial wage is reported to be \$15.05 per day. The unemployment level is judged to be at 2.8 percent, which is very low as compared to other Mediterranean countries. Debt servicing is only 10.5 percent of "exports plus invisible earnings."

Earnings in Athens are normally twenty to thirty percent higher than in the rest of the country on the average, but there are no reports that establish the differential, except that overall labor productivity indices are twenty-two percent less than the industrial labor productivity. Since Athens must stay in rough equilibrium with industrial productivity, a thirty-percent differential can be deduced. With an inflation rate of twenty to twenty-five percent per year, one cannot hope to achieve very great precision.

The current disturbances in output are a series of strikes. Banks were on strike for six weeks, and newspapers started a long strike at the end of June. They occur when the foreign trade deficit is now at a record level. Thus omens of instability are dominant. To counteract the drain there are still transfers of capital from places in Africa and

the Middle East, where Greeks are working who feel that conditions are even less secure in their immediate vicinity. This is a peculiar feature of the Athens economy, which it shares with Hong Kong and Singapore: political strife and threats of destruction cause bank accounts and gold to be transferred to them; half the money is then invested in land and property in the free trading city. The new industrial projects bringing in outside capital are located in small cities north of Athens and utilize a series of extremely capital-intensive technologies (ammonia, lead/zinc/sulfuric acid, ferrochromium, stainless steel, petrochemicals). Their futures are believed to be affected by strikes of service workers in Athens.

### **Ecostructure**

*Boundary.* Athens has been reaching out for living space in all feasible directions. Normally the limits are set at about a hundred-minute trip from an office in the central city during rush hour. This means that all Attica has for practical purposes been included, and scattered development is proceeding rapidly in the vineyards and olive groves beyond the central plains. (See Map, inner boundary.) This is synonymous with the 01 code for the telephone system and with the political subdivision of the *nomos*. It includes two islands, Salamis and Aigina, with regular ferry service, and will soon add Chalkis, a city to the north that is accumulating industry. By the year 2000 A.D. it is expected to capture Corinth and Chalkis; already the suburban line to Chalkis runs ten full trains per day.

Area (1980): 2200 km<sup>2</sup>

*Human Population.* Planners in Athens speak of being responsible for 3,800,000 people, but the three-to-five-percent growth rate in residents over the past two decades suggests that the actual number may be somewhat more. The growth rate for Greece as a whole is about one percent per year, so Athens has been absorbing population more rapidly than it is produced by the nation as a whole (90,000-100,000 per year).

Athens has a tendency to recruit the most alert young people, but it also contains

the best health facilities in the country, so the ailing are also attracted. The vigor of Athens is bimodal: the strongest and the weakest.

Population (1980): 3.8 - 4.0 millions

**Fauna.** One still sees authentic sheep with shepherds—dog, crook, and all—on the mountainside or in the olive groves, but they are now rare. Multistory “chicken-and-egg factories,” whitewashed, small-windowed, and with many thousands of birds, have settled into out-of-the-way places. Greener places support a few milk cows. The donkey is replaced by noisy three-wheel Mebea general-purpose farm transport, but the Korean Dae-Woo looks superior for the urban periphery.

Dogs are numerous, most often small and brown, particularly in the less built-up areas of the metropolis, where they guard domiciles. The population is held down by the threat of rabies; untagged dogs are removed. Cats are compatible at virtually any density, but they are rarely pampered.

Pigeons have invaded the central squares, and swallows nest in the rocks of the Acropolis, Likavitos, Ymettos, and other adjacent mountains. The foxes and hares have disappeared, along with the snakes, but a few hedgehogs remain. City life has invaded the rural territory; with the aid of the automobile and the van it wins out in the course of a decade or so, and eradicates the vestiges of ruralism in two decades.

**Flora.** Here one sees the epitome of the Mediterranean climate and a collection of all its flora. The older portions of the city have more water, so the public gardens are shaded with a variety of broadleaved trees. The small parks are younger in age, so there are more expanses of irrigated lawn. Flowering bushes and small trees are more common than beds of flowers.

One major change under way is the replanting and further extension of street trees. Property owners and neighbors are paying attention to them, whereas previously the hole in the pavement assigned to trees was primarily collecting bottle caps and sherds.

On the periphery the city people built upon the fruit orchards first, then the olive groves and vineyards, while the pine forest is usually protected; so the last of all to be developed is land supporting thorny brush, some of it terraces of abandoned wheat fields, the remainder being whatever is left by the sheep.

**Habitat.** Greeks define a room as an enclosure open to the air and light, generally by a window, into which a bed can be put. Any number of other household activities may be carried out in the room. Therefore it could be a dwelling unit all by itself, but even among the poor two to three rooms is most common. The household is most commonly three to four people, and the average size appears to be about 3.5 persons.

Athens is almost always overbuilt by the speculators, so there may be five percent of extra units, given the prevalence of “for rent” signs. (This may be an understatement, because the estimate preceded the abolition of rent control.)

The most common types of housing by far are apartment blocks that face the street with balconies and rise four to seven stories, serviced at best by dinky four-passenger elevators. The top floor has an abundance of potted plants and blue awnings, while the street floor is sometimes used for shops, but is otherwise closed up tightly to fend off the dust and street noises. The floor is often below street level by a meter or more, especially when built upon a slope. Front yards are rare, because space is used to greater effect privately in the rear.

**Community Facilities.** The most noteworthy of community facilities in Athens are the Greek Orthodox churches. Because the Church has a monopoly, it need not worry about attendance, so less than one percent of the communicants show up for Sunday morning mass. The *pappas* stands out from the people on the street with his black gown and flowing beard; the photos of Greece in the past show that he carried things wrapped in a scarf, but now he carries a trim diplomat's case. The house of worship comes in three scales: the tiny chapel with services on the day of the saint after which it was named, the community church for Easter and its saint's day, and the old

metropolitan church which also celebrates political occasions, such as the induction of elected officials and the funerals of the same.

The key facilities of Athens, besides government offices, are the harbor, the airport, and the banks. They are all intricately intertwined in the functioning of the metropolis.

Although the Parliament (*Syndagma*) is at the center, the Ministries are scattered. They all (even Agriculture) intervene in discussions about urban change. Conflicts are common, so delay is frequent. Planning is much more thorough at the project level than at integrated sectoral development, or program level.

The current issues affecting energy utilization revolve around the harbor and the airport. The harbor is a differentiated zone similar to San Francisco Bay. It extends through a wasp-waist isthmus, where heavy industry holds sway, to the lee of the Island of Salamis, where rusting ships await their turn to be scrapped, the waterfront of Piraeus with containers on one side and passenger piers on the other, and on to the yacht basins of Turkolimano and Glyphada. Back-of-the-harbor industries include oil refining, petrochemicals, cement, steel, shipbuilding, shipbreaking, ship repair, building materials, truck and bus body making, food storage, food processing, and the like. They are sized for import substitution and opportunistic medium-scale export. Capacity is limited much more by the contribution to pollution than by the availability of frontage or of deep water.

The airport, however, is pushing against capacity. Local passengers at one end of the strip equal in volume the international travelers at the other end. (The shuttle to Salonika, the second city of Greece, is now available hourly for most of the day.) High-status people living in posh coastal suburbs object to the noise of the traffic, and are doing their best to eject the whistling, blasting, and thundering aircraft. The level of airport activity rates only tenth in Europe, but competes for leadership in the Middle East, and must move its site in order to maintain its rank.

Many alternatives have been explored, one of them slicing off the top of a barren

island close to the coastline. The best location is held by the military, who refuse to release it. So a flat place in the Mesogeia, near a village called Spata, has been designated. Objections from the local residents have been mollified by liberal cash payment for land. An international airport of this scale will bring in many small warehouses and repair facilities, some metro services, especially hotels, and even some manufacturing for export. Within a dozen years after completion, a major subcenter for Athens will have evolved.

The present airport debate is about prospective growth. Will it be a linear extrapolation of the past, with 4.5 million trip-makers and 50,000 aircraft arrivals in 1978 increasing to 30,000,000 or more by the year 2000 A.D., or to half of that? The international consultants employed for the project disagree. The Doxiadis group takes the more conservative view. Actually, much depends upon the intentions of political terrorists regarding tourism to Spain, Italy, and Portugal. Can a small country like Greece absorb such an overflow?

*Foundations: Soils, Hydrology, Bedrock.* The Athenians live on the soils that have washed out of dolomitic rocks or have fallen into the interstices between the surface stones. The original bioecosystem can be seen in a few locales, protected from goats, that remain in the mountains to the rear. The soils there are a friable yellow-to-grey clay and very thin. The natural vegetation is very vulnerable to fire, from which it would take a century to recover.

The water percolates through the soil into the porous rocks, emerging as springs, the flow from which again soon disappears. Water flows in streams only after a major storm. The two "rivers" of Athens are dry stream beds that are now only concrete channels carrying a trickle of sewage in normal times. The springs were tapped long ago, so Athens reaches out fifty kilometers to a treated reservoir (to keep holes in the bottom from developing) at Marathon, and most recently to another a hundred kilometers to the other side of Mount Parnassos. The soluble bicarbonates are very high, so softeners are detergents are appropriate.

In the east of Attica some plutonic

activity resulted in mineralization (and "bad" drinking water also). The classic mines of Lavrion are still being worked for lead, zinc, copper, and silver, mostly from the tailings of earlier mines. Although fundamental to the rise of Athens in preclassical times, this resource makes only a minor contribution today, and at the expense of the visual appeal of the natural coastal environment. Because Greeks shun Lavrion, it is a place to put such facilities as power plants, polystyrene synthesis, coal ports, and aircraft landing patterns.

**Grids and Networks.** Athens manages a country that is still in the process of electrification. The connections are virtually complete, with more than ninety-nine percent of the addresses in Greece provided access to electrical power, and almost ninety percent of the places. The grid around the capital serves somewhat over a half of the population, and it has high voltage links to the northern grid. Therefore the appropriate reporting system is the whole country. Islands like Crete and Rhodes, and the diesel generators in smaller places, account for less than five percent. The DEH (Public Power Corporation) has just released its 1979 report, with figures for 1978 and estimates through 1980.

The level of consumption of electrical power in Greece was 1,946 kWh per capita in 1978, rising to an estimated 2,140 for 1980. About thirty-seven percent of all energy consumed in Greece is transformed into electrical power (37.5 percent in 1978). The rest of Greece is catching up to what Athens consumed domestically and industrially a few years ago, so enterprises and households are still investing in facilities that take advantage of the availability of electricity at an economical price. The present rates are about the lowest in Europe.

The power grid is fed by hydroelectric and lignite generation from within Greece, and by petroleum from the outside. For a capacity of 4,728 MW (1978 level, but virtually unchanged through 1980), 1,415 were hydroelectric. The first lignite-burning facility gave trouble, but another 300 MW is due to be added by 1982, as is 300 MW of hydroelectric, both in the north of Greece. Scheduled by the end of the decade are 900 MW more. About 160 MW of gas turbine

generators have also been on order, some of which are now being started up. Surveys have been started for a nuclear-power generating facility, but the final decision has yet to be made. Thus the oil required for power generation is expected to remain constant over the early 1980s at around thirty percent of the whole, and then decline thereafter if they have any luck at all with the lignite explorations now under way.

The peak demand is in the winter, when people try to achieve comfort with the aid of resistance heaters. Some of the richest suburbs may then experience power cuts. Athens probably consumes twenty to thirty percent more electricity per head for domestic and commercial purposes than the national average. But these relationships could change almost overnight, when rates are readjusted to become progressively higher with the level of consumption. A huge amount of investment had to be programmed for 1980-1981 for increases in capacity at a time when the DEH reports a return on capital of only 4.5 percent as compared to bank loans at twenty-two percent.

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#### Consumption Growth for System

1950-73	~14 %
1974	-1.2
1975	+8.5
1976	+10.4
1977	+6.8
1978	+13.5
1979	+5.2
1980	~5.0

#### Sector Shares Growth

	1977	1978	1980 (est.)
Industry	0.7%	14.3%	0%
Commerce	16.5	10.8	10
Domestic	10.7	15.1	8
Other	23.6	5.2	10

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More fundamental than power in an environment like that possessed by Greece is *water*. Athens and other cities in the country have a tradition of distributing potable water (in contradistinction to the Italian and Iberian peninsulas). However, supply has a tendency to run behind demand in many locales. Much of the new development goes up in places where mains have yet to be laid.



Therefore the suburbs contain entrepreneurs with tank trucks who will deliver water for \$1.00-1.50 per metric ton (about \$4.00 per thousand gallons). Similar dark-colored trucks (labeled EKKENOSIS) will pump sewage from sumps at the base of even the finest-grade apartment houses, but for a higher and more varied price.

Sewage treatment and sewer improvements have finally come to Athens, so a grid has belatedly evolved. One seldom encounters the smell of sewer gas when walking the city, or the ooze of contaminated ground water. Many of the beaches that were once closed due to pollution have been reopened.

The street system is another grid that has arrived. Now the roads are asphalted almost as soon as the apartment houses are built. The huge influx of autos in recent years must be served. Rough concrete is liberally employed to overcome erosion on the steeper slopes. Storm sewers are now often included in land-development operations, so erosion of the slopes is under fair control.

*Offices/Factories.* The center of Athens has high real-estate prices, but not highrise buildings. Construction controls have kept it down to eight floors in deference to the Acropolis and the Parliament building. Syntagma Square has a U-shaped ring of buildings that has virtually been appropriated by services to tourism—hotels, currency exchanges, airlines reservations, coffee shops, kiosks—but the local people take over the square itself at night to discuss politics and family opportunities. Omonia square has a major subway station on the rail line running about forty kilometers from the harbor to Kifissia, so it specializes in the professions that keep the metropolis going—law, accounting, banking, agents for distributors of many kinds, coffee shops, eating places—a virtual beehive of middle-scale enterprise. In between the two are banks, offices, and the Academia (the University of Athens), with more open space to view the fronts of buildings conceived in the mid-nineteenth century to be imposing for villagers, but failing today to disguise the dark, inefficient spaces of the bulk of the buildings behind. Renewal of buildings, fitting them to an age of electricity, telephones, and sewers is

almost complete for Syntagma, less so for Omonia, and even less for the corridor in between.

Kolonaki, the highest-status residential square, is gradually being infiltrated by shops and offices (bottom three floors) of high-prestige small firms. Piraeus has a long line of traditional shipping and insurance buildings facing the waterfront and proudly bearing the names of the firms across their fronts so that they would be visible from the ships. A few more modern buildings rise from the ranks of their elders around the flowered *plateia* and among the shops of the harbor community.

Out the main corridor to the north, one sees more of a commitment to the future rather than the past. The Athens Tower is a well-designed office complex with parking space. Automotive agencies cluster around its base. More recently Government has finished a couple of equal size, but still surrounded by open space.

On the toll road to the north (Highway No. 1) one sees a string of new factories, often with offices attached. Half display international brand names for pharmaceuticals, agricultural machinery, and engineering. Quite a few have yet to be occupied. This is where Athens implements the development of Greek resources by drawing upon technology generated elsewhere in the world since World War II. Each factory is separate and employs fifty to three hundred workers. Industrial estates were not in evidence. On the lesser road to the northeast some of the technology was updated “Greek traditional”—wineries, bakeries, tile for roofs and drains, marble works—but the majority was still European and American. The architecture was prosaic (two to three reinforced concrete slabs with cast concrete stairs and tiers of standard windows) unless the principal owner was out of the country. Then architects who understood comfort in this climate had a chance to reduce windows, except to the north, adapt the building form to the operations, enabling the design to move away from the stereotyped rectangular layout, and use some originality with respect to the site. In these factories (*biomechanias*), perhaps a third of the labor is white collar, and a high chimney is rarely attached.



The heavy industry is on the south, along the shoreline west of Piraeus. There one sees steel mills, shipbuilding, truck body fabrication, oil refining, petrochemicals, heavy chemicals, all of which produce so much dust, smoke, smells, smog, and water pollution that the white-collar workers flee to Piraeus or Athens. The actual employment is not very large, probably no more than 50,000, which would be equaled in the small fabricating cloth, leather, and plastics in holes in the wall and back rooms around the center of Athens, but the positions in heavy industry are all filled by males, while those around the Plaka are perhaps half females.

Almost all the new industrial projects are directed to sites far out of Athens because, during times of relatively full employment, Athenians resent industry.

**Machines.** Stationary machinery is not in strong demand in Athens. Elevators are primitive, air conditioners rare despite the summer heat, and even air circulation systems are skimped, since the sea breeze normally suffices. The exhibition of new machinery is not given pride of place in show windows, as in Seoul or Bombay, except for mobile equipment for agriculture. Those who worked in Germany brought back a pride in Mercedes-Benz cars but not in impeller pumps, injection molding machines, or stationary diesels. The machinery installed in the factories is rarely "up-to-date;" indeed, Patras and Salonika have more of a reputation for mechanical advancement than Athens.

There is no significant manufacture of electrical or electronic machinery in Greece (one exception: farm-scale water pumps). The uses of electric power seem to be predominantly at the small-appliance level. Therefore the population of stationary machines is diverse and unspecialized; it is also relatively young, because economic development has been quite recent. The machines have been placed backstage, however; so as not to interfere with public or family life.

**Vehicles.** The right to travel is not quite one of the fundamental human rights, although it seems to have acquired that status in America. When one looks back in history for the body of tradition that esta-

blished this keenly-felt propensity to travel, it can be traced to the conquest of the West by rootless pioneers, through the seafarers of Western Europe, to their legendary origins arising among the Greeks of antiquity. This part of Greek culture was continued in the diaspora during Ottoman rule, but had been lost to the population subsisting on the soil of Greece that later became the bulk of the immigration to Athens. But the people of the diaspora also returned, and created the shipping lines that now provide a large share of the economic base, and re-established the urge for spatial mobility.

only in the past half generation has the income of the Athenians risen to a level where this passion could become "automobility" of a kind familiar to Americans. The attachment to this life style is still far from universal in Athens, but where it is found it is at least as intense as in Texas or California. It is demonstrated by the share of income dedicated to the operation of a vehicle, and the extreme measures required on the part of Government to prevent scarce foreign exchange from being squandered on what was asserted to be a luxury. Each new initiative of the authorities is quickly undercut by those who consider the auto to be part of their persona, and also by the raging inflation which is caused by reluctance to adjust to the high price of petrol. The right to travel by car is threatened by the OPEC monopoly. Each new Greek administration is forced to undertake unprecedented measures for the control of traffic, of land use, of energy expenditure, and of vehicular composition. The bleeding away of foreign exchange in January through April of this year, combined with further increases in OPEC prices in June, indicate that still more desperate controls over vehicles are now in the offing. The current situation cannot be maintained even for another year. Therefore a precise description of current status is hardly worthwhile.

Interestingly, the Athenian attachment to vehicles is matched by that of residents of other cities. Despite considerably lower per-capita incomes, they range from 80 to 160 vehicles per thousand of population as compared to 115 for Athens and 80 for Greece as a whole. One question yet to be answered is whether the urge to travel can be deflected

*Vehicle Populations for Greater Athens—1980*

Passenger cars	450,000
Buses, public	2,400
Buses, trolley	300
Buses, private (tourists, schools, etc.)	4,800
Buses, total	7,500
Trucks*	(40,000)
Three-Wheelers	9,000
Motorcycles, Mopeds, Scooters	40,000
Bicycles	(100,000?)

\* (banned in central areas)

to two-wheeled vehicles. Quite recently they were viewed as suicidal, because of the density of traffic during the key hours of the day, but their rapid rise in numbers since 1978 indicates that a niche is being established which might well be expanded in the next few years.

The species of vehicles are exceedingly diverse, ranging from the Lada from the USSR and the Hyung-dae from South Korea to the full range of European, American, and Japanese models. The fuel crisis was responded to by a 1978 law imposing an automatic income tax charge equal to a \$7,000/year wage for a vehicle larger than six taxable horsepower (about 1,100 cc, *i.e.*, Peugeot, Toyota, etc., while the assessment for a Mercedes owner is for an income at least at \$35,000/year). A two-vehicle family with both vehicles in this "luxury" size will automatically pay taxes on an \$88,000 per year income. Thus the black money that went into automobiles suddenly dried up, and luxury models are now seldom purchased. Very likely some have migrated across the Mediterranean to the booming Arab markets. Simultaneously, Greek imports were drastically cut back (with a formula that hit the late-coming Koreans particularly hard), which impelled Datsun to set up the first assembly plant. The Mebea (formerly only three-wheelers) has upgraded to a Pony jeep with a Citroen engine at 8,000 units per year. Allowing for some exports, they will constitute a quarter to a third of the replacement market. Bus bodies have been built in Greece for decades, some of them for export. The Saracakis organization, which imports the Volvo chassis, dominates.

Truck bodies and trailers are mostly constructed locally, with Saracakis again on top.

Transport consumes twenty-seven percent of the total energy (fourteen million tons of oil equivalent) in Greece, when direct requirements are added up, but not indirect, such as asphalt for roads, fuel oil for cement, etc. This is higher than normal for a semideveloped country. No figures are provided, but a series of deductions suggest that thirty percent of that fraction is brought into Athens to service vehicles (1.30 to 1.35 million tons) for the year 1980. A large share of this quantity is sold to ships and aircraft. To take another way of viewing transport: about three-quarters of energy expenditure on it in Greece is for intercity movements, for which Athens/Piraeus is the obvious hub.

Within Athens much energy is wasted by congestion. Since it is a city with a definite center and a limited set of radial corridors, because of its location on an isthmus, the flows start early and are pushed into the late hours of the evening. Offices frequently open at 7:30 AM. The traffic comes to a virtual halt on those weekends when odd/even license number restrictions are not in force, so one concludes that vehicle populations are not synchronized with circulation space improvement.

The effects of the exhaust on the antiquities, mostly due to SO<sub>x</sub> and NO<sub>x</sub> created by interaction with sunlight and air, is referred to almost daily in the newspapers. (Should the Acropolis be coated in plastic?) Use of fuel adjacent to the Acropolis has recently been ordered cut back drastically. Tourists will soon be moved by electric buses and trolley buses in that vicinity.

Thus far the feelings about freedom to travel have been depicted in terms of intrametropolita and intra-Greece trips. For those categories Greek cultural patterns predominate. Spatially dispersed family relationships (because of prior rural-urban migration) are reinforced at times of christenings, marriages, illnesses, and funerals. Personal contacts with office-holders and their networks are needed to get things accomplished in the Greek politician system, which explains much of the going and coming of the heads of families. Also, until the

late 1970s, hospitals and medical practitioners in Athens held a virtual monopoly on specialized medicine, so medical consultation has been an important reason for travel, but will decline henceforth now that complete services are being opened up at several regional centers. Part of the tourism is made up of the same kinds of trips undertaken by Greeks living in, or related to residents in, urban colonies overseas. Melbourne, Montreal, Chicago, and New York seem to be best connected with Athens in this manner.

Greek tourism was built up to its present size by exploiting the classical education provided in the Western European *gymnasium* and *lycée*. The middle classes and the elite "understand" Greece better than Egypt, Tunisia, or Turkey, even though the latter contain more extensive relics of the past, so Greece is preferred for a winter holiday for the rich, and a summer vacation for the others. Lately the numbers have been increased by people who have come to shop; the Yugoslavs go to Salonika, but the Arabs come to Athens. About sixty-five percent of all tourists (five to six million in 1980) arrive in Greece by air, and this share is expected to increase, although growth is to be decentralized by peripheral airport development, particularly for charter flights.

The aircraft employed have their home base in other parts of the world. Olympic Airways, the designated national airline, needs to be modernized and refitted with energy-saving aircraft. But this depends upon airport expansion, since Athens's Hellenikon airport has reached capacity. The quandary it poses is discussed under urban facilities.

The boats serving the public from Piraeus are registered in Liberia and Panama, so their numbers are uncertain. Their role is to integrate the society and the economy of Greece. The minor islands, particularly the Cyclades, were threatened with extinction when the men took employment in the merchant marine and often settled overseas, but they are being resuscitated as centers for tourism, summer residence, and retirement. Quite large subsidies are required for the small shipowners; they must be negotiated frequently because of inflation. Thus the threats of strikes and lockouts hang over the harbor during the peak periods when the

various parties to an agreement have the most leverage to gain their demands. Piraeus operates at a level of 30,000 ship arrivals per year, including coastal operations.

Services for international shipping are the principal source of export earnings from Athens, roughly double the amount obtained from touristic services. This reveals a special form of vulnerability for Athens—its income disappears when the tankers fail to operate. Tourism could be cut off, for lack of fuel, at the same time. Since shortages would be associated with a fuel price jump, a Middle East crisis could subject Athens to a "double whammy" kind of catastrophe.

*Automata, Computing, and Telecommunications.* Greece has never had a reputation for synthesizing new control systems or installing advanced instrumentation, although Greeks as individuals in other societies are known to be theoreticians and top-level practitioners in these specialties. The social order in Greece has inhibited the kind of acceleration that has occurred in cities like Tokyo, Seoul, or Sao Paulo. Nevertheless, over the last decade major advances have been made in applying cybernetic principles to finance electric power management, reservations services, aircraft maintenance, telephone exchanges, and the like. An estimated forty percent of the computer capacity—the automaton of the modern era lives in "computer space"—is dedicated to public-sector activities. (My principal informant about current operations is architect Dimitri Katzinis, a promoter of projects for Univac and a member of the firm of Doxiadis Associates Computer Center.)

The leadership in teaching of computing at the university level was taken by Salonika, as in so many other technical professions. Its Univac is now shared by several newer Greek universities. The principal users there are the engineers and the applied mathematicians. In Athens the Polytechnic has recently installed a Control Data facility, complete with peripherals, after having lagged in computer science for many years. Therefore Athens will be producing some advanced programmers locally, rather than acquiring them from the provinces, or, more important, from overseas, particularly Amer-

ica and Germany. The programmers and computer scientists are now said to be in excess of 2,000 persons. The local pattern is for a specialist to move from project to project, each one increasing in scale and in complexity, until a permanent position is obtained in Government or industry. The local computer society is dominated by the latter. Its specialized journal contains news, articles, and advertisements; therefore it qualifies more as a trade periodical than as a professional journal.

Both electronic and electromechanical telephone exchanges introduced a key instance of computer use that integrates diverse urban activities. The subscribership to telephone service is almost always compromised by demand for capital and lags in connection to the network. The rich suburbs of Athens still have to wait for years to be connected.

Athens is different from other metropolises in that it registers 5,000 numbers in an indexed Latin-alphabet phonebook—as compared to about 900,000 entries in the Greek-language metro system. The telecommunications region is larger than the region defined by commuting distance and is, perhaps, an index of things to come in urban construction. Therefore telephone density is one instrument for every five to six people, allowing for multiple registration. There is also a Latinate “blue” addition to the “yellow” book. Both identify the multinational firms operating within, or outside of, Greece, but also churches, professional associations, and special tax-evasion opportunities. The number totals between 200 and 300 organizations, depending on definitions. Clearly defined were airlines, banks, parts distributors, consultants, and advanced professionals. This list puts Athens into the same league as Hong Kong and Manila as a base for operations of multinational organizations.

**Organizations.** Organizations in Athens grow out of families and clans. Small businesses fight for a place in the sun. According to the *Athens News* (June 24, 1980), the Greeks have nineteen businesses for each one thousand persons, and this number has almost doubled since the 1950s. This is to be compared to eight to twelve for fully developed societies. The same source

asserts that ten percent of them do fully half the business, a figure that has the appearance of being correct. Therefore in Athens we expect to encounter twenty to twenty-five businesses per thousand persons (say, 100,000), with quite a few in the larger category.

In government a similar phenomenon occurs. Nepotism is not only tolerated, it is necessary. One can trust a member of the family (say, a second cousin) more than he can a stranger assigned to the position by civil-service examinations. Each little bureaucratic office, particularly the new ones, is an outgrowth of family connections, and many “go bankrupt” when the Government falls, so the Government receives a high level of support from officeholders. Obviously seniority and merit have a place, but it is better to use these criteria for appointment within the network of one’s relatives.

Athens still lacks the capacity to create organizations that last for generations. The structure collapses when the energetic entrepreneur dies or retires; it erodes away when trusted employees accede to family pressures and utilize their experience and contacts to set up on their own. Thus Athens does not build up its share of corporate enterprises similar to those that arise in Italy, Spain, and even Portugal.

A large number of voluntary associations are formed much as businesses are. They range from music groups to football to the fine arts. These nonprofit organizations are registered, but many do not have a telephone number, and many are in reality defunct. A difficulty is to discover a criterion for determining when an organization is no longer viable. If only a few people remember its efforts and express words of appreciation, yet do nothing in concert with it, is such an organization alive?

In a highly competitive environment like that offered by Athens, one gets a glimpse of the future by asking for names of men who have the capacity to create organization; they mobilize human action to gain common ends. The nominees must be young and dynamic, and be able to attract still younger people with whom they collaborate. The targets they choose suggest what

new institutions will be added to the metropolitan society and the forms that new growth will take.

When such questions are asked in various quarters around Athens, a few names come to the fore. The leading one is Andreas Papandreou, who had been a professor in Berkeley before returning, eventually to become Prime Minister. He is building a coalition that could very well take office again in a few years, but even his backers admit that the coalition is held together less by common interests than by the opportunity to be heard in opposition. The talents of Venizelos built a Greek nation, and those of Karamanlis were responsible for the transition to a developed society described earlier. But those observations are after the fact. What Papandreou, who is far from young, could build is still also very unclear.

Another name comes up repeatedly: Stephanos Manos, an engineer from the Zurich Polytechnic, a graduate of Harvard Business School, and a successful entrepreneur in the family biscuit business. As a Subminister for Housing he created a great number of improvements and demonstrated a heed for integrated urban development, despite a limited power to add staff. So he was made a full Minister of Environment, Urban Planning, and Housing, a new portfolio, but later moved to the portfolio of Industry and Energy. His espousal of Doxiadis's proposal that half the gain from converting land to urban uses should be applied to public purposes mobilized strong opposition to him among the politically powerful landholding interests. In the recent shakeup occurring when Karamanlis moved over to the Presidency, the other ministers felt he should not yet be offered an established ministry. So now his organizing capabilities will be applied to Energy. This is a setback created by his aggressiveness, but it is felt to be temporary. He is only in his early forties, and has attempted to create a Kennedyesque image of himself in the mind of the voting public: an international figure, with a beautiful wife, a family man, able to carry the heavy weight of office.

Other names gained much less consensus. They included a technocrat who was using social research to reduce the scope of foreseeable conflicts, a cultural impresario

aiming to preserve the classical studies and ethnic arts of Greece in the context of new international themes, a banker who is widely connected, and so on. In Greece one finds an easy transition between business and public affairs and back again; thus all actions among the leadership are politicized, as in Tokyo, according to faction rather than ideology.

*Knowledge.* What kinds of knowledge do the organizations of Athens conserve and develop? They are hindered by the lack of a critical mass for publication in the native language. Yet only a minor share learn German, English, or French, which are languages more suitable to the accumulation of knowledge.

Books, journals, and computer software are media for the storage of useful information. The most advanced technical work in Athens is done largely in English and German, based upon imported publications and internal reports. That holds true for archaeology as much as for nuclear engineering or market surveys. Therefore knowledge in Athens is rather thin: most of what exists will disappear when the knowledge-carrier emigrates or dies. Libraries are incomplete and the files are poorly organized.

Yet Athens is one to several steps ahead of the capabilities of Arab countries and can therefore effectively serve as a channel for exporting general and theoretical knowledge to that part of the world. Tourism and shipping services make it easy for engineering, architectural, and business groups to work on the Middle East from Athens. Therefore, despite its handicaps, Athens is in the knowledge export business. The effort is fragmented and poorly coordinated, with inadequate investment in infrastructure, but it continues to expand.

As might be expected, the universities have become so politicized that only a few departments are effective knowledge producers.

*Government.* The Athens metropolitan area has a number of mayors, ranking hierarchically in status from Athens itself to the latest village captured by its expansion, but it has astonishingly little local government. If a new school is needed, or a sanitary system, it is the mayor's duty to amass

local influence and apply pressures upon the appropriate ministry in order to have the facility allocated to them. Justifications based upon need are important, but influence is even more so. Thus rich and influential communities tend to stay that way, because they obtain priorities in government expenditure. Usually they have a foot in each political camp, so their fortunes do not change even when a new party takes power.

Property transfer taxes are very high. They provide the capital needed for community services. They also bring about a stable participation in the community through ownership and a commitment of many Athenians to the village of their family. Changes made in 1980 are expected to increase family formation and birth rates.

Many community services such as garbage or water supply, are handled through government-dictated user charges. Living in the city at an urbane scale involves paying a long string of these monthly or seasonal fees. This arrangement suggests that Athens is really run by the national government, which makes decisions about new urban services or new levels of service. Thus the metropolis belongs to the nation as a whole. Conversely, the nation is there to support Athens.

**Fuel Imports.** Rather striking shifts in the imports and exports of fuels have been forced upon Greece during the late 1970s. Therefore a review of the statistics, explaining the major items and turns in trend lines, has little to do with the prospects for the 1980s and beyond.

Crude oil is the major import, but there are significant quantities of products as well, especially industrial fuel oil. The same kinds of products that are imported are also exported to places like Cyprus, Israel, and Lebanon, because refinery balancing is involved, both in Greece and elsewhere in the Mediterranean, and preferential contracts have been negotiated in the past.

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Import of Petroleum (1980):  $12-13 \times 10^2$  tons (Greece)

Import of Products (1980):  $1-2 \times 10^2$  tons or kl.

Export of Products (1980):  $2.5-3 \times 10^2$  tons or kl.

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To this should be added 1-2 million tons of coal and coke for the steel mills, depending upon world market conditions. Plans are to switch from industrial fuel oil in cement manufacture to powdered coal, but an efficient coal port has yet to be installed, so the transition will be slow. Perhaps sixty percent of the Greek imports arrive in the various small, specialized harbors of the Athens metropolis from several different sources, including the USSR (ten to twenty percent of the total). The bulk of the fuel goes into the manufacturing that is scattered about that area, but some is moved up to Chalkis, where modern manufacturing is getting established on newly constructed, privately operated sites.

Imports of fuel should be declining over the 1980s as various substitutes and conservation practices are introduced. Lignite goes into the power grid from the middle of the Peloponnesus to the south and from the mountains to the northwest; tripling in quantity by 1983 is scheduled. More imported coal will also be used. Energy-conservation practices may save ten to twenty percent, while manufacturing output still expands somewhat. Some metropolitan energy will come down from the new Aegean oil fields, perhaps enough to replace the dwindling supplies from the USSR. So the approximation for the Athens metropolitan region is:

Net Consumption of Petroleum (1980):  
4-5 million tons

The consumption that is reduced due to price increases will be matched by demand attributable to immigration and further industrialization. Thus a temporary plateau in demand is expected. The security of the supply, however, is most questionable.

**Food/Fuel Imports.** The caloric intake of Athens is based upon a cuisine that is an internationalized version of the traditional Greek village diet. The early morning meal is hardly more than a tiny cup of sweetened coffee, possibly some toast and honey, with bread and uncured cheese for those who must put in hard physical labor. At 2-3 PM a heavier meal with a soup, possibly some boiled meat but more likely white beans served with a starch, sometimes a vegetable, with some resinated wine. A snack at 5-6

PM is accompanied by *ouzo* and water for the men, while women might have tea with a small pastry. At 8:30-10:30 the family has bread, salad, cheese, sometimes meat, wine, and fruits in season. This stereotype has now been completely broken, yet it provides a set of expectations and suggests peaks and valleys of activity in the kitchen and the shops.

The basics of the Greek cuisine are picked up in four to seven shops of the *ken-tron* of a face-to-face community. They include:

bread	lima ("butter") beans
macaroni	navy beans
potatoes	pole beans
rice	
cornmeal	tomatoes
olive oil	cucumbers
	peppers
	eggplant
coffee/sugar	cabbage
wine ( <i>retsina</i> )	onions
liquor ( <i>ouzo</i> )	olives
	fruits in season
mutton	
eggs	white cheese ( <i>feta</i> )
chicken	cured cheeses
fish	

In the metropolis, however, many modifications are noted. They affect recent immigrants and the poor as well as the urbane citizens. The principal sources of calories are processed into more refined breads produced by larger bakeries. Western European rolls and whole-wheat loaves are assigned high status. Dishes using cornmeal and macaroni are downgraded, but macaroni comes in more varieties, and some do not lose status. Pastries increase in popularity, particularly the holiday types, but recently an American-style pizza has caught on in the cities and resorts.

The wine, stabilized against the heat by adding resin from the Attica pine, is now less popular than beer, and the nineteenth-century import from Germany and the 1960s import from Holland are being displaced by Menningers, lately introduced and brewed in Greece. The almost traditional orange and lemon carbonated drinks are being pushed

out by Pepsi-Cola, Coca-Cola, and Seven-Up.

The production of mutton has been declining while Athens was expanding, so New Zealand has come into the market. Fortunately, battery-raised chickens were introduced to meet the universal demand for omelettes and roast chicken. The fish have meanwhile become very scarce and expensive. Cattle are increasing in number now that irrigation improvements can guarantee summer forage. This strategy guarantees greater cheese production, including the cured cheese types of Western Europe. Also fish farms are starting to produce fresh-water species popular among sophisticates.

The fruits have expanded, as have vegetables, to supply the early season Western Europe market, not merely the dried onions, figs, and currants of a bygone era. The orchards bearing citrus and the peaches-plums-pears-cherries of smaller valleys are of varieties imported from California, because the latter were designed to meet the elite market specifications for quality, but they taste better when grown in Greece.

Meanwhile supermarkets have been belatedly introduced, and they offer packaged goods imported from all over Europe and a bit of America. (Greece does comparatively little canning and preserving, or even freezing, on its own initiative.) Ice cream in individual servings is now widely distributed by kiosks, sweet shops, and cafe-bars. Entry into the Common Market in 1981 will reduce the barriers to internationalization still further, although, curiously, the large flow of Greek *Gastarbeiter* returning from Germany brought exceedingly few recipes, pastries, or popular brands into circulation. The taste for mechanical things for cooking, on the other hand, was very strongly influenced, because they promised to save either menial labor or household time.

### Resilience to Food Shortages

The price variations in the market associated with extreme worldwide shortages would affect only a few commodities. The adjustments to scarcity in the prices of grain, cooking oil, sugar, and other imports would quickly reduce the local production of chickens, because they are grown on imported



corn. The amount of fat in the Athenian diet has been noticeably lessening anyhow, so a further reduction is not a hard step to take. The cornmeal that the chickens would have eaten may be converted into *moussakà* and traditional corn breads. The minority addicted to sweets (mainly women) survived an outrageous price escalation in 1972-1973 without many tales of deprivation remaining in the lore of the society—nothing to compare with the Communist invasion of 1946-1949, when Athens was cut off from fuel and food, and people went out at night to pull out cabbage roots and filch trees from the parks for cooking fuel. Since 1970 Greece has started up sizable sugar beet cultivation.

Greek production of food is water-limited, but there are so many microclimates and isolated valleys that no general, catastrophic drought seems possible. Nevertheless, some attempt should be made to correlate the output of agricultural staples output (wheat, sugar beets, potatoes, rice) with the failures of the monsoon in South Asia, if only to help the rest of the world and maximize profit. If they are synchronized, Athens is likely to suffer a burst of inflation not unlike that currently experienced due to OPEC price setting. If there is inverse correlation between successful monsoons and rainfall in Greece, the people of Athens would be in a relatively strong position during a world food crisis.

In this test of vulnerability it is only the worst years for India and Bangladesh that count. They would involve considering growing conditions in Greece during 1965-1966 and 1974-1975, and possibly 1942-1943 (the time of the Bengali famine), although that point would be debatable because the famine was mostly attributable to a breakdown of the transport during World War II. A few instances of near-crop-failure in Greece should be sought and analyzed for coincidence with difficult times in North India and Pakistan.

Thus we see that the Greek import substitution policies of the past three decades in the area of Greek agriculture will pay off handsomely for Athens whenever a global shortage occurs. The primary population to decline seems to be that of chickens—a rather recent addition to the general cuisine.

*Resistance to Worst Case.* It has already been argued that Athens's place at the apex of the Greek food economy makes it possible to survive the effects of a world food shortage with very little disturbance to the diet—it seems to be a matter of substituting cornmeal *moussakà*, potatoes, and beans for the loss of rice, sugar, and chicken. But what if this food crisis occurred during a period of turmoil in the Middle East, when the bulk of the petroleum production from the Persian Gulf area could not be shipped? The earliest any simultaneous crisis could occur is 1982. Therefore let us consider conditions that probably apply to the 1982-1985 period:

1. Greece would be producing oil from newly-found fields in the North Aegean to a level of ten to fifteen percent of total consumption.

2. The power from lignite will have doubled or trebled, and hydro power increased by 300 MW.

3. Shipping services supplied to world trade by Athens (its principal export industry) would fall twenty to forty percent, primarily due to the Greek specialization in large oil tankers. Employment of sailors would be off almost as much. But insurance commissions are likely to be stable, or even higher, due to added risk from the political turbulence. Shipbuilding would be way down, ship repair off, and salvage delayed due to scarcity of power for the electric furnace. (If the Suez Canal is cut off, Greek shipping services could be either up, or down even more, depending on conditions elsewhere and the competition).

4. Tourism becomes problematic. Athens might argue that the amount of employment produced per gigajoule of energy allocated to services to tourists is quite high, if planes and buses are kept full. Western Europe would be cold, due to extreme measures taken for conserving energy, so many people would be willing to spend their savings along the Mediterranean, trying to live through the crisis as comfortably as possible. The problem they face is that each mode of passage now requires liquid fuel—the scarcest at that moment.

How are tourism and air travel to be regulated in a period of extreme petroleum

scarcity? Refinery balance arguments provide one approach. The needs for gasoline for transport may determine refinery runs, but more likely diesel requirements will be a limiting factor. The fraction of the cracked crude oil that goes to aviation jet fuel can also be used for kerosene and stove fuel. Thus cooking fuel and tourism compete for the output of distillate supplied by the three Greek refineries. Once minimum Greek needs are guaranteed (they are actually quite small), the remainder might go to the highest bidder for low-priority aircraft and surface travel, the turbojets being by far the thirstier, but the more convenient.

Another procedure is equivalent to that employed by military, government, and business bureaucrats. In effect, one receives travel orders which justify the level of priority. The airline networks adjust flights to reservations made at top priority, while surplus capacity is made available for entrepreneurs, students, family visits, and similar purposes, and further capacity is available to vacationers, commuters, and other low-priority purposes. Such a scheme would reduce Greek aviation to perhaps a third of its present level, and Athenian tourism to possibly a half.

All this assumes a rational, organized approach to energy conservation during a time of international, and very likely internal, crisis. It sounds utterly un-Greek, foreign to a culture that emphasizes every man for himself and his relatives. But the tourists and the fuel both come from the outside, where bureaucratic controls are predominant and evasion of regulation is less prevalent. Athens has no clout which allows

it to impose its preferred responses to emergencies upon others; it must make the most of what it can obtain on the spot markets elsewhere. The airports might be set back all the way to 1970 levels of activity, but the auto population level might be pushed back to 1975 conditions and electric power only to 1978. Athens would be jolted by a rise in unemployment, but the prevalence of family firms suggests that a good share of this loss of jobs will evaporate and take the form of invisible underemployment.

The overall picture is therefore not too alarming. Athens sees next door a country, centering on Ankara and Istanbul, which has injured itself to a far worse degree through mismanagement and political intransigence. Several times during the last two generations Greek politics started down the same road. Yet impatience with political moderation is growing in Athens, according to surveys reported in newspapers, for reasons which are quite unclear. (This is the only city that I know of where the Communist Party would reward a revered leader, just released from prison, with a shop, a going enterprise, instead of a pension—and do it without seeing any paradox in the gesture.)

## Conclusions

One must conclude from these wide-ranging reflections on global possibilities that Athens has achieved a rather stable situation with respect to food and fuel decisions. Political schisms, both internal and external, are not evident at present, but are potentially more disrupting to the urban ecosystem than those arising from energy.

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