

# RANGE MANAGEMENT

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## Range Management in the General Economy of Greece

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### Highlight

This article discusses the status of range management in Greece and its relationship to other aspects of the general economy. Since the general economy is improving rapidly, increased attention is being given to range management and forestry, and especially to teaching, research and demonstration. The Greek government is doing a great deal toward improving livestock and grazing practices.

During the academic year 1961-62, I taught the first course in range management ever given in a Greek university. It was offered at the Aristotelion University in Thessaloniki, under the Fulbright Program. The three lectures per week, attendance at which was optional, drew up to thirty forestry students at a time. The course covered the basic principles of range management.

Since range management in Greece is a responsibility of foresters in the Government Forest Service, a special two-week short course was also given for practicing government foresters, at the invitation of Mr. Nikolaos Metaxas, former Director General of Forests of the Ministry of Agriculture. Of the 204 professional foresters then employed by the Forest Service, 75 were sent to take the course at gov-

ernment expense. This is indicative of the considerable attention being given to range management in Greece. In the two-week short course, two lectures of one-and-a-half hours each and a two-hour discussion period each day covered essentially the same material as that given in the longer course.

The lectures were translated into Greek by Dr. L. G. Liacos, and were published as a textbook, co-authored by Biswell and Liacos. The title is a single Greek word; "Levathoponeke," meaning "economy of range management." The chapter on range economics and that on range livestock husbandry were prepared entirely by Dr. Liacos.

For nearly two years before we went to Greece, we studied the Greek language off and on—a language that few foreigners try to learn. We did not become fluent, but our efforts obviously contributed to the success of the Fulbright project, and we were personally repaid by our added enjoyment of the country and by the friendliness with which we were accepted.

Range conditions and practices in Greece are closely tied with the pattern of living and with the economy and development of the nation as a whole. Therefore, many things other than range

itself must be considered if the story of range management and improvement is to be fully understood.

### Country and People

Greece is a beautiful country of mountains and shorelines surrounded by deep blue waters. It is small (about the size of Alabama), with an area, including the islands, of 51,682 square miles. About 90 percent of the country is hilly and mountainous; only 25 percent is arable—much of it dry and rocky. The land area is classified as follows: high mountains, 25.6 percent; semi-mountainous, 42.4; semi-plains, 15.4; and plains, 16.6 percent. Generally, Greece has mild wet winters and hot dry summers. The climate is similar to the Mediterranean-like areas of California, but varies considerably between the south and the islands and the northern part of the country. The temperature is rarely extreme.

The Greeks are a friendly, hospitable, and sociable people who like to read, and are interested in politics. They are justly proud of their ancient and distinguished heritage which, even today, doubtless influences their approach to twentieth century problems. The population is approximately 9,000,000, with about 60 percent of the people living in villages of less than 5,000. Nearly 2,000,000 live in the metropolitan area of greater Athens, and nearly 400,000 in Thessaloniki. Another half dozen cities have populations of 50,000 to 75,000.

About 50 percent of the people work on farms, in contrast to only 8 percent in the United

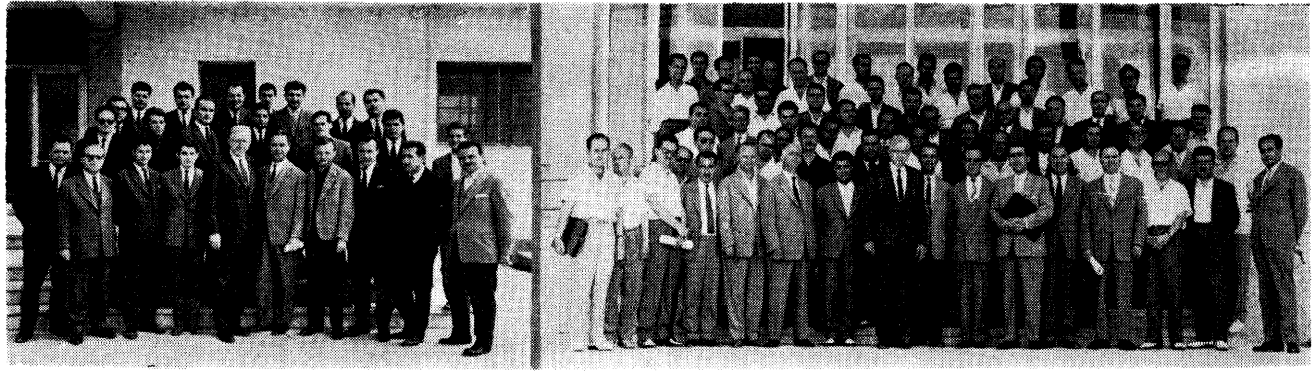


FIGURE 1. *Left*—Students of first class in range management, Aristotelion University, Thessaloniki, Greece. *Right*— Professional government foresters who took two-week short course in range management.

States. There is much under-employment in farm areas; that is, on small farms people can keep busy only 25 percent to 50 percent of the time. Many of the small villages are in the mountains where land for cultivation is scarce, and much of it is on steep slopes. In such places the economy is based largely on range livestock grazing and forestry, but there is a need to develop alternative sources of income. The capacity of the mountainous lands to support people is not high, and many of the young people are moving to the cities and to more productive lands where they can increase their income.

In 1940, Greece was invaded by the Italians, who were pushed out by the Greek army, and a little later it was overrun by Hitler's armies. War, and the burden of four years of Nazi, Italian and Bulgarian occupation left the Greek nation devastated. In that period of national weakness, the communists made two attempts to pull Greece behind the Iron Curtain. The first was defeated by British intervention in 1944 and 1945. The second, in mid-1946, backed by the Soviet satellite nations, was repulsed in 1949, with extensive American assistance. Since then, Greece has developed steadily and rapidly. However, since Greece is bounded on the north by the Communist countries of Bul-

garia, Yugoslavia, and Albania, she must maintain a strong military force in that area at great expense and drain on the economy.

*Industry.*—Greece is undergoing rapid industrial development. Hydroelectric power provides cheap electricity for industrial and agricultural development, and refrigerators, electric stoves, fans, irons, and other such items are becoming common. Many such items are now manufactured in Greece, whereas a few years ago most of them were imported. Greece has recently built three large sugar-producing plants and two fertilizer factories, and similar developments are taking place in other industries. There are large deposits of lignite now under exploration and recent discoveries of rich uranium deposits are of great importance.

Industrial development is important in providing employment opportunities, thereby helping relieve pressure on the range and forest lands. In other words, fewer people will have to depend on production from these lands for their livelihoods.

*Tourism.*—Greece with its long history, beautiful landscape, pleasing climate, and friendly and hospitable people, is a tourist attraction supreme. The many new hotels are excellent, and room and lodging are relatively cheap. The main roads are good to excellent. Tourism activities

employ many people, provides a use for the country's livestock and agricultural products within its own ecosystem, and brings in foreign currency. The government is aware of the importance of tourism and is devoting large sums of money to developing this phase of the economy. With tourism flourishing, more money will be available for industrial and agricultural development, and this in turn will reduce the pressure on agricultural lands and on ranges and forests.

*Agricultural Production.*—In 1947, Greece produced only 700,000 tons of wheat; in 1963 the total was 1,800,000 tons. In 1951, 79,000 tons of cotton and 131,000 tons of citrus were produced; in 1963, the totals were 253,000 tons and 312,000 tons respectively. Comparable figures could be given for fruits such as apples, peaches, and raisins; and for tobacco, corn, and other products. A few years ago agricultural products had to be imported; now many are being exported for foreign exchange. Along with the increase in agricultural production, the number of tractors has tripled in the past six years. Although most farms are too small for large farm machinery, one afternoon in the plains southeast of Thessaloniki, we saw five wheat combines at one time—a scene reminiscent of the rolling grainlands of central Nebraska.

Although great progress has been made in agricultural production, much remains to be done in developing such projects as irrigation and reclamation, improving pastures and poultry production, and establishing soil conservation on the cultivated as well as on the range and forest lands.

#### **Pattern of Land Ownership and Management**

The land uses of Greece are classified as follows: farming land, 17.0 percent; grasslands, 33.0; woodland pastures, 24.5; forests, 21.7; and non-productive 3.8 percent.

*Farming Lands.*—The farming or cultivated lands of Greece are in private ownership, and the people go from the villages by donkey or other means, to tend them. The average size of the farm is about eight acres, and many of these are fragmented. Sometimes a farm may consist of as many as 15 to 20 or more scattered plots. Often the plots are long, and extend up and down slopes. This pattern exists because, throughout the centuries, each father has attempted to distribute his land equally among his children. Such a division assured each child the same amount of good and poor land.

The many problems involved in tending and utilizing these scattered, small parcels of land are slowly being overcome by the Ministry of Agriculture through a program of land redistribution. In this program each farmer turns all his bits and pieces into a central pool, and receives in return land of equal value, as determined by the villagers themselves. At present, many of the small and fragmented farms can be tilled only with hand tools. Obviously, in such cases, the farmers' income will be small so long as crops such as grains have to be harvested by hand and the vineyards cultivated by spades and hoes.

*Range and Forest Lands.*—About 65 percent of the range and forest lands is public; the remainder is community and private. The villagers usually graze their animals over the ranges, and pay rent to the community. The villagers are assisted and advised by professional government foresters. Range and forest lands are not fenced, and the livestock must be herded. Most village farmers own a few livestock. The cattle are gathered each morning into small herds, and the flocks and herds are shepherded over the ranges during the day and returned to the villages at night. In some cases big operators may own several flocks of sheep or a herd of cattle. In early morning and late evening one can see many animals leaving and returning to the villages. Of course, trampling and extremely heavy grazing occur near the villages a situation that is difficult to avoid under the village system and pattern of land ownership and management. To fence the ranges, thereby eliminating the need for shepherds, is probably not economically feasible at present. Furthermore, many wolves inhabit the mountains, and can be serious predators on unattended range livestock.

The livestock are usually grazed for part of the year on rangelands and for part on agricultural lands. Herding livestock over small and fragmented areas is difficult, and the land redistribution program should help solve the grazing problem.

Greece has an active program in forestry. About 5,000,000 trees were planted by villagers during the season 1961-62. New plantations must be protected against livestock for a few years, thus creating a temporary hardship, at least, for people already hard pressed for livestock products. Were it not for this, more trees would certainly be planted each year. Fortunately, areas of cer-

tain shrub types such as those dominated by *Erica* spp., are not so good for livestock browsing, but are highly productive of forests. In such cases the conflicts between forests and grazing are at a minimum.

The forests are most abundant and productive in northern Greece. Their most important product in the past has been fuel wood for both cooking and heating, but this is gradually being replaced by oil. The forests of the future certainly will be used more for pulpwood and lumber production than in the past. Already two pulpwood industries have been established and efforts are being made to increase lumber production to save exchange. The reduction in use of fuel wood may work a hardship on some of the mountain people employed in cutting and hauling it, but this slack will probably be taken up through greater government contributions to planting and other care of the forests.

The Forest Service provides work opportunities for villagers of the mountains, thus eliminating some of the pressure on the range and forest lands. It may also furnish fruit trees at no cost, as well as forest seedlings. Fuel wood is offered by the Forest Service at a minimum charge, and also more efficient stoves are being furnished at little cost in order to reduce the amount of fuel needed. Cheap materials for livestock shelters, water storage facilities, and the like are other contributions made by the Forest Service.

Water from the range and forest lands probably constitutes the greatest natural resource of the country, and big efforts are being made in watershed management and torrent control to make more water available for use.

#### **Forage and Livestock**

*Forage.*—Range forage is similar to that in California and consists of herbaceous plants, both

annual and perennial, and shrubs. The annual plants and shrubs are particularly well adapted to the Mediterranean climate, just as in California. However, in northern Greece I was impressed by how quickly the perennial grasses replace weedy forbs under protection and managed grazing. Legumes are abundant, especially on the calcareous soils, which are widespread. These soils produce good quality forage, and the milk and cheese from these areas are in demand because of their fine taste and high quality.

Brushlands are widespread in Greece, with scrub-oak (*Quercus coccifera*), the most abundant browse. This plant usually grows to a height of 3 to 5 feet. It sprouts vigorously and increases in density by means of shoots from underground stems. The shrub furnishes particularly good browse for goats, which like it, just as goats like sprouts of interior live oak (*Q. wislizenii*) in California. Sheep are not fond of it, however, and cattle scarcely eat it at all. The abundance and distribution of goats in Greece are related closely to those of scrub-oak browse. Research by Dr. Liacos proved that goats are more productive in scrub-oak brushlands than are sheep, and that they yield a greater income per animal.

The scrub-oak is also valuable as fuel, especially for outdoor ovens. The sprouts are cut close to the ground and are hauled in by donkey or mules. A good stand of scrub-oak yields more than a half ton of fuel per year. In fact, a few years ago brushlands that yielded this much fuel per acre were considered forests. Of course, when such lands are used for both fuel and grazing, there can be considerable conflict in use. Many of the coppice forests of oaks and chestnut are being changed to tall-growing forests for increased lumber production. However, many coppice forests,

managed intensively under short rotations like those of chestnut on Mt. Athos, probably provide higher net returns than many high forests.

I had expected that fire might be used in brushlands to improve conditions for livestock grazing; however, fire is seldom used. If the brush becomes too tall for good browse, it is cut for fuel for the ovens and stoves. In fact, there has been a shortage of fuel in most places and it would be foolish to control burn on the range.

All over Greece one is impressed by the abundance of thorny plants and weeds of negligible palatability. Selective livestock grazing over thousands of years has led to this sort of plant cover. Greece is not alone in this respect; we also have many spiny and near-zero palatability plants like the thistles in the United States, and they are probably increasing in number and abundance.

*Livestock.*—Greece has about 1,100,000 cattle, 9,000,000 sheep, 4,600,000 goats, and 60,650 water buffalo. One of the primary products of livestock is milk, from all kinds of animals—cattle, sheep, goats and water buffalo—and usually the young are slaughtered early so that humans can have the milk. The cow's milk is used for drinking, the milk of sheep for cheese because Greeks like the cheese "phaeta" and the best phaeta is made from sheep's milk; the milk of goats for first quality butter for cooking because it is very aromatic (goats browse aromatic plants mostly on rocky sites). Goats' milk is also used for drinking, and the milk of the water buffalo is used for cream because it is very rich.

As to the meat, there is an increased preference for beef. Lamb meat is also liked by Greeks, and barbecued goat-kids are very good, especially along with good wine and Greek dances.

The trend is toward relatively more sheep and cattle and fewer goats where the forage is mainly herbaceous. Where the forage is mainly browse from scrub-oak, however, we find little change in numbers or kinds of animals. The villagers are attempting to improve their flocks and herds through introducing better home-bred breeds of goats and other kinds of livestock, and the government is assisting in this work. Where appropriate, the government pays a subsidy to villagers who dispose of their goats and graze sheep instead.

Most of the sheep are breeds that tend to graze together and are therefore easily herded. Since the small fields are not fenced, the shepherd has to be very careful to keep the sheep in their proper places. Sometimes the animals are taken to the mountains during the summer, where they always stay on public grazing lands. However, the government is making an effort to stop this practice because the villagers higher in the mountains need the forage for their livestock. In some operations, the animals (usually sheep) are herded toward the mountains in northern Greece during the summer and toward the plains in southern Greece during the winter—a sort of nomadic grazing system. The government is also trying to stop this practice, and is making good progress.

### Soil Conservation

In America we hear a great deal about soil erosion in Greece. Certainly erosion can be expected since the country is hilly and mountainous and has been grazed and farmed for centuries. Furthermore, during the wars the forests were heavily cut and burned. Some of the summer and early fall storms are intense. Greece is also a rocky country. A saying in Greece goes, "When God created the earth, he used a sifter and made the valleys in all the other countries. When he

was through, he threw the rocks in his sifter over his shoulder, and it was these rocks which created Greece." I concluded that the rocks have both their good and bad features. In many places soil between the rocks produces good forage. However, at a distance the landscape may seem one of solid rocks. The rocks may be helpful in preventing gully formation and "bad-land" conditions. In many rocky, calcareous soils the infiltration capacity is high, and springs at the edges of the plains and valleys are numerous.

Considerable current erosion was observed in some places and very little in others, about as we find here in America. Apparently soil erosion has been observed for centuries. This was pointed out by Bruce Lansdale, Director of the American Farm School in Thessaloniki, in his January 1964 article in *American Forests* entitled "Now Look Here—Mr. Stuart." Bruce mentioned that the philosopher Plato (427-347 B.C.) had something to say about soil erosion in his "*Criteas*," more than 2000 years ago: "At the period, however, with which we are dealing, when Attica was still intact, what are now her mountains were lofty, soil-clad hills; her so-called shingle plains of the present day were full of rich soil, and her mountains were heavily afforested—a fact of which there are still visible traces. There are mountains in Attica which can now keep nothing but bees, but which were clothed, not so very long ago, with fine trees producing timber suitable for roofing the largest building; the roofs hewn from this timber are still in existence. There were also many lofty cultivated trees, while the country produced boundless pasture for cattle. The annual supply of rainfall was not lost, as it is at present, through being allowed to flow

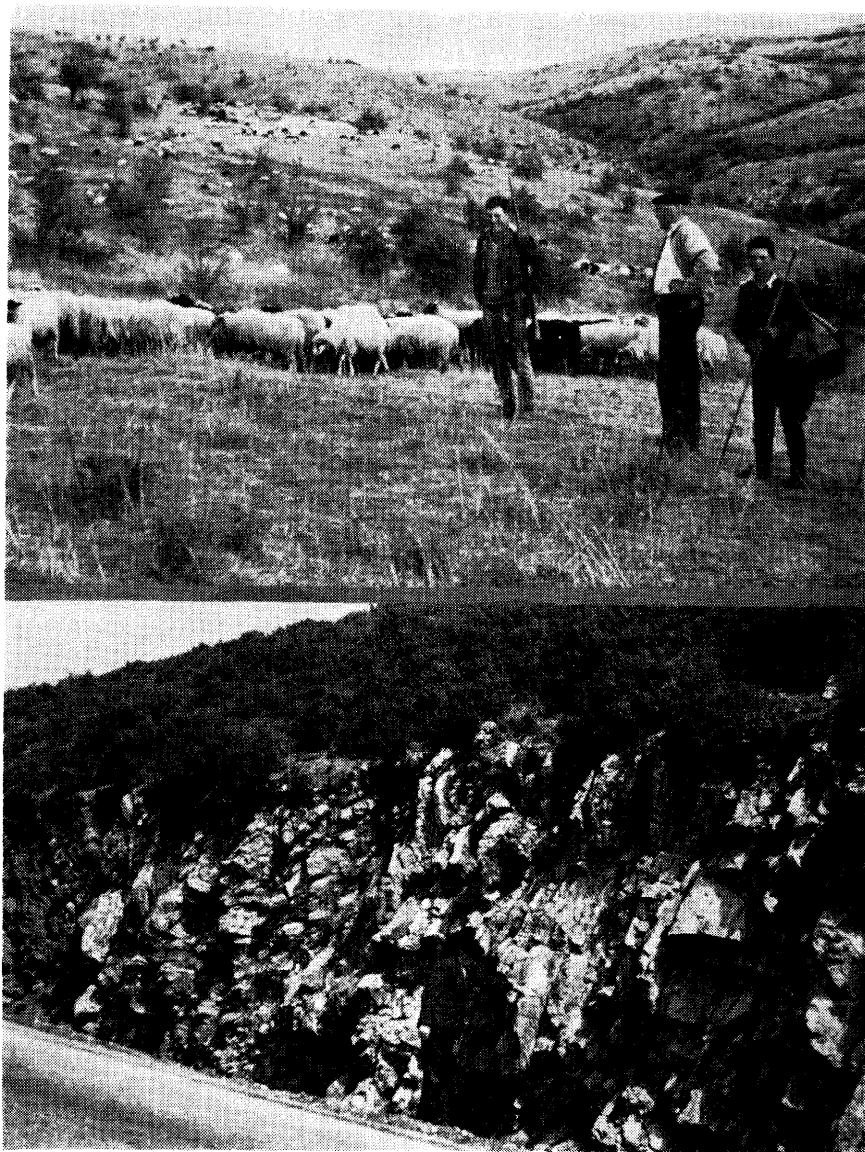


FIGURE 2. *Top*—Typical of grasslands of northern Greece grazed by sheep and cattle. *Bottom*—Woodland pasture of dense scrub-oak best utilized by goats. Deep fractured rocky soils of this sort are well suited to growth of shrubs.

over the denuded surface into the sea, but was received by the country, in all its abundance, into her bosom where she stored it in her impervious potter's earth, and so was able to discharge the drainage of the heights into hollows in the form of springs and rivers with an abundant volume and a wide territorial distribution. The shrines that survive to the present day on the sites of extinct water supplies are evidence for the correctness of my present hypothesis."

It is interesting that Greece is still an important country in bee culture. It ranks fourth among all countries in honey production, and probably the best honey in the world comes from this area. Most of the good honey producing aromatic plants such as lavender, the salvias, etc., are worthless as forage plants for livestock. It is conceivable, therefore, that a conflict could arise in some areas between management for honey production and improvement of ranges for livestock production.

### Future Development of Range Management

Range development in Greece is closely related to the whole economy of the country, and particularly that of the mountains. More intensive agriculture in the plains and valleys, industry, and tourism, will do much to give the people more employment and to relieve pressure on the range and forest lands which are rather low in potential production.

Aside from these developments, other advancements in range management will come through teaching and research. Greece is moving forward in these two areas. The Aristotelion University in Thessaloniki is taking steps to establish a chair of range management in the school of agriculture and forestry. Animal husbandry and livestock problems are taught in the university both at Thessaloniki and Athens, and a closer cooperation between foresters and agriculturists is being established.

In research, a new branch of the experiment station was established in Thessaloniki during 1963, with Dr. Liacos, director. The first range research at this station is being directed toward the ecology and economic importance of the native forage plants and weeds, with special attention to the browse species, both native and introduced. Once the ecology of the species is known, control tests can be conducted to evaluate grazing management as a range improvement method. At the same time, attention can be given to various methods of weed control, reseeding, and other cultural treatments to improve the ranges.

An important contribution in range management would be the development of ways and means to bring about rather strict livestock control and the initiation of grazing systems to improve

the ranges. This will involve grazing each range type with the kind of livestock best suited to the particular kind of forage, controlling the number of livestock and their distribution for proper intensity of utilization, and grazing at the seasons best suited for the forage and soil. Most of this development must take place through foresters, trained in range management, working with the village people who own and manage the livestock.

The American Farm School in Thessaloniki, under the directorship of Bruce M. Lansdale, is doing excellent work for the village people. The school, with headquarters at 36 East 61st Street, New York, is endowed by private funds. Its enrollment includes 200 in its four-year course and over 1000 in short courses. The students are brought in from villages all over Greece, usually two or three from a village, to learn all about modern methods of farming, improved pastures, soil conservation, range management, livestock and poultry production, farm machinery operation and maintenance, and many other subjects. Most of the boys go back to the villages from which they came.

In conclusion, the future of range management in Greece appears largely dependent upon two things: first, the general economic development of the country as a whole, which is being brought about by intensive agriculture on the fertile plains, and by industry and tourism; and second, the development of good range management practices, as achieved by teaching, research, demonstration and extension programs in the university, and conservation programs sponsored by the government. The government already has a definite program of action in the mountainous areas, which is briefly outlined as follows:

- (a) Recognition of the village as the unit of development.
- (b) Program of public works.
- (c) Controlled grazing.
- (d) Improved utilization of mountain pastures.
- (e) Increased production of stored fodder for use during winter.
- (f) Change in composition of livestock output.
- (g) Improvement of livestock composition.
- (h) Home Economics studies.
- (i) State assistance for technical training.

#### Acknowledgments

Thanks and appreciation are due several people who helped make the academic year in Greece both pleasant and, I think, successful. Professor Dr. Christos Mouloupoulos of the Aristotelion University took the initiative in inviting me to come there to teach the course; he and others of the School of Agriculture and Forestry were very helpful and added to the pleasure of our year at the University. Special thanks are due the President (Rector) of the University, John N. Koroneos, who served during the academic year 1961-62. We shall always remember the banquet that he gave for members of the School of Agriculture and Forestry and their wives, in our honor. Also, we shall remember the banquet given by the foresters in the short course, and we continue to enjoy the gifts given us by each group.

My thanks and appreciation go also to Mr. Nikolaos Metaxas, then Director General of Forests of the Ministry of Agriculture, for his gracious help and kindness, especially in assigning Dr. Liacos as my assistant in teaching and on field trips. Most of all, I want to thank Dr. Liacos, who had most to do with my success on the Fulbright project. He had previously been at the University of California for three years, as a research scholar in range management, having earned the Ph.D. in torrents control in France. Finally, I want to thank Mr. Daryl Dayton who was in charge of the Fulbright program in Greece when I first considered going there, and who is now Cultural Attache in the U.S. Embassy in Athens.