

The Volcanic Destruction of Minoan Crete

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IN the long history of Minoan civilization two great catastrophes are discernible, of which the famous Cretan palaces themselves provide the chief source of our knowledge. Everywhere the catastrophes are seen to be contemporaneous. We can distinguish a period of the first palaces (MM) and a subsequent period of the second palaces (LM). There is no perceptible break in the development of the civilization as a result of these catastrophes. For this reason, the theories that the palaces were overthrown by invaders from abroad aroused opposition from the first. Usually the Achaeans—and even the Hyksos—were suggested as the destroyers.¹ By this theory, however, it was not possible to explain two facts: the decorative arts continue on their way undisturbed, and the second palaces are built at once on the ruins of the first and are still unfortified. The Cretans would not have been so foolish as gratuitously to provide easy loot for fresh invaders.

After the great earthquake of 26 June 1926, which did such damage to the Candia Museum, Sir Arthur Evans put forward a new theory, suggesting that the catastrophes were caused by earthquakes, and this is much nearer to the truth.² There can be no doubt that at Knossos, lying in the district of Crete which is most susceptible to earthquakes, the destruction of the palace on many occasions was due to them. The attempts made in recent years to tabulate the occurrences of earthquakes show us that in every hundred years the Herakleion district experiences at least two severe, destructive ones.

When, however, we attempt to explain the various catastrophes throughout the island by common earthquakes, the problem begins to present difficulties. The other parts of Crete are less susceptible³; many districts, indeed, are almost wholly immune. Moreover, earthquakes are usually confined to a very small area. So far, even in the

¹ Edouard Meyer, *Geschichte des Altertums*, 22, 1, pp. 43-4.

² *Palace of Minos*, II, 313 ff.

³ *op. cit.* II, 319.

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Herakleion district which suffers so much, each earthquake has, as a rule, destroyed only a few villages and the surrounding districts have been little affected. It is, therefore, worth our while to examine in detail the two great catastrophes which befell the Cretan palaces.

Three palaces are already known—at Knossos, Phaistos and Malia. It is very probable that we may discover one, perhaps two, more. At the eastern end of the Mesara, under the shadow of Mount Dikte, where the rich cave of Arkalokhori was excavated a few years ago, we can confidently expect the discovery of a new palace.⁴ In the eastern districts of Crete, Mirabello and Siteia, a brilliant school of art with distinct local characteristics flourished from the beginning to the end of Minoan times. It is probably there where we must look for the home of the magnificent 'marine style'.

Until, however, new excavations give us fresh light, we must base our conclusions on the three palaces already known. Recent discoveries have shown that at Malia, as at Knossos and Phaistos, we have two periods of palace construction. It is not yet absolutely certain when the first palace at Malia was destroyed, and though the beginning of MM II is suggested⁵ as the date, M. Chapouthier now believes (as he kindly tells me in a letter) that it took place in the MM IIIa period. The two other palaces—at Knossos and Phaistos—were destroyed during the splendid 'first acme' of Cretan art, the 'Kamares style' period. According to Sir Arthur Evans a simultaneous 'seismic' catastrophe befell Knossos and Phaistos during MM IIb, about 1750 B.C.⁶

If, meanwhile, we look at the great store-jars which were buried in the store-rooms of the two earlier palaces, great doubts arise in our minds. Was the destruction of Phaistos absolutely coincident with that of Knossos? This would be essential if one and the same earthquake were supposed to cause both. The store-jars at Phaistos are, as a rule, smaller and more archaic-looking than the corresponding Knossos

⁴ For Arkalokhori see the preliminary reports in *Arch. Anzeiger*, 1934, 251 ff, and 1935, 248 ff.

⁵ *Mallia* (the correct orthography is Malia), II me. Rapport (*Études Crétoises*, IV), p. 50.

⁶ *Palace of Minos*, II, 319 and cf. I, 258, 299, 315-16. Pernier (*Festós*, pp. 452-3), like N. Åberg, dates the destruction at the end of the Middle Minoan Period, *i.e.*, about 1700 B.C., but it is noteworthy that Pernier seems not to distinguish the two separate catastrophes at Knossos, that of MM IIb and that of MM IIIb. We conclude from his passage on page 453 that he considers that the new palace at Phaistos was built during the advanced MM III period.

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examples. The 'knobbed' store-jars are more squat and have fat, swollen bodies. They seem earlier when contrasted with the developed, tall appearance of those at Knossos.⁷ It seems, therefore, as if the destruction of the Phaistos palace took place during MM II, but before that of the Knossos palace. In any case, it appears certain that the first palaces on the Cretan sites were not destroyed simultaneously. The palace at Knossos cannot have been destroyed by anything but an earthquake, but, in the case of the other two sites, we cannot exclude the possibility that they were destroyed through violence by enemies, who in fact sacked both. The destroyers cannot have come from abroad. It was clearly the dynasty of Knossos which must have imposed its power by violence. The Knossos palace is rebuilt on more grandiose lines than the two others, with wide spaces and great vistas. Its huge store-rooms and other riches, the progress of its complicated, bureaucratic system of writing and, in general, the great prosperity of the Minoan city with its magnificent buildings surrounding the palace, show clearly that here was the centre of power. Knossos had no rich and fertile territory round about, such as the Mesara plain which surrounded Phaistos. It is, therefore, clear that the vast store-rooms of the Knossos palace received the tribute of all the other districts.

We can, then, say that the political unit, which finally resulted in the famous *pax Minoica*, was realized very early—during Middle Minoan times. We need not picture a despotic and strictly military constitution. The peaceful character of the Minoan civilization, and the fact that the palaces at Malia and Phaistos are rebuilt, prove that the constitution was a loose one, just firm enough to retain the whole island under one chief ruler. The peaceful and enterprising people of Minoan Crete—mainly merchants and sea traders—soon saw the advantages of a controlling power which made it possible for them to devote themselves with carefree confidence to their own sea enterprises. We find wholly analogous conditions in Mesopotamia which had one chief ruler, Lugal, and other lesser rulers, the so-called Patesi, each of whom was subservient to Lugal but wielded a certain amount of independent power.

All the Cretan palaces were rebuilt during MM III. Those of Phaistos and Malia lasted until the end of LM I, when they were destroyed. In the earthquake-suffering district of Knossos we have an intermediate catastrophe about the end of MM III but the palace was immediately rebuilt. It is obvious that we must attribute to this

⁷ Cf. the figures in *Palace of Minos*, 1, 232 fig. 174-5.

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event the rich painting of the walls of this palace with frescoes, a means of decoration which was introduced at that time. In the other palaces we have no frescoes of this period.

The fresh catastrophe of LM I was fatal and general throughout the whole of Crete. It seems certain that it was the most terrible of all which occurred on the island. The palace of Knossos had, as we have seen, just been rebuilt and it may in consequence have suffered less than the others. It is, in any case, the only one that was repaired and continued in use into the succeeding period of the 'Palace style' (LM II). The other two palaces were destroyed, but that is not all. The same tragedy befell all the so-called mansions, such as those at Hagia Triada, Tylissos, Nirou Khani, Sklavokampos, Amnisos and Apodoulu—to mention only those already excavated. Whole cities, too, were destroyed. Gournia and the town of Knossos are typical examples but there were also Palaikastro, Pseira and Zakro. Even sacred caves fell in, like the one at Arkalokhori.

Here we must interpolate a few words about the ceramic styles of this time, in order to make it clearer that this great catastrophe was everywhere simultaneous. The LM I period is divided into two parts—the so-called 'floral style' period (LM Ia) and the 'marine style' period (LM Ib). It is generally thought that these two periods succeeded one another, but that is not quite true. Perhaps it is not true at all, for, in the frescoes from which the potter drew inspiration, the floral style is contemporary with the marine style. We have, moreover, vases painted in the marine style, such as the jar with dolphins from Pachyammos, in MM III, and furthermore the antecedents of both styles, both plant motives and marine motives, are already to be found at the height of the Kamares style in MM II.⁸

It is apparent, therefore, that in the vase-painting of both periods the floral and marine styles exist side by side, at least in their general lines, and are contemporaneous. Thus in the different ruined centres we have mentioned the greater number of examples (and the

⁸ For the jar from Pachyammos, *P. of M.*, 1, 608, fig. 447. Vases of the Kamares style decorated with floral motives are very common, especially from Phaestos: Pernier, *Festós I*, pls. XVI, XX, XXI–II, etc. Marine motives, too, are common enough. Fish are already found on MM I vases from East Crete (*P. of M.*, 1, 182, fig. 131). For an octopus on a vase from the cave at Kamares, *op. cit.* 1, 246, fig. 186 (f). Seashells in combination with rockwork are known, e.g. *Festós I*, pl. xxx. Cf. the well known flying fish and sea creatures in faience from the Temple Repositories at Knossos, *P. of M.*, 1, 520, fig. 379 and the gold goblet from the shaft graves at Mycenae, Karo, *Schachtgräber von Mykenae*, pl. CII, no. 73, which are works of the MM III period.

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more developed in style) of the marine class are found in East Crete (Palaikastro, Zakro and Pseira)—perhaps because the marine style was at home there. At Amnisos no vases of this type have yet been found but isolated examples occur at Gournia, Malia, Nirou Khani and Tylissos, together with vases of the advanced floral style—these last in great abundance. At Sklavokampos we found, together with vases of the advanced floral style, a jug decorated in the advanced marine style. The clay sealings which were found in the mansion at Sklavokampos are of the same style as those of Zakro and Hagia Triada. We even found—it was the first time such a thing had happened in Crete—a sealing identical with one from Hagia Triada, impressed by the same seal—a gold ring with an ellipsoidal bezel—on which a chariot was represented.⁹

There can, therefore, be little doubt that the great catastrophe overcame the whole of Crete at one and the same time. It has been suggested that Knossos may have destroyed the other centres. This is, however, scarcely plausible, for Knossos itself did not escape. It too was destroyed, together with its harbour town, Amnisos, and the whole surrounding district. Nor can we believe in an invasion from abroad. It is still premature to suggest an assault by Achaeans or any other invaders. If that were the case, we have yet to explain why Knossos, the only place to escape complete ruin, remained unfortified afterwards.

Thus the only remaining explanation of the disaster is one of 'natural causes'. A normal earthquake, however, is wholly insufficient to explain so great a disaster. In all the many earthquakes known to us, there has never been such widespread destruction at one and the same moment. In another district of Greece extremely liable to earthquakes—Corinth—the last destruction of which is still very fresh in one's memory, we find that Old Corinth was destroyed and New Corinth was built six kilometres away. Then the new town was destroyed and the old village remained intact. We know, too, that at the time of the great disaster of Helice, where the population was drowned to a man as a result of a great earthquake, the neighbouring Voura sustained serious damage but no more distant Aigion (40 stades) did not suffer at all.¹⁰

⁹ The mansion at Sklavokampos is still unpublished. For a preliminary report see *Arch. Anzeiger*, 1933, pp. 288 ff. and cf. Karo, *Altökretische Verwaltungskunst* (Eis Μνήμην Σπ. Λάμπρου), pp. 569 f.

¹⁰ Paus. vii, 25, 8. Cf. Senec. Quest. nat. lib. 6, 25.

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We could cite many other examples of the same sort of thing. When, therefore, we remember that Crete is made up of many, very varied, geological deposits and that it is only the soil of the Knossos district which is alluvial and prone to earthquakes, we cannot believe that a simple earthquake could cause so terrible a disaster. It was, therefore, all the more gratifying that the excavations at Amnisos furnished new evidence on the subject and led me to think that the disaster in Crete must be attributed to a tremendous eruption of the volcano on the neighbouring island of Thera.

This eruption is the greatest which can be proved historically. Briefly the story of the volcano on Thera is this. In geological times there were only two bare, rocky islands composed of non-volcanic stone. Their present names are Hagios Elias and Monolithos. Gradually several craters were formed under the surrounding sea and by their continual eruption of volcanic matter a round island was built up, incorporating the two original rock-islands. The volcanoes were dormant for a time, and the whole of the island was covered with vegetation. We know that at that time myrtles, olives and palms were among the flora, and that the island was inhabited. There was, in fact, more than one settlement on it. Then suddenly the sleeping volcano awoke and, after a tremendous paroxysm, the whole of the centre of the island, together with a part of the west coast, was blasted away and sank—in all an area of 83 square kilometres. What remained was Thera, Therasia and Aspronisi. In the centre a great abyss was formed, originally more than 600 metres in depth—the greatest and most imposing caldera in the world.¹¹

Before the final eruption a great quantity of ashes and pumice stone, thrown up by the volcano, covered the island with a layer thirty metres thick—a phenomenon which is typical of all the great explosions of Thera. We know from the Byzantine chronographer Theophanes that during the eruption of A.D. 726, in the reign of Leon Isaurus, pumice stone covered a great area of the sea round about and floated afterwards as far as Asia Minor, Abydos, Salonika and Macedonia. Similarly, during the eruption of 1655, of which we have more than one description, ashes and pumice stone and even the sound of the explosion reached Asia Minor. In Chios they thought that a naval battle was taking place in the neighbourhood between the Venetian and Turkish

¹¹ See the important book by Fouqué, *Santorin et ses éruptions*, Paris 1879. The geological processes of the great eruption are a little modified by Hans Reck, in *Santorin*.

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fleets. During the first mentioned tremendous eruption, which destroyed the island, many houses were buried under the layers of pumice stone. Some of these have been excavated, in particular by Gorceix and Mamet of the French School in Athens. They found vases, implements and pieces of fresco¹²—all belonging to the First Late Minoan period. The vases are of local manufacture but they imitate Cretan prototypes and thus we can safely date the explosion to the last years of LM I, about 1500 B.C.

No historical account survives of this great earthquake, but fortunately we have an excellent means of reconstructing all the phenomena which accompanied the disaster, in the eruption of Krakatau in the Dutch East Indies on 26–27 August 1883. Geologically speaking, both volcanoes belong to the same family, and the phenomena of their eruptions are therefore analogous. The islet of Krakatau is much smaller than Thera and the part of it which was submerged was about a quarter of the other (22.8 sq. km. against 83 in Thera). The account of the events and disasters which accompanied that eruption is truly amazing.¹³ Vast quantities of pumice covered both the island and a great part of the sea round about. A whole island, Calmeyer, was formed in the strait of Soude and a harbour in the neighbouring island of Sumatra, that of Lampong, was so blocked up that for several months sea communication was broken off. A tremendous roar accompanied the explosion and was heard over 2000 miles away—just one twelfth of the earth's circumference. The vibration of the atmosphere set up by this noise broke window-panes and cracked walls at places as much as 100 miles away and even further, and these air waves encircled the earth several times. Such quantities of volcanic ash filled the air that, even at a distance of 100 miles, day was turned into dark night, and these ashes fell as much as 1000 miles away. Very fine particles of ash were thrown 30 miles up into the stratosphere, picked up by the air currents and dispersed over the whole of the earth. This dust was suspended in the air for months and months, and the wonderful colourings of the sunsets in 1883 were ascribed to it. But worst of all was a series of terrific waves which rose after the explosion. They were as much as 90 feet high, and broke with devastating force and

¹² The vases are now in the French School at Athens. They have been published by Renaudin, *B.C.H.*, 1922, XLVI, 113 ff. On the frescoes see Perrot and Chipiez, *Histoire de l'Art*, VI, 538–9 figs. 210–12. The flowers represented upon the stucco fragments are lilies of an already advanced LM I style.

¹³ R. D. M. Verbeek, *Krakatau* (Batavia, 1886) in Dutch and French editions.

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speed against the coasts of Java and Sumatra. Where they struck a plain, they swept inland, and as far as 1000 yards inland they were still 15 yards high. Whole towns, villages and woods were destroyed, and great masses of stones from the sea were hurled far inland. So, too, trains and ships. One of them, the steamer Barouw, was found afterwards beyond the town of Teloek-Betoeng several kilometres inland. This amazing catastrophe cost over 36,000 lives.

The distance between Thera and Crete is only about 62 miles. It is certain, therefore, that the inhabitants of Crete in 1500 B.C. lived through the same moments of terror as did the inhabitants of Java and Sumatra in 1883. If the explosion took place during the day, the day was surely turned into night and much damage was caused by the tremendous vibration of the air. The thunderous roar, too, must have deafened and terrified the Cretans, who had, of course, no means of knowing what was its cause. Then must have come the rain of mud and ashes, some cold, some ablaze and burning. Worst of all, however, were the waves which broke over the island, much higher and more rapid than those at Krakatau. For on the basis of his observations of the phenomena Verbeek has worked out a mathematical table, from which one can see that the speed of such waves is in proportion to the depth of the sea at each point. This is shown in the following table, which is based on observations at three different points on Sumatra, giving their relative distance from Krakatau and the respective depths of the sea.¹⁴

Place	Distance from Krakatau	Depth of sea	Speed of wave per second
Sanganila	64.00 km.	43.9 m.	25.96 m.
Beneawang	110.40 km.	109.5 m.	36.70 m.
Vlakke Hoek	103.00 km.	150.0 m.	41.17 m.

The sea between Thera and Crete is incomparably deeper than in the strait of Sonde. According to the excellent chart¹⁵ of Imray, Laurie, Norie and Wilson, which I have before me, the sea here reaches a depth of 1005 and 1020 fathoms, *i.e.* about 2000 m. Even near the coast the depth is 150 and 400 fathoms at different points off Thera, and 96 and 116 off Crete. At a point exactly 26 miles from Amnisos it is as much as 1100 fathoms deep. (I do not know whether the composition of the sea floor at several points where it is marked 'yellow mud pumice stone' may be ascribed to volcanic matter from Thera).

¹⁴ *op. cit.*, p. 400.

¹⁵ Imray, Laurie, Norie and Wilson (London), no. 149c.

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There is, therefore little doubt that waves caused terrible destruction in Crete at that time. Mathematicians can calculate exactly the speed of the waves on the basis of Verbeek's algebraic tables; but, if we take only the very low speed of 50 m. a second, little more than half an hour sufficed for the inundation of the Cretan coast; and the speed was certainly much greater than that.

All the settlements on the coast soon disappeared—Amnisos, Nirou Khani, Malia, Gournia and Zakro, perhaps too Pseira and other towns. (This depends on the height of the waves). The finds in these centres prove that they were destroyed at one and the same time. At Nirou Khani the inhabitants had no time to take anything away. Huge double axes, the sacred symbols, lay where they had fallen. In one room the excavators found dozens of offering tables stacked one on top of another, as they were stored at the time of the disaster.¹⁶ At Gournia the carpenter's and coppersmith's shops were found intact.

The most instructive excavation, however, was that of Amnisos. One of the buildings there, which lies quite near the sea, gave us the clue to the cause of the great disaster. The deeper levels of it were buried under a great mass of pumice stone and sand. A square pit inside the building near the southeast corner was literally full of pumice stone. We did not at first appreciate the significance of this fact and in my provisional report on the Amnisos excavations I asked whether the pumice stone were as traders' wares, purposely stored in the pit, though Santorin and the eruption came to my mind.¹⁷ Later, however, the real explanation occurred to me. We can, in fact, reconstruct the phases of the disaster. When the waves broke the building was carried away almost to its foundations. Then it lay abandoned and after a time the north breezes brought the pumice stone from the volcano as far as Crete. As this building stands on the shore, it was constantly inundated by the sea and the rooms were thus covered with pumice stone. That this certainly was the case is proved by the fact that the pieces were all small, rounded, and polished like pebbles. Similar pieces—in small quantities—are to be found today on the Greek coasts. They fall into the sea at Thera and are carried everywhere by the waves.

The excavation of the 'Villa of the Frescoes' at Amnisos was equally instructive. Lying as it does a little farther inland and higher

¹⁶ *Αρχαιολογική Έφημερίς*, 1922, p. 1-25.

¹⁷ *Πρακτικά*, 1932, pp. 79 f.

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up the shore, it was not reached by the pumice stone. During the excavation, however, we noticed the unusual way in which the walls and the corners of the rooms had fallen in. Undoubtedly a tremendous natural force had caused this devastation—surely the waves after the eruption. As these waves receded, their strength was so great that they prized huge orthostatic blocks out of position and made the walls bulge outwards.¹⁸ This is on the west side, at right angles to the line of the coast. On the north side, parallel to the waves, where the impact was much greater, two orthostats (or perhaps a single one of great size) are now missing and undoubtedly were carried away by the waves.

A further point proves how theoretical arguments are often insufficient to explain the facts. In the villa at Amnisos where, as so often in Minoan architecture, wood was used to a very great extent, we find that, especially on the north side, where there was a hall in both stories, there were traces of intensive fire. The stone bases of the wooden pillars were much damaged and blackened and rendered very friable. This was a great problem, as I could not reconcile the fire with a terrible inundation caused by the sea. I then found that exactly the same phenomenon was observed at Krakatau. 'At Tjaringin the waves swept away the houses . . . between seven and nine o'clock. The waves overturned the houses on the coast and the ruins were set on fire by the little lamps. The fire was repeated three times'.¹⁹ We can, then, suppose that by the time the waves from Thera reached Crete it was night, or the day had been transformed into night and the inhabitants had lit the lamps—exactly as happened in the case of Krakatau.

To complete the picture of terror and dismay we must mention a few more characteristic phenomena at Krakatau. As all these were perceptible as far away as 100 and 150 km., we may justifiably suppose that similar conditions prevailed in Crete—to an even greater degree. The atmosphere in Krakatau at that time was electrified so that lightning struck people, and buildings such as lighthouses. A terrible gale sprang up with a deafening roar. Burning volcanic ashes, which blistered and killed people, rained down. At intervals soil and pumice stone fell. Pieces of pumice stone as big as a man's head fell 80 km. from Krakatau. This means that they must have been ejected at a speed of more than 1070 metres a second and have risen to a height of 50 km. Lamps were torn from their supports at Buitenzorg in Java,

¹⁸ One of these orthostatic blocks is two metres long and one metre high.

Cf. Πρακτικά, 1932, p. 92, fig. 10.

¹⁹ Verbeek, *Krakatau* (French edition), p. 46.

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150 km. from Krakatau. We have already mentioned that window-panes were broken equally far away. Old houses in places as far as 830 km. from Krakatau were so cracked that they had to be abandoned.

I think there is little reason to doubt that the devastation of the coast-sites of Minoan Crete was caused by the waves from the eruption of Thera. We read of similar phenomena on the occasion of later eruptions of the same volcano, which were in every case less violent than the one in 1500. Philostratus, for example,²⁰ reports that during the eruption in A.D. 60, when the islet Hiera appeared in the caldera the sea receded about seven stades from the south coast of Crete, at the point where the Asclepieum of Lebena was situated. The terrified priests expected that the waves on their return would sweep the sanctuary away but Apollonius cried 'Take heart, for the sea bore earth'. Similarly it is reported that in the eruption of 1650 the waves in Ios rose 50 feet; at Sikinos the sea came 350 feet inland, while in Thera itself 'the waves came two miles inland and swept away old walls and chapels, foundations and all'. In Crete the ropes with which boats were tied up were cut through.

It is difficult to say, in the case of Crete, how far inland the waves came during the eruption of 1500 B.C. In the case of Krakatau we know definitely that 1600 m. from the coast the waves were still 15 m. high. Elsewhere the sea came two km. inland. Here the waves were only three metres high but they advanced with such force that widespread damage was caused.

It was only in the plains, however, that the waves came so far inland. The Cretan palaces, therefore (with the exception of that at Malia, which was almost certainly destroyed by the waves) and the other inland settlements could not possibly have been reached by the waves, even if we suppose that they were much higher than at Krakatau. It is only by a series of violent earthquakes that they can have been destroyed.

This put a new difficulty in the way of those who believed in a simultaneous destruction of all the sites of Crete, since Fouqué and Verbeek agree that eruptions such as those of Krakatau and Thera are never accompanied by earthquakes. This was proved in the case of Thera by the fact that the prehistoric buildings buried under the deep layers of pumice had their walls intact to a height of several metres. It is, therefore, impossible that earthquakes accompanied the eruption.

²⁰ Philostratus, *Vita Apollonii*, 34.

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Moreover, during the eruption of Krakatau only insignificant shocks were felt.

New light was thrown on this problem by a series of articles by Professor N. Kretikos, Professor of Seismology in the University of Athens. Verbeek had already noticed that before and after the eruption of Krakatau earthquakes were felt more often than usual in all the districts round about. Some of them were serious. According to Verbeek, some of them, particularly those which took place after the eruption, were possibly to be attributed to it.²¹ Professor Kretikos has developed the theory more systematically,²² and shows that before and after every eruption of Thera a whole series of earthquakes is to be noted in the neighbourhood: in Crete, the Cyclades, Sporades, Dodecanese and even farther afield. This was what happened in the great earthquake of 26 June, 1926, which beyond doubt was connected with the eruption of Thera some months earlier. It caused considerable damage not only in Crete but in many other districts—in the islands of Karpathos, Kastellorizo and especially in Rhodes, where thousands of houses were destroyed with loss of life. In Anatolia, too, houses and mosques collapsed. Damage was widespread throughout Egypt, with the exception of Assouan, and in Alexandria and Cairo alone 600 houses collapsed.

History corroborates this theory of Verbeek and Kretikos. We know, for instance, from various sources (Strabo, Pausanias and Plutarch) that in 197 B.C., when the island of Hieria appeared, serious earthquakes devastated Rhodes and Asia Minor. It is reported, too, that a great earthquake took place a year before the eruption of A.D. 726. Theophanes put the responsibility for all the disasters at that time upon the shoulders of the iconoclastic Emperor Leon. So, too, it is reported that very serious earthquakes took place a year before the eruption of 1650.²³

We may be sure, therefore, that the same thing happened on the occasion of the tremendous eruption of 1500 B.C.—either as a prologue or, more probably, as an epilogue. A series of violent shocks may have devastated all the neighbouring districts, until the disturbed layers of

²¹ Verbeek, *op. cit.*, p. 463.

²² ' Sur la sismicité des Cyclades et de la Crète ', *Annales de l'Observatoire d'Athènes*, 1925, IX, 36; ' Sur les phénomènes sismiques produits avant et depuis l'éruption du volcan de Santorin ', *l.c.*, 1926, VIII, 2 ff. Cf. also *l.c.* 1928, X, 47 ff. and *Comptes Rendus de l'Acad. des Sciences*, vol. 181, p. 923.

²³ See Fouqué, *op. cit.* and B. 'Ακύλας, *Τὰ ἠφαιίστεια καὶ ἡ νῆσος Θήρα* Athens, 1925.

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the earth had settled again. In Crete, especially, earthquakes may have completed the devastation which occurred.

This is neither the time nor the place to examine the possibility that devastation elsewhere—in the Cyclades (Melos), the other islands, in Asia Minor and even in Egypt—should be attributed, directly or indirectly, to the great disaster of Thera. Let us confine ourselves to Crete, where this terrible disaster had a profound influence on the culture of the island. It received an irreparable blow, and from then onwards gradually declined and sank into decadence, losing its prosperity and power. What power remains is concentrated at Knossos which, for a little while, carried on the venerable traditions of the Minoan civilization as the 'Palace Style'. The other palaces are not rebuilt, and the 'Palace Style' is to be found only sporadically here and there outside Knossos. There is no longer any town or any great centre in Crete. The culture and art faded steadily and finally died out completely.

We can be certain that after the great catastrophe the majority of the inhabitants fled in terror from the island. They thought that the mother-goddess had turned against her island and cursed it. Anyone who wants to picture the terror and agony of the islanders during the eruption of Thera should read the personal impressions of a scholar so calm and rational as Verbeek, as he recorded them during the eruption of Krakatau. Although he was at Buitenzorg in Java, 150 km. away from the volcano, he recounts that there, too, as in Batavia, which was equally far away, singularly dramatic events took place. During the whole night no one in western Java could sleep for the roar and the flashes from the eruption. Anyone who did not witness it can scarcely imagine the feeling which comes over a man when a mountain which lies 150 km. away utters a roar as terrible as the salvoes of guns fired in the immediate neighbourhood. In addition, all the objects which were free and loose were continually being moved about; as a result, crashes, bangs, clashes, creakings and crackings resounded everywhere, causing physical and mental agony. The crashes were followed by complete silence, which was equally terrifying and caused widespread nervous hysteria. In the morning a horrible noise broke out so that the men who were attempting to make up for their lost sleep leaped from their beds. Lamps fell from their fittings and plaster from the walls; doors and windows were thrown open; complete pandemonium reigned. Then it began to grow dark, increasingly rapidly after ten o'clock and the lights were lit. A cloud of yellowish grey smoke came

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over the land. Everywhere mists came down—cold and damp and bringing a slight smell of sulphuric acid. The domestic animals were as frightened as the people. They stayed near their owners and near the lights and refused to go away even when dragged. About two o'clock a dim light appeared in the East and the cocks began to crow. . . .²⁴

Given that the eruption of Thera was more violent, and its distance from Crete less, than even described, there is little doubt that the Cretans lived through moments of equal, if not greater, terror. When, moreover, great earthquake shocks followed, it was quite natural that some of the survivors abandoned the cursed island in search of new homes. May we suppose that the Keftiu of the Egyptian frescoes were Cretan refugees who settled in North Syria or somewhere thereabouts? And does the tradition that Crete remained devoid of inhabitants from that time reflect some vague reminiscence of this event?²⁵ The period of the 'Palace Style' suggests that a fairly powerful dynasty still reigned at Knossos but it already looks as though Crete were no longer invulnerable. It would appear that the Achaeans first began to descend on Crete. It is now that we note a considerable change in the hitherto peaceful character of the Cretan people. The first graves of warriors furnished with swords and arrows date from this time and the tablets of Knossos present lists of armour, horses and chariots.

In time Crete sank further and further into decay. After 1400 even the palace at Knossos was deserted and simultaneously the great period of Mycenaean expansion began, when colonies were established in Rhodes, Cyprus, Asia Minor and elsewhere. It is not possible that Crete was excluded from this great movement by the Achaeans, and to this are due the Achaean place-names: *Μυκῆναι*, *Ἀμύκλαι*, *Θεράπνη*, *Ἡλέκτρα*.²⁶ We need not imagine a wholesale conquest of Crete. It may have been mere colonization, carried out without violence, which resulted in strong trade connexions with the mainland. This explains why Cretan art and even Cretan writing—with the same combinations of letters found on the tablets at Knossos—occur on the Greek mainland. *Mutatis mutandis* we could repeat the well-known phrase *Creta capta ferum victorem cepit*.

A civilization of 2000 years' standing does not disappear without leaving a trace. The Dorians found many products of an advanced civilization, and therefore progressed quickly. They learned, for

²⁴ Verbeek, *op. cit.* 33-40.

²⁵ Herod VII, 171.

²⁶ A. Fick, *Hattiden und Danubier*, p. 9.

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instance—alone of all the Greeks—the science of archery;²⁷ to keep slaves under more humane conditions than existed anywhere elsewhere in Greece; there they found music and poetry. Finally, in the island of Minos, the great law-giver, they developed the famous laws which were later borrowed by their fellow tribesman on the mainland. Who knows how many of the clauses of the famous inscription of Gortyna are of Minoan origin? As for the religion, it has already been proved that most of its elements are derived from the Minoans. The Dorians in Crete continued to frequent the caves which had been sacred to the great Minoan goddess. It seems as if the race were not changed and as if no other change took place later. No break in the cult is perceptible from the height of Minoan times to the last days of Graeco-Roman antiquity. Many of these caves are already known and more are continually coming to light.

NOTE.—The Editors wish to point out that in their opinion the main thesis of this article requires additional support from excavation on selected sites. They hope that such excavations will in due course be carried out.

²⁷ Of this problem, which had already drawn Pausanias' attention (1, 23, 4), I think Minoan tradition provides the only reasonable explanation. The Minoans are represented as energetic archers and huntsmen from the Early Minoan period to the very end of Minoan times.