

Malta as it exists to-day might be looked upon as having attained almost as high a degree of agricultural development as it is possible for any small state to attain, considering its situation and its present rather unfavourable climatic conditions. I said almost, for, although most of the island is subdivided by stone walls into thousands of little fields which are cultivated throughout like kitchen gardens, yet there are to be seen here and there small barren patches where the original bedrock shows on the surface in its old-time nakedness. In fact, we might say that the Maltese take as much as it is possible to take out of the parts of the island which are under cultivation, and are, as far as their means allow them, slowly reclaiming the uncultivated bare areas.

History relates that some five or six centuries ago a large portion of the surface of Malta was naked and uncultivated, and that for some considerable time after the occupation of the island by the Knights (A.D. 1520), the inhabitants regularly imported thousands of shiploads of earth, and spread it over the ground to make a skin of soil for cultivation. The inhabitants of Malta are by nature very industrious, and the conditions of peace which they have enjoyed since the occupation of the island, first by the Knights and afterwards by the British, have enabled them to bring their little state to a condition of agricultural perfection which, considering all the adverse circumstances of climate, distance from markets, etc., with which they have to contend, might be regarded as model.

For one half of the year, from May to November, practically no rain falls on Malta, and although during the other half year there is a fair average rainfall, yet the desiccating action of the summer so predominates over the winter rains that if it were not for the number of sheltering stone walls which are erected all over the island, and the artificial watering carried on by the natives, Malta would soon be reduced to the semi-barren rock condition which it was in some centuries ago. This condition of affairs is characteristic of many parts of the littoral of the Mediterranean, and it is a curious fact that although there is, as a rule, in most places a fair total

annual rainfall, the conditions found are of arid, dried-up countries. A rainfall of 25 or even 30 inches does not seem to help a country if it all falls in one short season and leaves the land parched for the rest of the year.

The stone walls, then, and the artificial watering, are the preservation of Malta, and these could only be carried out in a country protected from plunder and pillage. Let us now visit some of the barren patches alluded to as existing here and there

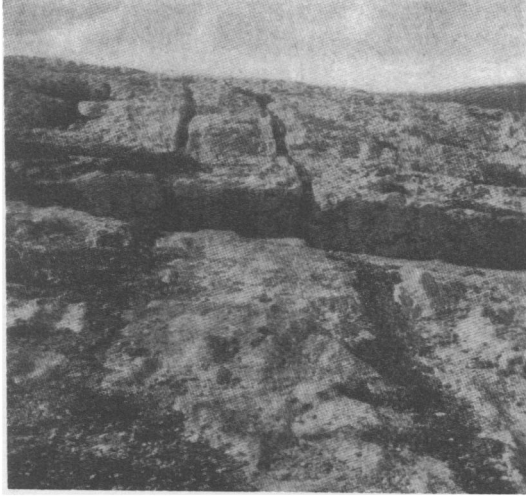


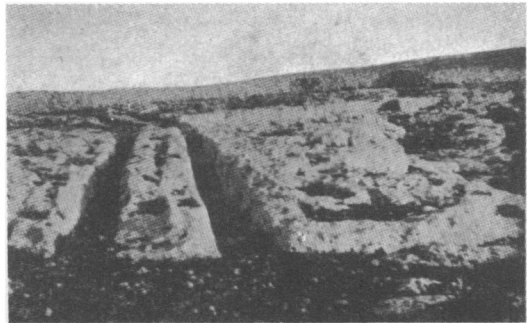
FIG. 1.—CART RUTS TO THE NORTH OF DWEIRA, ON THE WAY FROM NAXXAR TO ST. PAUL'S BAY.

over the island, and we shall be surprised to see what seem to be peculiar cart ruts cut in the hard rock. Fig. 1, from a photograph kindly given me by Professor Zammit, shows these ruts. They always, as we see there, run in parallel pairs, and are cut to a depth of anything from a few inches up to 2 feet or more. In this photograph the ruts are seen cut in the coralline crag which covers a great part of the higher levels of Malta. This coralline crag is a fairly hard rock, and the amount of traffic necessary to cut the rocks shown in the illustration must have been considerable, and prolonged for a good period. Professor Zammit informs me that these

ruts are found in abundance all over the island, and I have seen them myself in many places, so we must conclude that at one time there was an extensive amount of carting carried on in Malta.

Various writers have mentioned the Maltese cart ruts, and it has been generally assumed that they date from prehistoric times, and might even belong to the Neolithic period, and I may state here that Professor Zammit, who is the greatest living authority on the archæology of Malta, holds the view that they are of Neolithic origin. During the autumn and winter of 1916 I was enabled to visit Malta on various occasions, and once I lived a fortnight on the island. During these visits I made a detailed study as far as I could of the cart ruts, and I will give as concisely as I can the results of my work on them. I found that they often branched and came together again in a way which suggested a modern railway junction. They varied considerably in depth, and passing down the face of a hill I found they zig-zagged, always choosing a moderate gradient.

I also found in this place other pairs of ruts running independently of the first, also passing over the side of the hill and following practically the same direction. These latter were only a few yards from the former, and it would



[Photo, T. Zammit

FIG. 2.—DEEP PREHISTORIC CART RUTS ON THE SELMEIN PLATEAU.

seem that when one pair of ruts became worn too deep another track was started.

I found that in no place was there any sign of a groove cut by horses' feet between the ruts, but the space between them was rough, hummocky, and showed no signs whatever of wearing.

Now in Patagonia, where I lived for several years, I noticed that on the tracks made on the pampas by bullock carts there was no wearing down between the wheels, as the bullocks walk in the ruts made by the wheels. In the case of Malta, however, no bullock could walk in the ruts, as they are too narrow, too clean cut, and too deep to afford a footing to any animal.

An average rut will be found to be about 3 inches wide at the bottom, and, with the sides sloping apart slightly, will be about 8 or 9 inches wide at the top. From this we are driven to conclude that the motive power which propelled the vehicles which cut the ruts was something other than horses walking between the shafts, or bullocks walking at the side.

And the only power we can think of is human power, in the shape of a number of men drawing waggons. It has been suggested to me that the vehicles which passed over these ruts had runners and not wheels, but as I found that the floor of the ruts is, as a rule, very undulatory, and that the individual undulations are often very short and sharp, I concluded that this suggestion must be negatived. This undulatory condition of the floor of the ruts, coupled with the fact that the ruts are often very deep, and that the space between them is generally very hummocky and rough, led me to believe that the Maltese cart ruts were cut by vehicles having high, strong wheels. I noticed then that most of the Maltese carts have high wheels, and on one occasion I measured a typical one. I found the diameter of the wheel was 5 ft. 4 in., and the distance from the outside of the tyre of one wheel to the corresponding point on the other was 4 ft. 8 in.

I then went along to one of the cart rut areas and measured some of the ruts, and I found that in a typical place the distance between the points corresponding to the outside of the tyres was 4 ft. 9 in. The inside distance was 4 ft. 4 in. From this it would seem that the ruts were made by vehicles with wheels much the same size as the present-day Maltese carts and with axles the same length. In one place I found a modern track joining an old pair of ruts, and the modern wheels seemed to fit the old tracks perfectly. This fact would lead us to believe that the ruts possess no real antiquity, but were formed on the island a century or so back, before macadamised roads came into use. If, however, the reader were to take the trouble to go over a number of the bare cart rut areas and study these old tracks carefully, I think he would be convinced that, notwithstanding the above-mentioned fact, the ruts have no stamp of modernity.

The patination of the surface, the fact that they are often worn away and obliterated in places, to reappear again a little further along, impress the observer with the fact of their age.

But in addition to these there are other facts even more convincing.

One day down at Marsa Sirocco I noticed a pair of ruts running out into the sea, and I could trace them some distance under the water. This points to some antiquity, as a subsidence of this portion of the island must have occurred since they were formed. I am told by Professor Zammit that they are often seen running into the sea in other parts of the island also; if so, the subsidence must have been general and not local, and consequently argues a greater antiquity still. As far as I could find out, since Valetta harbour first began to be used to the present day there has been no noticeable alteration in the level of the land round about it. But to me, one of the strongest bits of evidence of the great antiquity of these cart ruts is the

fact that in some places where they are found cut in the coralline crag, the surface is so rough, jagged, and hummocky, that no living creatures, human or otherwise, could possibly maintain a footing if dragging a heavy load behind them. And I have found considerable lengths of ruts cut deeply through the roughest of this crag.

Sitting out on the island one evening I came to the conclusion that these roads were in use at a time when Malta was covered with a rich soft soil, for I could not imagine a few centuries ago, when earth in all forms was a very valuable commodity, that the natives would use it simply for roadmaking, especially when you think that such material would have to be renewed every year, as, being constantly broken up by the traffic, it would be blown away by every wind into the sea. Then again, if macadam was used some trace of the broken stones would have remained to the present day, but I have never seen any sign whatever of same. I conclude from this that the Maltese cart ruts were cut by wheeled vehicles in some former time when the climate of this portion of the Mediterranean was moister and more salubrious than it is at present.

It has been stated by Bradley, in his book on *Malta and the Mediterranean Race*, that the cart ruts disappear over the cliffs on the south side of the island and reappear again on the Island of Filfla, 3 miles out to sea. Now this island is only a small rock a hundred yards or so across, and its sides are precipitous all round. The channel between it and the main land is deep, and large steamers can pass between. So if cart ruts disappear over the cliff on the south side and reappear again on Filfla it would be absolute proof of the antiquity of the cart ruts.

I asked Professor Zammit if this were the case, and he told me that although he had visited Filfla on several occasions, he had never seen the ruts on its surface, but as it had been used as a target constantly during the last thirty years by the naval people, most of the original surface had been broken away. I myself walked several miles along the cliffs on the south side of Malta, and although I saw typical ruts in more than one place I never saw any of them actually running over the edge. On many parts of Malta, and to a much greater extent on Gozo, there are abundant megalithic remains belonging to the dolmen period or latter half of the Neolithic. I have endeavoured to find if there was any connection between these remains and the cart ruts, but the evidence seems to prove that there was none. The ruts in no way converge towards the megalithic remains, and in the neighbourhood of the latter the ruts are often scarce. The abundance and size of these megalithic remains, and the magnificent workmanship displayed in the rock-hewn temples, shows that at the close of the Neolithic period Malta must have had a fairly moist climate and was capable of sustaining a fairly large population. Recent geological study has shown that after the ice of the Würm age had retreated there were several minor oscillations of climate, such as the turbarian and forrestian described by Geikie, and it is quite possible that these oscillations extended well into historic times, and even into the Iron Age, for it is impossible to think that the enormous climatic disturbances which took place during the Ice Age could have subsided suddenly without leaving some minor pulsations behind. If so, it is quite possible that between two and three thousand years ago Malta was much moister and a more salubrious country than it is at present.

All over Malta there is evidence of a former higher rainfall, in the shape of deep dried up river valleys, cut often for hundreds of feet in the solid rock. Small streams still run down these valleys when there is heavy rain, but even after the most violent storms the rivers are so insignificant that they are incapable of tearing up the bushes and shrubs which can be seen growing across the bottoms of the valleys from side to side, and we may conclude that there is no perceptible deepening of the river valleys at present.

It is consequently possible that as fluctuation of climate in former times was the rule, that the Neolithic civilisation was brought to a close by a period of desiccation, and that the dawn of our Mediterranean historical period was heralded in by a change to the moist again. This change was productive of "the glory that was Greece and the grandeur that was Rome," and it has been followed by another period of semi-desiccation, and it is in that period we now live.

If these views are correct they will explain to some extent why the centre of gravity of European civilisation has worked its way north during the last thousand years.

In conclusion, then, we may say that although the Maltese cart ruts do not date from neolithic times, they probably took their origin in the early part of the Iron Age, at a time when the climate of that part of the Mediterranean was moister and more calculated to support a large population on the island than would the present conditions.

A number of people drawing repeatedly a heavy waggon argues one thing to me, and that is slavery, and to have slavery you must have a fairly large population. When the population is small and the people sparsely distributed, you will never find slavery, and a large population indicates favourable conditions for living; among these a genial, moist climate will figure largely, and if historians would study a little more the question of the climate which prevailed in former ages, they would probably find that from that source they would have a considerable amount of light thrown on the beginnings and endings of empires and nations.

The above was written after my return from the Mediterranean in the end of 1916. Since then I have spent nine months in Egypt and further east. When in Egypt I consulted Mr. Quibell, of the Cairo Museum, and Dr. Hane, Director of Geological Survey of Egypt, relative to a possible change of climate during historic times, and they both stated that they have no evidence of any such change since the 1st Dynasty in Egypt, but they do not negative the possibility.

I myself, from reading Egyptian history, thought I could trace evidence of altered climatic conditions of the surrounding countries producing large populations resulting in invasions of Egypt, such as the Hyksos invasion (14th to 17th Dynasty), and subsequent invasions by Libyans. However, on coming home I talked the matter over with Professor Cole, and he advised me to get *The Pulse of Asia*, by Ellsworth Huntington. I did so, and I cannot too strongly urge all students of history and climate to carefully read that excellent book. I need not detail here the evidence he produces to show that the climate of Western and Central Asia has altered many times during known history, suffice it that he believes an alteration to the moist occurred about the sixth and seventh centuries of the Christian era. That period would correspond with the wave of Islamism which started in the Arabian Peninsula, and which is now believed to be the fourth Semitic wave which took origin in the same locality. I may here mention that Leonard W. King in *A History of Babylonia and Assyria*, Vol. II, p. 119, after mentioning that the Semitis originated in some part of the Arabian Peninsula, goes on to state that there were probably four waves of Semitic advance, and seems to think that each was preceded by an alteration to the moist in the climate of Arabia. He concludes as follows: "To such climatic changes, which seem, according to the latest theories, to occur in regular cycles, we may probably trace the great racial migrations from Central Arabia, which have given their inhabitants to so many countries of Western Asia and North Africa." The Hyksos invasion of Egypt, and the great wave of Islamism, he includes in the same, and he would have it that consequently in the seventh century of our era the climate of Arabia once more altered to the moist.

It is quite possible that the Maltese cart ruts date from this latter period. The present Maltese carts are probably of an archæan type; I have seen the same type in Egypt and in Italy, and I have seen similar cart ruts in the streets of Pompeii. Professor Cole has suggested that as Malta stands on a shallow platform it once was a much bigger island than at present, and possibly with a moist climate supported a large population.

Before concluding I will mention that Professor Zammit has suggested that the "ruts" were cut first by men in the rock so as to make a track for the wheels. I cannot agree with this idea, for in many places I saw ruts cut a few inches deep, and then the wheels had shifted and cut another rut parallel to the first and only a few inches away from it, and between the two sets often could be seen a narrow flange of stone standing up. A large lumbering waggon with big wheels would easily shift its course when being dragged along, and cut new ruts alongside of the old. Such a condition is of common occurrence, and in some places two or three parallel ruts can be found, all more or less shallow. With regard to the age of the ruts, I think it will be conceded that if they were cut by large, heavy wheels, 5 to 6 feet in diameter, those wheels must have been shod with iron, and on consulting with an eminent Egyptologist, I find that although small pieces of iron have been found in the remains of the early dynasties, iron was not in common use till 600 B.C. From this it would appear that the Maltese cart ruts date either from Roman times or since then, and I think that the early middle ages is the most likely period.

NOTE.

Huntingdon traces a high fluvial period before the Christian era, falling then to an interfluvial dry period from 400 to 600 A.D., during which the conditions were dryer than the present day. This latter, after 600 A.D., was in turn followed by a moist period, which possibly oscillated to dry again during the centuries 1,000 to 1,200, and again became moist in the later Middle Ages. The interfluvial period, 400 to 600 A.D., would probably be the cause of the Decline and Fall of the Roman Empire, and the consequent drifting of power to the north. The cart ruts were possibly formed during Roman times.

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