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LEBANON—THE MOUNTAIN AND ITS TERRACES*

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LEBANON proper consists of “The Mountain,” and only “The Mountain.”† Neither the coast nor the interior has ever been fully Lebanese in character, nor, historically, has their possession ever been quite assured to the Lebanese people. “The Mountain”—Mt. Lebanon—has height, coolness, a heavy rainfall, abundant springs, fertile land, and forests, all of them rarities in the Middle East. It has become, therefore, a region of choice and attraction. It has been, too, a region of refuge and survival. In its rugged heights and inaccessible valleys neither Arab (to use the word in the narrower sense) nor Turk was ever fully master. Islamic orthodoxy never triumphed. The Christian peoples of pre-Islamic days, notably the Maronites, survived, and to them were joined, through the centuries, other Christians, turning their backs on the Moslem interior and hoping for a future on the westward-looking slopes of Mt. Lebanon. Here too Islamic heterodoxies flourished or survived tenaciously, and today the southernmost block of the mountain is predominantly Shiite, while immediately to the north are the Druse villages. Here in the mountains the hardy peasants of these minority groups could count on a livelihood and on their independence. But the livelihood was limited by the narrow bounds and scanty soil of the mountain; and for centuries the pressure of population on the land has been felt. The re-

* The writer is indebted to Mr. M. Tabet for his help in the preparation of this article. Thanks are also due to those who have provided photographs, as acknowledged in the captions.
† The Republic of Lebanon is usually called, in English, “Lebanon” (Arabic, Lubnān). The French “Le Liban” is sometimes taken over and appears as “The Lebanon.” The essential Lebanon is the range of mountains that rises out of the sea and parallels the coast. The range is called variously “Mt. Lebanon” or the “Mountains of Lebanon” (Arabic, Jebel Lubnān). Locally, “The Mountain,” “the mountains,” or “the hills” are used in referring to the range, but “The Mountain” has a rather special connotation that carries with it something of the pride the mountain people feel for their homeland.

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response has been, of course, emigration when possible, and intensive use of the soil. It has been necessary to use land that in other countries would have been neglected because of its steepness or paucity of soil, and the Lebanese peasant has countered both by building terraces.2

Terracing is an absolute necessity on the seaward side of the mountains, where slopes are steep and rainfall heavy.3 Beirut's mean annual rainfall is about 36 inches, whereas as much as 60 inches falls in the high mountains, more than two-thirds of it in the four winter months. Violent rainstorms, in which several inches of rain may fall in a few hours, are characteristic of these months.

NATURE OF THE TERRACES

Although there are several types of terrace, there is no fundamental difference between them. The principle is almost always to replace a slope by steps with horizontal “treads” of soil and vertical or near-vertical “risers” in the form of retaining walls. The walls are made of stone excavated in the process of making the terraces, or quarried in the immediate vicinity. The amount of work necessary, and its cost, depends on slope, rock type, abundance or paucity of soil (it may have to be carried from one place to another in baskets), nature of the vegetation, and type of terrace under construction. The diagrams (Fig. 2) show how the work varies with the terrain. The broader the terrace, the higher is the rise to the next terrace,

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3 On the lower flanks of the eastern side of the mountains there are considerable areas with gentler slopes and lighter rainfall. Vineyards around Zahle, for example, are not necessarily terraced.
FIG. 2—Types of terracing. A, terracing of moderate slope, soil bed one or two meters deep. B, terracing of steep slope; extension of terrace outward to retaining wall preferable to extensive excavation. C, terracing with buried retaining walls (experimental).
and the stronger must be the retaining wall. The steeper the slope, the
greater is the cost of terracing. With a slope of one in four the walls must
be twice as high as with a slope of one in eight, and with slopes of this order
the construction of broad terraces becomes very expensive. Limestones,
which underlie most of the agricultural land of the mountain, often produce
heavy, clayey soils, difficult to handle. Where sandstones predominate, the
soil may be lighter, but the stones broken and turned up in the process of
terrace construction tend to be small, friable, and unfit for masonry; stronger
rock for the walls must be quarried elsewhere, thus greatly increasing the
costs. At the other extreme, in some areas loose stones and fragments of
bedrock are produced so abundantly that their disposal becomes a problem,
and walls as much as eight feet thick are built between the terraces. Such
walls can be buried under about two feet of soil, so that the space is not lost
to the farmer.

The building of these retaining walls is an important and skilled craft.
The majority are “dry stone,” without mortar or cement. Most of the older,
narrower terraces on low-grade land are divided by crude, low walls of
rough stone (Fig. 4). From this type to the high, thick, elaborate walls of
cut stone used above or below roads (Fig. 11) there are many gradations.

In some areas terraces are constructed differently, notably in the moun-
tains east of Sidon, where soft white marls of the Upper Cretaceous and
Eocene are dominant. Here soil and rock merge, and terraces can be cut
or graded fairly easily. The “treads” are not necessarily quite horizontal,
and are divided by sloping earth banks, sometimes roughly revetted. Terraces
broaden out or narrow to nothing as the terrain dictates, reminiscent of the
strip linchets of the English chalk downs (Fig. 3).

TERRACES IN ECONOMIC LIFE

The economic history of Lebanon is written in its mountain landscapes.
At first sight the land-use pattern seems paradoxical, for blocks of carefully
laid out terraces contrast with large areas of rough, neglected land. Why is
there so much land of this latter type? In the first place, great stands of cedar,
pine, oak, and mixed forest were cut down hundreds or thousands of years
ago, and the land has lain bare ever since. Other land may once have been
worth cultivating, but in one of the many periods of disorder, economic
recession, and neglect that have marked the history of the country it reverted
to rough grazing and has never been reclaimed; some formerly cultivated

4 L. Dubertret: Carte géologique de la Syrie et du Liban, i:1,000,000, 2nd edit., Délegation Géné-
rale de France au Levant, Section Géologique, Beirut, 1943.
Fig. 3—Terracing in marl near Sidon.

Fig. 4—Typical rough terraces for wheat or barley, near Shemlan. (Photograph by Miss A. N. Renton.)

Fig. 5—Terraces for a new orchard, near Bhannes.
land is unprofitable under present-day conditions. Large areas are state or communal property, and here centuries of woodcutting and goat grazing have done their work; and other lands are the property of old-fashioned absentee landlords, content to draw rents and uninterested in improvements.

Other great areas are devoted to wheat or barley. These crops are taken from the same land year after year, or are rotated with fallow, vetch, or lentils. Much of the land given over to grain cultivation is poor, and the terraces are old, narrow, and ramshackle (Fig. 4). This type of land use reflects the needs of a peasant society primarily concerned with the production of its own basic foodstuffs. The peasants could, of course, buy Syrian or other imported grain, and much of the land they sow with wheat is better suited to fruit trees, which would pay more in the long run. Despite these facts, grain cultivation plays an important part in the economy of the three mountain provinces. Wheat and barley occupy a total of 54,978 hectares in the three provinces of North Lebanon, Mount Lebanon, and South Lebanon (41,791 hectares in wheat; 13,187 hectares in barley); in the country as a whole the two grains occupy 92,270 hectares (68,803 hectares in wheat; 23,467 hectares in barley). The total area under grain crops represents about a quarter of the cultivated land of the country.

Why is there this concentration on bread grains? First, it fits into the established pattern of peasant self-sufficiency. Second, outside sources are not cheap enough or secure enough to displace the home-grown product. Bread in Beirut is now ten times more expensive than in 1938, and such a rise in prices has encouraged home production and prevented the peasant from depending on imported grain. The peasant producer has little or no rent to pay, and no labor costs; he usually provides his own seeds and uses his own animals and wooden plow. If he is to buy wheat instead of growing it, he must sell something, and this is not always easy. To enter the market offered by the cities or the export trade in apples and other fruits is a difficult and expensive business that only a man of some little means can afford. The peasant may not be able to incur the heavy capital cost of reterracing his land, buying good fruit stock, and waiting four, six, or eight years for his first returns. In spite of these difficulties, however, a good deal of such development is taking place. The most conservative farmers from this point of view are large landowners in some of the more backward parts of the country, particularly in the south, who handle their lands in the traditional way.

These are some of the reasons for the continued emphasis on wheat pro-

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duction. Its culture has, however, decreased, and many hillsides are lined today with disintegrating, uncultivated terraces where wheat once grew. This is marginal land, the desertion of which began in the nineteenth century with the breakdown of the feudal system and the beginning of the movement to the towns and abroad. World War I hastened the process; during the famine of 1916–1918 many villages were partly or wholly deserted, and much land went out of cultivation.

Nowadays young men, especially Maronites and other Christians, many of whom are educated, are unwilling to work on the land. They prefer jobs in the towns, and failing that many of them would rather live with their families, unemployed and aimless. So, too, the women of the more sophisticated villages no longer work long hours in the fields. A great part of the income of the Lebanese villages is currently derived from sources other than farming—from earnings in the towns, for example, or emigrants’ remittances, or the renting of houses to visitors in the mountain summer resorts. Moderately well-off families now hire labor for at least some of their farming operations. Thus it has come about that unpaid labor has to some extent given way to paid labor, and this in turn helps to drive marginal land out of cultivation. In the old days the low-grade wheat terraces were maintained by the work of the owner’s family; now they are not worth the cost of labor because of the low yields of the unscientifically cropped, tired land—20–30 kilograms per dunum (200–300 pounds per acre) is an average yield. The use of chemical fertilizers and similar methods of increasing the yield is highly restricted, but with their adoption yields might be doubled and wheat farming made more profitable. For the moment, many owners prefer to make a small sum effortlessly by letting the land for grazing or renting it to the brushwood cutters who supply the village ovens and potteries. They think it better still, where possible, to develop the land by building on it or by growing fruit.

As terraces bearing wheat have decreased in number, so, but more dramatically, have those bearing mulberry trees. A century ago silk production was an important industry, and the mulberry provided the country’s chief cash crop. Now, owing to foreign competition, and to the increased use of artificial silks, only scattered trees and derelict spinning mills remain. There are still small areas of well-tended groves and a few mills, but the industry is unimportant.

**Expanding Orchards—A New Development**

Fruit production, on the other hand, is increasing. In 1947–1948 the three mountain provinces had 49,445 hectares in fruit trees, exclusive of bananas
Fig. 6 (left)—A steep wooded hillside, partly terraced, near Serahmoul.

Fig. 7 (below)—A terraced hillside and melting snow, near Bcharre. Meltwater is absorbed by the level ground of the terraces, and runoff is reduced to a minimum.
Fig. 8 (above)—A terraced hillside below the palace of Beit el Dine. Mixed cultivation, with wheat, olives, vines, fruit, and vegetables. (Photograph by V. L. Menage.)

Fig. 9 (right)—Terraced vineyards amid rocky, uncultivated land, near Aley.
and citrus, grown only on the coastal plain. The figure for the whole country was 53,425 hectares, or more than half the area in wheat and barley. Two-thirds of the area growing fruit is devoted to grapes and olives, neither of which needs irrigation. Vineyards are everywhere, though phylloxera has led to uprooting in the southern mountains and in the Beka'a. The production of wine from foreign rootstocks is concentrated around Zahle and Chhtaura, on the lower eastern slopes of the Lebanon. Terraced groves of olive trees, often old and beautiful, form a characteristic element in the landscape (Fig. 10). The two areas of greatest concentration are on the coastal plain south of Beirut and on the lowest slopes of the mountains behind Tripoli, but olives are found all over the seaward slopes at moderate elevations. The crop is vital, for olive oil is essential in the Lebanese diet.

The current increase in fruit production is not, however, due to any great expansion in the acreage under these traditional crops. Since 1920, and especially in the last few years, carefully made broad terraces at levels higher than most of the olive groves are becoming more and more common, and in this development is written the latest trend in the economic history of the country. The potentialities of the Lebanon for fruit production are now being realized. With an Eastern Mediterranean climate and slopes that rise abruptly from the coast to 10,000-foot peaks a few miles inland, there is little that cannot be grown, from dates and bananas at sea level to apples, pears, plums, and cherries above 2000 feet. These deciduous fruits need a relatively cool climate and some summer irrigation, and very few areas of the Middle East outside Lebanon can provide these advantages. Terraced land is well suited to fruit trees: the dry-stone walls give good drainage, and since the trees are spaced vertically as well as horizontally, about 25 per cent more can be planted than on flat land. Production has been hindered by high costs and lack of adequate transport, packing, and sales facilities. But these are being overcome under the stimulus of the growing urban and export markets; the production of apples for export, for example, has grown from a negligible quantity ten years ago to half a million cases in 1951.

This new development is concentrated particularly on the well-watered slopes above the port and market of Beirut. There is a good road network, for the majority of the country's summer-resort villages are found here, and a not inconsiderable part of Lebanon's wartime and postwar trading profits has gone into the area. The orchards and terraced gardens of new villas stand out from their surroundings because of their regularity, the freshness of the newly cut stone, and the elaborate care with which the terraces are built (Figs. 5 and 13). Well-shaped masonry is used, provision is made for
irrigation and drainage, steps are built from terrace to terrace, and the whole property is usually walled and fenced. Such developments are expensive, for water, as well as land, must be made available. It may be necessary to dig for it, to pipe it from a spring or stream some distance away, or to collect winter runoff in a cistern above the plot of terraced land (Fig. 13). These cisterns are almost as characteristic of the fruit-growing areas as the terraced orchards themselves. Deciduous-fruit growing is concentrated between 2000 and 5000 feet, and land provided with irrigation water near a main road at these elevations is worth £1,400 to £1,500 per dunum (the Lebanese pound is equivalent to 28 cents U.S., a dunum to about a quarter acre). Terracing costs as much again; contracts for terracing, fencing, and planting run to as much as £1,500 per dunum. Forty to fifty trees are planted per dunum, each one costing the owner as much as £175 before he gets a return from it.

The development of this new type of fruit farming reflects the economic and social changes which are taking place in Lebanon. The old landowning families are losing their pre-eminence, and a new middle class is coming to the fore. The new orchards are owned by city entrepreneurs and villagers of moderate means. With their dependence on capital investment, modern techniques, transport facilities, and urban and foreign markets, they are in strong contrast to the extensive agriculture organized on a semifeudal basis by the old-fashioned big landowners of some of the more backward regions.

High capital costs represent one of the chief obstacles that the fruit growers must surmount if their products are to compete at home and abroad. Can these costs be reduced—by new terracing techniques, for example? They probably can in limited areas, especially where slopes are moderate and there is a soft subsoil rock. Experiments were made on such terrain in 1951 with powerful tractors which pull single plows that go three feet deep, loosening the soil and bringing the large stones to the surface. Subsequent terracing was facilitated. Experiments are also being made with buried terrace walls that may be made crudely and cheaply. The diagram (Fig. 2.C) shows the principle: the wall prevents the tendency of the soil to slip and erode, if the earth slope between terraces does not exceed a critical angle. (It is suggested that slopes up to 45° may be used.) Plowing, of course, is along the contour. Trees may be grown on the earth banks as well as on the terraces. The terraces are broader than those of traditional construction, and tractors can be used in their construction.6

The terraced hillsides of Lebanon demonstrate how water and soil can

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6 The writer is indebted to Mr. M. Tabet and to Mr. R. A. Abdunnur for the information contained in this paragraph.
Fig. 10—A beautiful and characteristic feature of the landscape—terraced olive grove, near Beit el Dine.

Fig. 11—Modern dry-stone wall of cut stones, at roadside near Shemlan.
Fig. 12—Terracing in area of mixed cultivation and pine copses, near Antoura. (Photograph by A. Johnson.)

Fig. 13—New terraces for fruit, flowers, and vegetables, Shemlan. (Photograph by A. Roussel.)
be conserved even on the steepest slopes, and offer impressive testimony to
the efficiency of the farmer, working without the aid of government and
without the intervention of planning or supervisory agencies. The farmer's
most effective work is done at levels below 5000 feet. Above this there are
great areas of rough land, much of which would probably best be taken in
hand by the government and reforested. Most of it is too remote for orchard
development, and fruit trees would be broken by the heavy snowfall of most
years. At the medium and lower elevations, however, in Lebanon and other
Mediterranean countries, it seems probable that the individual farmer is
the best guardian of his country's most precious resources. A well-terraced
limestone hillside is as effective in conserving soil and water as a forested
one; it gives a return within a half-dozen years of its creation, and the
owner of the soil and its products will be his own most conscientious steward.
One should bear in mind here the long-term nature of forestry as an invest-
ment, and the need for fencing and patrolling a block of state-owned land.

The free-range goat is a menace, and it is pitiful to see vast areas of
land, ruined by erosion in the past, now of use only to goats. But as the
private landowner with his terraces, trees, and fences moves in, the goat
must move on. There is little sense in banning the goat unless there is some-
thing better to put in its place, and at the moment the best weapon against
the goat and against erosion is the continued stimulus of favorable economic
conditions that will enable the farmer and the entrepreneur profitably to
extend their operations.

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7 See, for example, "The Proceedings of a Conference on Land Use in a Mediterranean Environ-