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CRETE: ITS SCENERY AND NATURAL FEATURES

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Read at the Meeting of the Society, 12 May 1919.

DURING the latter part of the last century and the beginning of this, the amazing discoveries, at Knossos and elsewhere in Crete, fill so large a place that it is probably no exaggeration to say that for most people Crete is Knossos and Knossos is Crete. And this is as it should be; for, once you have found the cradle of Western art, it is as right as it is inevitable that the shrine should dominate its setting. And nothing is more certain than this—that the names of those who have done this work will go down through the days to come, lit by the light thrown by their labours, patience, and knowledge on all that wonderful story written for any to read, chapter by chapter, as this or that discovery was made.

By about the middle of the last century various investigators had made researches into both physical and archaic questions in Crete. We need not go back as far as Strabo, but in 1745 Pococke, in his 'Description of the East,' gave many interesting facts. Robert Pashley, in 1834, determined or confirmed the sites of Aptera, Lappo, Eleutherma, Præsos and other ancient settlements, and was the first of the moderns to visit the cave of Zeus on Iuktàs. In 1837 he published his 'Travels in Crete.' In 1865 Captain (afterwards Admiral) T. A. B. Spratt, though not a trained investigator, paid much attention to ancient sites while engaged upon his marine survey; and though some of his conclusions have been challenged, his book 'Travels and Researches in Crete' still retains considerable interest. Victor Raulin in 1869 produced his 'Description physique de l'île de Crète,' which will always remain a delightful, informing, and indeed a classic work.

But to pass from these to more recent days we are met by several familiar names of those who have done distinguished antiquarian work in Crete. Besides that of Sir Arthur Evans, which is identified with Knossos, these names include among others those of D. G. Hogarth, J. L. Myres, R. C. Bosanquet, and H. Boyd (Mrs. Hawes), and the record of their work may be studied in the *Annual of the British School at Athens*, and the *Journal of Hellenic Studies*. There, for instance, we shall read of

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discovery after discovery at Knossos, of the exploration of Palaikastro, Zachro, Gournia and the cave of Zeus on Dicte, while in the publications of the Italian Mission are recorded the results of work at Phæstos and Hagia Triada.

The present paper is by one who went twice to Crete as a naturalist, and even were he qualified to speak upon Cretan antiquities (and to this, he regrets to say, he can make no claim), they form no part of our subject to-night ; all that this paper, aided by photographs, sets out to do is to leave with those to whom it is read as clear an impression as may be of the scenery and natural features of Crete, and to show that, even if there were no Knossos, no Phæstos, no Dictæan Cave, Crete would still be entitled to be regarded as one of the most beautiful as well as one of the most remarkable islands of which we know.

The coasts of Crete present an extremely rugged outline. Since the main axis of the mountains which run from east to west is not centrally placed, but is much closer to the southern than to the northern shore, long plains may slope down to the sea on the northern side, as for example those behind Khania and Heraklion (Candia). This coast is marked by three very prominent peninsulas, the largest of which, distinguished as *The Peninsula*, τὸ ἀκρωτήριον, forms the northern walls of Suda Bay, that remarkable inlet, now, since the outbreak of war, so well known to the ships of our Navy, which is one of the largest, safest and most easily entered of all the Mediterranean harbours. According to ancient myth, the Sirens, after their defeat in music and song by the Muses, lost their wings, threw themselves into the sea, to rise again as three white islands. These whitish rocky islets still guard the mouth of Suda Bay. One of them has the remains of its Venetian fortifications. Just inside these rocks the water sinks in a depression to the depth of 122 fathoms (730 feet).

The two other "akroteria," or peninsulas, are on the north-west corner—that of Grabusa (or Grambusa) and that of Spatha, or Rhodopus. Rhodopus is of course the old Rhodope, while Grabusa takes its name from an island crowned with Venetian fortifications. This, with Suda and with Spinalonga on the Gulf of Mirabella, was the last stronghold left to Venice before she was finally expelled by the Turks. The whole length of the western coast of Crete, from Grabusa Point to Cape St. John, is closed in by a towering breastwork of limestone rock, here and there with masses of gypsum, behind which lies the warmer schistose formation, with its tilled lands, of Kisamos, Khanià and Sèlino. This gives to the district about the Bay of Sèlino a far more comfortable and attractive appearance than is possessed by any other point on that coast. Sèlino has a good wide beach, cornfields border it, and there are masses of olive trees ; at Stomion is a large grove of chestnuts, no doubt planted by the Venetians, for this is not a Cretan tree. At Elapho-nisi (the "Isle of Laphonis") copper is worked. There are, then, no harbours on this

western coast of Crete, and we may say at once that, neglecting roadsteads, there are no harbours in Crete for large ships, excepting Suda Bay and Poro by Spinalonga. So suddenly on the southern coast do the mountains fall, that the 100-fathom line is never far from the coast, and in places almost touches it.

On rounding the south-west corner of the island and passing the shores of the Eparchia of Sèlino one comes suddenly upon the very wildest part of the Cretan coast. It is a district of crags, ravines and caves; and in various places are evidences of raised beaches and shore-lines, sometimes as high as 100 feet above the present level. The village of Sphakià lies between cliffs of beautifully folded rock at the foot of precipices over 2000 feet high. It is interesting as being the seat of many of the risings against Turkish rule associated with dreadful massacre. Its athletic inhabitants, the Sphakiots, have ever been the great patriots as well as the most ruthless revolutionaries of Crete.

One day as we arrived off Sphakià, the skipper of our little trading-boat called me to the bridge and, pointing down into the sea, said, "Good water." At that time my acquaintance with modern Greek was so poor that I was unable to ask for an explanation. He seemed disappointed at my want of interest, and repeated over and over again with much emphasis, "Good, *good* water!" At a later date, when walking with a young civil guard along the shore, this man pointed out to sea in the same direction, and told me that there was a fresh-water spring in the sea, and that fishermen would take up a bucketful to boil for their tea. I believe it is a fact that such springs exist in places off the coasts of South America, Australia, and elsewhere.

If on the whole of the western and southern coasts there is no harbour for vessels of large size, and though the southern harbours and roadsteads are at the mercy of St. Paul's wind Euroclydon, which falls on them from the mountains like a hammer, two of them, Lutro (St. Paul's "Phœnice") and Kaloi Limniones (St. Paul's "Fair Havens"), are of supreme interest because of their association. The much-vexed question of what St. Paul meant by describing Phœnice harbour as lying "towards the south-west and the north-west" is, I venture to think, sufficiently explained by the fact that there are two bays, one on either side of the point, though the western one is rocky and is only possible for small boats in quiet weather. The remains of Phœnix, or Phœnice, are still to be seen on the promontory. The Fair Havens, locally called "Kaloi Limenes," are screened by rocks and islands against all but south-easterly winds. The south-east headland ends in a sheer cliff of limestone with a large cave at its base inhabited by hundreds of Blue Rock pigeons. There are two sandy beaches, and on the north-east rises a black basalt island rock; here the water is nearly 50 feet deep. Of other places connected with St. Paul's voyage, the site of the city of Lasea is a little further to the east, while the island of Claudia, now called Gavdos, lies 26 miles due south of

Sphakià, and is the seat of a copper-working. Referring to the sea between Crete and Gavdos, Spratt remarks on a chasm nearly 1000 fathoms deep ; and says further that soundings showed a depth of 1950 fathoms, or nearly 12,000 feet, at a distance of 15 miles from the south-west extreme of Crete. " Thus, as the White Mountains at this end of the island are 8000 feet high, there is a submarine valley under, or rather off it, that is about 4000 feet deeper below the surface of the sea than either the White Mountains or Mount Ida above it. We therefore have a difference of level between the bottom of the sea and the top of the White Mountains of nearly 20,000 feet in a distance of 25 miles." This is the mountain we should see were the adjacent sea to be drained.

Crete is essentially a mountain country. The mountains are connected and continuous almost without exception throughout the whole length of the island. At one place only, namely, from Heirapatras to the Gulf of Mirabella, is it possible to go from one sea to the other through an open valley ; by every other route one must travel either along precipitous mountain-ridges or, as we shall presently see, by way of deep ravines. The three principal groupings of this mountain system are those of the White Mountains towards the west, the Ida group in the centre, and that of Dicte to the east. The highest point in the first is Mount Theódoro, over 6800 feet high, Mount Dicte is over 7000 feet, while in the Ida section the *massif* of Mount Ida rises to over 8000 feet in height. Snow lies thickly upon these heights during the greater part of the year ; probably there is no month in the year when snow does not lie in the northern drifts.

The name "White Mountains" does not necessarily imply snow, for the jagged line of these limestone mountains always shows very white with the sun upon it, as seen from the northern plain or from the sea. The general character of the formation of the Cretan mountains presents points of extreme interest. Owing to the sudden exposures of their steep sides by the agencies of frost and water, by the silting deposits of mountain torrents, by the vertical section of ravine, by the character of the vegetation that marks without fail this or that formation, he must be blind indeed who, in any given mountain district, does not observe the rocks around him. He could not, for example, possibly pass over the micaceous schists, or even the shales, when his whole path glitters before him. Schistose masses and shales, though they usually are found at the lower altitudes, and on the northern side chiefly form the foothills, may yet be observed as high at least as 3000 feet, and on the southern slopes of the mountains are as a rule found very high up, though in a few places on this side they descend to the sea, as, for instance, just west of the Fair Havens, and in Kisamos and Sèlino they nearly span the island from one sea to the other. Lake Kurnàs, the only lake in Crete, lies partly in this and partly in the next formation. A considerable area in the island, that occupied by the valleys—Messarà, Apokōrona, and others—

MOUNT IUKTAS: THE TOMB OF ZEUS

Phot. by M. Diamantopoulos

PORTO LUTRO: ST. PAUL'S PHOENICE

consist of marine tertiary deposits, as evidenced by their fossils, Pecten, oysters, and others. The southern promontory, by the Gulf of Messarà, may be said to be an epitome of the geology of the island. Here the ancient sites of Phæstos and Metallon lie in the marine beds, Lasea in the schists, the point of the promontory is limestone, while immediately to the west of Lasea, on the sea forming one side of the harbour, is a patch of igneous rock. There are extrusions of igneous rocks at various points in the island, but never over very large areas. On the southern side of Ida, below the Plain of Nida, is a mass of serpentine.

In the case of an island such as Crete, which has presumably never been forest-planted by man, it is extremely interesting to observe how the indigenous vegetable growth exactly follows the geology; so that it is no exaggeration to say that the botanist may, even at a distance, pretty accurately judge of the character of the formation from the nature of the vegetation. Thus in the limestone of the White Mountains the only tree which has any noticeable range is the cypress (*Cupressus sempervirens*, v. *horizontalis*). Some of these trees grow to an immense size. In the gorge of Samarià is such an ancient group, considered sacred. The ilex (*Quercus Ilex*) forests again are largely confined to the schists, as in the district round Kritsa, and the pine to the schists and shales and gravels.

These, which Spratt calls the "red gravels," I always considered as offering one of the interesting problems in Crete; a heterogeneous accumulation of unstratified earthy gravel, rounded stones and boulders, they are piled up above the marls, reaching sometimes to at least as high, by guess-work, as 1000 feet. They at once brought to my memory those great moraine drifts and deposits one has seen in Spitsbergen and elsewhere, and left no doubt in my own mind that they were glacial in origin. This view was confirmed by the discovery of what appeared to me to be undoubtedly ice-scratched stones. But this formation deserves, if it has not since received it, careful examination at the hands of the expert geologist. To my mind they were, with one exception, the most interesting of the problems presented by the geological formation of Crete; only exceeded, if indeed exceeded, in interest by those fresh-water deposits here and there from which Spratt collected his fresh-water shells. These, taken in conjunction with corresponding deposits in other parts of the Mediterranean coasts, are held to point, as is well known, to a great fresh-water basin over the whole or a great part of what we call the Mediterranean Sea. Mention should also be made of recent marine deposits, many foraminifera from which were kindly worked out for me by Mr. Joseph Wright, of Dublin.

The distribution of these forests, with remarks on the flora and natural history generally, may be found summed up in the appendices to a book on Crete written by myself a few years ago ('Camping in Crete.' Witherby & Co., 1909).

Before we leave the mountains we must notice Crete's well-known

mountain-plains. There are several of these in the island ; but the largest and best known are those of Homalo, Nida, and Lasithi. Homalo (or Homalos) lies in the White Mountains at an altitude of some 4000 feet. It is roughly triangular, with an approach in each of its three angles. The plain is cultivated, and there are a few low-built houses upon it, besides one of greater pretensions belonging to a Greek gentleman. Almost the only species of tree growing upon it are a hawthorn (*Cratægus*) and the wild pear. The western exit from this plain is by the precipitous gorge of Rumèli, or Samarià, which shall be later described. At the eastern corner of the plain is a large cave, in which the Cragmartin and the Alpine swift, besides many Blue Rock pigeons, nest ; and the cave forms the entrance to one of those extraordinary passages or drains in the limestone rock known as "katavothra." As each mountain-plain has one of these, and since there are various others in the island, this may be the proper place in which to describe one, taking that of Homalo as a type. "It is a large vaulted cavern, on the right hand as we descend, about 150 feet long, but 10 or 15 feet below the general level of the plain, and terminating in an aperture that descends spirally and nearly perpendicularly into the bowels of the mountains, and then by hidden channels finds an exit through them to one of the lowland rivulets" (Spratt). Very often no doubt, as Spratt says here, a katavothron may have its exit in an open stream far down the hills. This may be, for instance, the source of such a surprising river as the Platanos, which comes welling out of the rock at Mesklà, a full-formed river, like Athene from the head of Zeus ; but they may only find their exit near the sea, or even perhaps out in the sea itself. In some instances the opening into a katavothron may lie actually in the open plain, at the lowest point of its floor (there is one such on The Akrotiri), and thus serve as an exit for the drainage generally : but in the case of Homalo, Nida, or Lasithi it is not so ; that of Homalo is separated from the plain by a ridge of higher ground, and thus only serves for the overflow of the high-flooded water of the melting snow. The supply of water below that level—water from melting snow or from rain—finds its way down by soakage through the ground. And this may act very quickly ; in March the plain may be a welter of mud and water, in April may be turned up dry by the little ploughs for crops. The mountain-plains of Homalo and Lasithi are cultivated ; that of Nida is of fine grasses, so closely cropped by goats that the plain resembles a gigantic cricket-ground. The katavothra both of Nida and Lasithi (3000 feet) are considerably higher than the level of their respective plains. The cavern of Nida is the celebrated Kamàres cave, the first in Crete to be explored ; its explorer was Dr. Halbherr. Unfortunately in a paper such as this we must not stop to do more than refer to the famous cave on Dicte, for long claimed as the birthplace of Zeus. In this cave, as is well known, Sir Arthur Evans made his celebrated discovery of the libation table.

Quite apart from their connection with Minoan worship, the caves of

Crete have a great interest for the palæontologist. In 1893 Signor Simonetti discovered remains of a large elephant and of a small deer. Ten years later an accomplished naturalist, Miss Dorothea Bate, spent several months in cave exploration, making many interesting discoveries ; for instance, those of a small hippopotamus first referred to by Spratt's expedition, and forming, with corresponding instances in Malta and elsewhere and with shell-remains in fresh-water beds of Crete, one of the evidences of the Mediterranean, or a large part of it, having in remote ages been a fresh-water lake. Those who would wish to read a connected account of Cretan caves I should like to refer to Miss Bate's admirable chapter kindly contributed to 'Camping in Crete,' the book to which I just now referred.

We have been drawn into the digression on caves by consideration of the plains of Homalo. There has been much speculation as to the origin of these mountain-plains. It has been suggested that they are craters ; it has been held that they are lacustrine. The arguments for and against these theories may be found considered elsewhere. The first view is not supported by evidence ; and although, as will be seen, the appearance of one of these plains strongly suggests the bed of a lake, there are facts against the lacustrine theory. It is, for instance, difficult to say why it should ever have held water if it does not do so now. My own view is this—that Homalo at any rate is the creation of water, frost, and wind, the *débris* from denudation filling up a chasm, floods and wind—for wind is the great leveller—doing the rest. This is not to deny that some of the mountain plains may be lacustrine. Katharo, 1000 feet above Lasithi, as Miss Bate points out, may once have been a lake ; teeth of hippopotami were found there.

The subject of these great natural drains is in itself so fascinating that it is disappointing that we have been able to do no more than briefly touch upon them here ; but allied to it is another physical feature that cannot be passed over, even in this hurried outline. At three points on the northern coasts, viz. in the Bay of Retimo, the Bay of Candia (Heraklion) and in that of Mirabella, there is to be found a remarkable pool called an Halmyros. As the name implies, these springs are slightly saline—the water is brackish. Let us visit the Halmyros of Malevizi, not far from Suda Bay ; one may go in a boat from Candia. As one approaches one nears the mouth of a river so strong that, at a little distance out at sea, the sea-water is only brackish, and the surface of the sea is troubled. Then the water becomes rough and broken over a bar, and the current is so powerful that oars are dropped and the boat has to be towed. The channel narrows and grows deep, shoals of little red-scaled fish appear, sinuous snakes swim in the water, water-tortoises take headers from the reedy banks and are seen crawling on the floor of the stream, perhaps 15 feet below, among ribbons of green weed. Yet the whole river is short, certainly not more than one mile.

long, and probably not so much, and soon one comes upon a line of flour-mills where the water rushes through a dam of Venetian masonry with foam and roar. On the other side in the walls of rock lies the pool of the Halmiros. In shape it is nearly circular, and is perhaps 50 yards across. The water is absolutely clear, and in the middle is of great depth. On the surface, as I have seen it, it is a cold Antwerp blue, but in the depths bluish-green, which becomes lighter just where the bottom is lost to view; here it seems to be illumined by light from below—a reflection no doubt of the rocky floor of the pool. The clearness, the colour, the sunlit depths, the waving weed, and the constant strings of rising bubbles make one feel exactly as if looking into a gigantic aquarium. The fish one sees in it must have rather a restless time; for in the centre of the pool the springs rise so strongly that the surface appears to be slightly convex. The force and volume of the water that comes ceaselessly from the springs is indeed surprising; it swirls through the hatches

Hypothetical Section showing origin of Halmiros

like a river running at flood. It is difficult to imagine a more beautiful phenomenon than a Halmiros. Above the pool is a small superficial stream which disappears in the ground to enter the pool on a level with its surface; but of course this is not the source of the great deep springs.

Now from where does this water come? When we look at the map we cannot help being struck by the similarity in position of the three Halmyroi of Crete, which are all on the northern shore. It will be seen that each is in the south-western corner of a gulf or bay, and that each lies north-east of one of the great massifs of the rocky backbone of the island; that of the Eparchia of Apokorona is related to Theodoro and the White Mountains, that of Malevizi to Psiloriti (Ida), that of Mirabella to Dicte and the Lasithi range. Each of these massifs has its mountain-plain, each plain has at least one katavothron or "chthonos," and from each the general dip of the strata is slightly towards a little to the east of north. Does it not then seem probable that there is a close connection between the two, and that a Halmiros is neither more nor less than the water-exit from one or more of these great mountain chains? It is evident

that if the water of snow or rain, imprisoned in the strata, can find no exit, it must continue to follow down until it meets with a fault in the rock which enables it to escape, and this may not even be until it is far below the surface of the sea. The cause of the salinity of these springs is not known, whether it is derived from percolation through salt rock, or whether from penetration by the sea.

While we are on the subject of these powerful springs I may refer to a remarkable pool which I have not myself visited, which is thus described by Spratt: "On the east side of the cove called the Mandragio of St. Nikolo is a small circular pool of brackish water about 150 yards in diameter. It is separated from the sea by about 20 yards of low ground only, and yet this pool was proved to have a depth of 210 feet in the centre—a depth not attained in the adjacent sea within 2 or 3 miles of the coast." Miss Bate describes the water as beautifully phosphorescent. She writes: "There were a great number of fish in it which darted about as if made of fire." This is very interesting; although so-called "phosphorescence" is familiar among marine protozoa, mollusca, cephalopoda, crustacea and other marine organisms, I am not aware that any fresh-water forms are phosphorescent; and this pool is not salt but only brackish. It is probably to be regarded as the exit of what was once an underground stream from a swallow-hole or katavothron; and possibly this was also the origin of Lake Kurnàs, the only lake in Crete.

The longer axis of this lake—about a mile long—is from south-west to north-east. The water is fresh, and the lake is fed entirely by springs, for no stream enters and, more strange to say, no stream leaves it. I visited it first at night, and perhaps may be allowed to quote a description written elsewhere. "It was a rough and rather steep descent, and so dark under the fringe of myrtle that I all but stepped into the water before I knew I was there. But on the lake and on the mountainous hill beyond the moon shone brightly, and the mountain was reflected in the lake. The water was quite unruffled—it was like a mirror in the moonlit night. I could not hear a sound of any kind—not a bird, nor an insect nor even a frog; the stillness of the tarn was absolute, as if under an enchanter's hand. When I rejoined the camp I found two new men of Muri there. They talked for a long time and told us things about the lake. They did not go home again, but slept where we slept on the stony hillside. They said that every five years, with perfect regularity, the lake overflowed and its waters flowed down into the sea. I think this would mean a rise of over 15 feet. When this happened great eels were carried off and left lying about the lands. They had taken a boat and had failed to find the bottom with a 45-metre line. The next morning the charm of the shadowed and moonlit tarn had given place to another that was frankly beautiful. Here and there its surface was just flecked by the lightest of breezes, elsewhere it reflected faithfully the mountain masses that rose straight from it on its western and southern sides. Its northern and eastern

sides were clothed with a dense mass of myrtle. The water was clear as crystal, and at the south-western corner, where the springs that feed the lake came welling up with great swirls of displacement, it was like green glass, and seemed to be of a profound depth. Lake Kurnàs is altogether a most beautiful and interesting thing."

In the Cretan mountains are many gorges, but two, the ravine of Askiphu and the ravine of Rumèli (or of Samarià), are remarkable. They are different in character though probably the same in origin. The head of the gorge of Askiphu is over 2000 feet above the sea. It is entered by quite a gradual slope which is continued until the sea is reached. The passage takes about two hours at a horse's walking pace. The walls rise straight on either hand to perhaps 2000 feet in height, and the ravine is so narrow (for in places you can almost, if not quite, touch the walls to right and left) that the light is dim. It is dry and is very winding ; you can seldom see far in front of you, but are constantly faced by vertical buttresses of rock round which the track winds. The gorge of Rumèli is very different. It is entered at Rumèli, a station of the Civil Guard. It has a stream running through it, and gradually rises for about 6 miles until it is closed by a precipice, at the top of which is the plain of Homalo. To the right and left of the actual entry to the plain are points in the mountain respectively determined at 6721 feet and 7610 feet in height.

We will enter the gorge from its foot. The sun is low, too low to find its way into this abysmal ravine, so that we move as in a cold grey dawn ; only the swirl and sound of the hurrying river give a sense of life to the place. Yet there is colour—colour in the red of the broken rock masses, in the cold clear emerald of the weedless pools, in the dark sap-green of the sombre cypresses. Not one lateral cutting opens into the gorge on the western side throughout its entire length, nor on the eastern side until we come to Samarià, at which point a secondary gorge branches off to the north-east leading up to the top of the White Mountains. The great body of the mountain through which the gorge has been cut is of limestone, but here and there are masses of conglomerate ; this rock is here like concrete and has the same water-resisting power. The limestone is smoothed down, is grooved as by a chisel above the conglomerate and below it, but this natural concrete stands out in great shelves, to all appearance unaffected by the agencies one sees at work. At one point is a narrow passage only 10 feet wide. Here the traveller has to move up actually in the middle of the stream, and without help the horses would be swept away. From Samarià we are accompanied by two kids of the wild goats, who follow an old tame nanny-goat, their foster mother. They often dance away and chase one another over the rocks. Their agility is amazing ; they never run on the level but always over the biggest blocks of rock they can find. Then night falls, and for some time all is pitchy-dark. Gradually in the depths of the chasm there is a

curious sense of light; the moon is rising somewhere out of sight, shining on the mountains all those thousand feet above our heads. It cannot light the bottom of this great mountain rift, so it is still dark with us, but the darkness begins to feel luminous, as it were. By-and-by the cold white moon comes sailing along the line of the gorge, but always a little to one side of it, so that we are almost always in shadow while much of the other side is bright. It is an enchanting time. The silence is broken only by the old goat's bell, by hoofs and tread of feet, and by our shepherd calling "Ela, èla" to the kids; and those wonderful little creatures go and come the while; out of the shadows and across the moonlight they follow one another as untiringly as at the first. At last we come to an abrupt mountain-face, a vertical wall of rock, and up this zig-zags a narrow track—the Xyloskalo. The wall is so steep that when we look down we cannot see horses or men as they follow up the next length of track below us. We began our journey from Sphakià at 4.30 yesterday morning by a sheer climb of 2000 feet up to the plain of Anopolis; we descended the difficult gorge of Aradena; we made a second rather trying descent down a long talus mountain slope, and all this before we even entered the great ravine of which we have been speaking. Ever since that early hour we have been travelling continuously, excepting for a short halt or two for food. To find oneself confronted by the stupendous height of the Xyloskalo at the end of a sixteen-hour journey is rather an exacting experience. However, the climb is finished at last, and close upon an hour after midnight we are on the plain of Homalo and are able to sleep on beds of "phascomelia," as the Cretans call a beautiful scented shrub (*Phlomis pomifera*).

I should like here to call attention to the interesting fact of ripple-marks on the side of Mount Siderota (the "Mountain of Iron") in the Eparchia of Amàri. The rock here is hard stone, ringing under the ponies' feet, and these ripple-marks were presumably made in shallow water some 1000 feet below.

Those who look carefully at the photograph of Mount Iuktàs, the burial-place of Zeus, will notice its remarkable form. Whether the ancients were led by the form of this mountain to ascribe to it the honour of being the resting-place of the Father of Gods and Men, we do not know, but certain it is that the human mind cannot conceive of a more sublime monumental sepulchre. Rocks and mountains often bear a likeness to human lineaments; every traveller can recall many such resemblances, but none that I have seen has the convincing dignity of the face on Iuktàs. The bearded face and the drapery and pillow occupy the whole of the mountain-top. Seen in the flatness of the midday light it is an interesting outline and no more, but at turn of the sun the sculpturing begins, and the chisel is the sun;—a high light here, a deepening shadow there, till with closed eyes the head sinks, as it were, upon its pillow just as the sun is low. The face of Zeus on Iuktàs, seen from the sea at close

of day, is infinite in the pathos of power wearied, infinite in the dignity of peace.

As Crete is a land essentially of mountains, so also is it essentially a land of springs, and springs are turned to good account for the purposes of husbandry. In a humid land like ours we do not know what can be done with water in the cultivation of rocky mountain-sides. In Crete, as in the terraced heights of farther Eastern lands, water is brought cunningly from level to level to irrigate the little patches of growing crops. By and through villages it is led in channels along the tops of walls, and, in such a glen as that of Psychro, by an ingenious contrivance it turns the horizontal wheels of many mills.

The mountain Cretans are fine athletic men. I do not know in any country better-built men than those of the Civil Guard, or any body of men that look more attractive than they in their long sheepskin boots and picturesque native uniform. In the cold weather the shepherds wear a black wool sheepskin coat, except on Ida, where the coat is white. I always found them and their Italian officers very kindly and courteous and ready to help. Perhaps I cannot say quite as much for the "Agro-fulaki," or Field-Guardians, but I have known some pleasant men even among them.

The dress of the male Cretan is singularly picturesque; it consists of black Turkish trousers, sash, blue waistcoat, with the back and front embroidered and kept open to show the prettily worked cotton shirt with its white sleeves, a blue jacket worn over one shoulder, and a black handkerchief, or, in the case of the Turks, a red one, wound round the head. The long sheepskin boots seem strange in a hot country, but, as Raulin points out, they are probably needed against the thorns; for a large number of spiny plants grow in Crete. Many of these grow in the shape of a close-rounded cushion; such are a Spurge, *Euphorbia acanthothamnus*, and a spiny Rest-harrow, *Ononis diacantha*; another is *Poterium spinosum*, which, from time immemorial, the women have used as a filter in their water-pitchers.

Husbandry, as one would expect, is in a primitive condition, yet on the whole is well suited to the character of a mountain country. On the large plain of Messara, where fields are wide and flat, a breed of large oxen is used; but in the hilly and mountain districts a cow, a donkey and perhaps a woman together pull the plough. The wooden plough is simple and portable, so light that it can be loaded on one donkey and taken up the mountain. Where the corn is thick enough it is cut with a sickle; but on many an upland terrace it is too thin for this, and there each stalk of corn must be separately plucked by the fingers. Then the harvest is taken to the threshing-floor—a circular piece of ground with a sun-baked surface. Here cows are simply turned in to tread it out, or a wooden sleigh is used. On the underside of this sleigh is a series of projecting flint teeth, and a man or woman stands or sits upon the sleigh, which is drawn by cows, two

THE RUMELI GORGE

Phot. by M. Diamantopoulos

GORGE OF RUMELI FROM HOMALO

Phot. by M. Diamantopoulos

or three abreast, round and round and across the threshing-floor till the teeth and the pressure have rubbed out the grain. The winnowing takes some time ; for it consists in throwing up the grain into the air with a wooden shovel until at last the chaff is all blown away. This may sound primitive to us now, but it was not so very long ago, for I remember it well, when English farmers did the same. Where there is no stream for water grinding is done by windmills. These are a characteristic feature of Crete. One may see near together twenty or thirty of these little windmills. The common implement for digging is an adze-shaped hoe like those used by the African natives.

The Cretans tend their vines carefully ; in the best vineyards they understand the use of sulphur-dusting. The wines of Crete were always celebrated—"Malmsey" of course was a Cretan wine. One finds the best wines in the monasteries. Although a considerable quantity of raisins come from Crete, I suppose the greatest export trade is done in olive oil. Many of the olive trees are of immense age, and their hollows afforded for some time a hiding-place for the Christians from the Turks ; but when their enemies came to know of this they systematically searched the hollow trees, butchering every Christian they found concealed. We have spoken of the mountain-fields. It is amazing to think of the "ant-work" that has built up these fields, of the intense labour compelled by the conditions. Nowhere else in the Ægean may perhaps be seen such extreme examples of mountain-husbandry. Up the face of a mountain, sometimes to the summit of comparatively low altitudes (for the vine flourishes up to 3000 feet), tier upon tier of terracing rises. Most of the terraces which thus cling to the mountain-side are but a few paces wide, some but a few feet—little more than ledges fashioned from the rocky steep, filled with stony earth and curtained by a wall. Think of the earth that may have to be taken up there on donkeys ; of the water carried up or led there from a mountain spring ; of hoe, sickle, seed-sack, plough—every implement borne wearily up those heights. In the sweat of his brow indeed does the Cretan make his bread.

In one or two of the valleys near the sea one sees a large breed of fat-tailed sheep, but the ordinary sheep is very small ; it is white, black or parti-coloured, the rams with small horns ; often they have the pendent ears of Eastern breeds. During the summer many of the flocks are pastured on the high mountains, but on the approach of winter are brought down to the lower ground. The goats, by nature browsers and not grass-eaters, pick up a scanty living off bushes, but in such situations as the lofty sides of Ida the sheep feed to a great extent on the leaves of the plant we know in our gardens as "Glory-of-the-Snow" (*Chionodoxa*). The shepherds live with their flocks on the mountains, sleeping in a stone-built hovel in one corner of the sheep-yard "mandri" or in one of the little huts seen in the photograph of Ida shepherds. They are very deft with the crook, and the lads use slings and are extremely expert with them. It is surprising

to find the dog used only as guard or companion, the place of the sheep-dog being often filled by a boy or a girl, who darts with great agility over the rocks to head the sheep. The shepherds are fond of dancing and of playing on a stringed instrument called a "lyra," and make quite pretty music on a little mouth-organ (but without reeds) which they fashion out of wood.

The Cretans are clever workers in iron and the metals. A great deal of silk was formerly spun and woven, but, though the mulberry trees of the silkworm are still there, the industry has now greatly fallen away. A picturesque but coarse pottery has been made in certain villages from very ancient times. Cloth is still dyed the ancient "murex" blue, but I am not sure how far this celebrated mollusc now contributes to that colour. A fascinating operation is the moulding and baking of those immense wine and oil jars which date back at least to the Minoan age, as all will know who have seen photographs of Knossos. In the neighbourhood, for instance, of Thrapsano one may see these being made, not in a large pottery but just by the side of the road, each jar being separately baked in a brushwood fire.

Although it may not strictly belong to geography, may I close this paper with a few words about the animals and plants of Crete? Forms of life in deep-sea islands—lands long separated from the mainland—must always have a great interest for the naturalist, because as a survival from archaic conditions they may be highly specialized. Crete with its deep and ancient seas has many such forms. We have already spoken of the remains of the hippopotamus and the elephant as being found in the Pleistocene deposits of Crete. One of the former was of pigmy size, while the smaller of the elephants (*Elephas creticus*) was hardly more than 3 feet high. With these have gone a deer (*Anoglochis cretensis*), though the deer survived until 2000 B.C., since its horns and bones have been found in the shrine of the Snake Goddess in Knossos and in the Dictæan cave.

But among these remains are those of certain animals existing in Crete at the present day. One of these is the so-called Cretan "ibex," though this is not an ibex but a true wild goat. As is well known, a wild goat called *Capra hircus Ægagrus* is found in Asia Minor and in Persia; and this animal is represented in Crete and in the Cyclades Islands by a small distinct form weighing about 70 lbs., known as *Capra hircus creticus*. We have seen that remains of this goat have been found in the caves, and it is also represented on the seals and gems of Minoan art. The kids who accompanied us up the gorge of Rumèli were of this species. These "Agrimia," as they are called, inhabit the inaccessible heights of the White Mountains and Ida. Among other animals found in the fossil state and still represented among living forms are a shrew (*Crocidura canea*) and the spiny mouse, *Acomys minöus*, which forms a link with Africa. The badger, the marten, the hare, even the field-mouse, have, so to say, Cretan

peculiarities and are small in size. We have no time to notice the birds, though the list is a long one, for they range from the majestic Lämmergeier vulture, which, as one reaches the top of Ida, sails low overhead, so close that its red eye is easily noticeable, to the tiny wren. They will be found described in the book before mentioned. The capercailzie appears once to have inhabited Crete, for Pierre Belon, writing in 1555, describes a bird "larger than a capon," often seen in the high woods; it must have been this. He also tells of a white wild sheep (now unknown).

The distribution of forest trees in a mountain country is always an interesting one. Not only is the distribution of vegetation connected with the geological conditions, it also varies with altitude in a strikingly definite manner. On the sea-level and up to 500 feet we find the common lentisk (*Pistachia Lentiscus*) and the large-seeded juniper (*Juniperus macrocarpus*), and by the streams tamarisk (*Tamarix parvifolia*), oleander (*Nerium oleander*), a willow (*Salix fragilis*), myrtle, arbutus (*A. unedo*), and a scented shrub allied to the Verbena called by the long name of *Vitex Agnus-castus*. This plant affords a striking instance of protective resemblance. Its seed-vessels are grouped in masses thickly down the stalk. There is a little snail which almost exactly resembles one of these seed-capsules, and the snails have the habit of grouping themselves in colonies around the stalk of the plant in such a way that even the eye of the sharpest bird might easily be deceived. Just as we were breaking up our bivouac one morning, I was hastily rubbing off some seeds when I found I had a handful of snails. I showed the deception to my very intelligent camp-lad, who would not believe it, insisting they were seeds; but when convinced, he used to amuse himself going round the bushes trying to detect which were seeds and which were snails. The quince, of course, takes its name of Cydonia from the ancient town and Eparchia of that name now known as Khanià.

Characteristic trees of the 500 to 2000 feet region of hills and plateaux are the terebinth (*Pistachia Terebinthus*) and the plane (*Platanus orientalis*). There is probably a plane peculiar to Crete: certainly the plane scrub by the Platanos River has leaves more glossy and of a thicker substance than those of either of the planes we have in our gardens. It is to be hoped that some future visitor may follow up this hint; if there in winter he may yet discover the evergreen plane mentioned by Pliny. In the higher wooded region over 4000 feet we find the cypress (*Cupressus sempervirens*), the ilex (*Quercus Ilex*), and the maple (*Acer creticum*). Above 6000 feet we meet only with the common juniper (*Juniperus Oxycedrus*) and a barberry (*Berberis cretica*), and at 8000 feet with the lovely little pink-flowered plum (*Prunus prostrata*), which creeps closely over the rocks. The maple presents us with an extremely interesting example of development of protective defence; for, where much browsed by goats, the bushes of the maple scrub often send up but one growing and flowering stem bearing the palmate leaf and the pink-winged seed-

cases characteristic of this tree; but this stem ascends through and surmounts a dense surrounding impenetrable growth of hard and twisted branches bearing aborted leaves, yet this growth is carried up far beyond the reach of any browsing sheep or goat. In other words, the browsing of goats, added no doubt to the cold and force of the mountain winds, has gradually induced a permanent change in the constitution of the plant, almost indeed, as far as function is concerned, amounting to a dimorphic condition; the dense small-leaved, undeveloped, impenetrable bush encircling and acting as a guard to the single flower-bearing shoot that rises from its centre. Nor is this all, for correlated with this is a still more striking modification. The maple is not a thorny tree, yet, upon many axial and lateral shoots, in place of the terminal pair of leaves, a thorn projects. These points are well calculated to pierce the palate of any animal who should close its mouth upon them. You will agree with me that we have here an extremely interesting instance of modification by environment.

The list of flowering plants is a long one, including somewhere about 1500 species. The names of those who have studied these in Crete itself include those of Pierre Belon, 1548; Onorio Belli, 1594, who described 47 species; Joseph Pitton de Tournefort, 1700, 306 species; our own countryman, John Sibthorp, 1806 (see the 'Flora Græca' edited by J. E. Smith); J. Lindley, who continued this splendid work; Franz Wilhelm Sieber, 1823, 500 species; Victor Raulin, 1869, 750 species; and Thomas von Heldreich, 1869, 1300 species. In 1904 de Halacsy published his 'Conspectus Floræ Græcæ,' which includes the plants of Crete. Many of these plants are beautiful, many most interesting because, like the animals, they are specialized local forms. These range from *Cistus creticus* of the coast, from whose gum laudanum was obtained by brushing the leaves with whips, to a tiny Forget-me-not (*Myosotis idæa*), one of the only four plants seen on Ida's summit.

"The scenery and natural features of Crete." We have kept strictly and with difficulty to our text. Many will in the future go to Crete, not as naturalists, not as experts in ancient sites, but drawn there by what we may call the sheer romance of its mythology. These, human nature being what it is, will not be easily turned from the path of old beliefs; they will concern themselves less with the snake-goddess than with the later culture of Zeus. For them the Bull will land with Europa where the great plane grows by the stream of Kamarites, that finds its way into the little entry now called Stomion; for them, when Rhea on Dicte bears the infant Zeus, standing in deadly fear of his father Chronos (for Time the Devourer passes nothing by), she will carry off her babe to hide him at the foot of Ida, in the cave on Nida Plain. For them shall Zeus be buried on Iuktàs, the mountain which still takes on the likeness of his features when the evening sun is low. Finally, for them the Minotaur

and the Labyrinth will remain the real Minotaur and the real Labyrinth of childhood days, in spite, alas ! of proven facts and even of Sir Arthur Evans ! And some may well go for scenery alone, and for a certain indescribable charm the island has. As one who has travelled and stayed in many lands, I can say, without going beyond the literal truth, that I do not know any place that can charm one more when one is there, or for so long after one has left can hold one more strongly under the spell of memory, than this most beautiful island of Crete.

Note on transliteration.

Place-names are so variously spelt and pronounced in Crete (*e.g.* 'Ελεούθερναι, 'Ελεούθερνα or 'Ελευθέρνα) that I have usually followed the first spelling as given in a most useful book, "Στατιστική τοῦ πληθυσμοῦ τῆς κρήτης," by N. Stavraki (Athens, 1890).

Before the paper the PRESIDENT said : Mr. Trevor-Battye, who is to address us to-night, is a very well-known traveller, naturalist, and author. We have been accustomed lately to interest ourselves in Crete from the point of view of the marvellous discoveries which have been made there by Sir Arthur Evans and others, but to-night we are to have a description of Crete from the purely picturesque point of view, by Mr. Trevor-Battye, who of all men is perhaps best able to give us an account of Crete from that point of view.

Mr. Trevor-Battye then read the paper printed above, and a discussion followed.

After the paper the PRESIDENT said : We have a distinguished visitor here to-night in the person of Sir Arthur Evans. I will ask him to address the meeting.

Sir ARTHUR EVANS : I am very glad to meet my friend, Mr. Trevor-Battye, again and to hear his very interesting and romantic account of the island, which appeals, perhaps, almost more to those personally acquainted with its scenery than even to those who do not know it. I feel that it is a very good thing that you should have this account from Mr. Trevor-Battye, because of all the travellers who have been through Crete in recent times, and there are a good many altogether, none, I think, have done the country more thoroughly, shrinking from no hardships and with the determination to see things through, than Mr. Trevor-Battye. And though he has not said it, he himself has made very important and interesting contributions to the natural history of the island. He only mentioned one—the shrew. I know there was a great deal more. I remember the interest he took in what I might call at the time the pet of our excavations at Knossos, which happened to be a squeaking beetle.

We have heard a great deal of the interior geography of Crete illustrated in a most beautiful manner. I would only ask you just for a few moments to look at Crete as it stands, as it has always stood, as Homer saw it and as we see it to-day, as the great central island of the Eastern Mediterranean, and there you will find its whole history, and a good deal even of the history of our continent, contained in a nutshell. Crete is a half-way house between the three continents. It stands, as you know, in one direction within hail of Greece. On clear days from the heights about Knossos the peak of Melos is distinctly visible. On the other side, Karpathos and Rhodes are stepping-stones to the shores of Asia Minor. But what is in some ways more interesting, it is also within easy range

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