

ON THE CAVES OF GIBRALTAR IN WHICH HUMAN REMAINS AND WORKS OF ART HAVE BEEN FOUND.

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CHAPTER I.

ALTHOUGH presented to the Congress in my name, it will be seen that a very considerable part of the following account of the Gibraltar Caves is derived from the reports and letters, and given in the words of my excellent friend, Captain Frederic Brome, late Governor of the Military Prison, whose unwearied labours during the last five or six years have been devoted to their exploration.

I have also been greatly aided in my task by the joint notes taken both here and on the spot by the late Dr. Falconer and myself, and contained in a report prepared for the British Association in 1864, immediately before our visit to Gibraltar, and in which was embodied an account of the main points then known of the geology and topography of the Rock. But on the former subject I have here, for the sake of brevity, touched very slightly, as it is but distantly connected with the more immediate object of this communication.

Dr. Falconer, as is well known, took the liveliest interest in the Gibraltar researches, as forming part of that extended study of the Mediterranean quaternary fauna to which he had devoted so much time and attention; and of which he had contemplated embodying the results in a general memoir on that fauna. It is deeply to be regretted that his untimely death should have prevented the completion of this great design, for the execution of which he was so peculiarly qualified.

In the following pages I have, however, only attempted

to give an account of the recent discoveries in Gibraltar and have confined myself to that locality alone.

In doing this I have found it convenient to subdivide the subject into two distinct parts: the one including the Caves as related to man and his works, which is given in the present communication; and the other an account of the more ancient animal remains, found in the deeper fissures, or embedded in the true ossiferous breccia, and which, in my opinion, belong distinctly to an epoch anterior, though, it may be, not very long anterior to the period when man began to take up his residence on the Rock.

The publication of this second part, which has no immediate connection with the objects of the Congress, will take place elsewhere.

But since, for the clear understanding of the nature and conditions of the various caverns and fissures, of which an account is here given, some acquaintance with the general geological relations and topography of the promontory is requisite, I will commence with some remarks on those subjects, compiled from various sources, and based in part upon the observations which Dr. Falconer and myself were able to make during our brief stay in Gibraltar in the year 1864.

1. *Introductory Remarks on the Geology and Topography of the Rock of Gibraltar.*

The principal physical and topographical features of the Rock of Gibraltar are familiarly and well known through the minute and careful surveys which its importance as a fortress has demanded of its holders, for the vast defensive works that have been carried on almost incessantly upon it during the period of our occupation.

The Rock and its Bay, with the neighbouring districts, have passed successively under the dominion of a savage prisca race, of the Phœnician, Carthaginian, Roman, Goth, Saracen, and Spaniard. The ruins of Carteia at the head of the bay, and within a few miles of the gates of the fortress, have yielded numerous vestiges and monuments of the ancient Semitic and Roman occupants of the country; and tumuli

in the neighbourhood of these ruins have also afforded the polished stone implements of a still earlier race; but, in the Rock itself, no relics of this kind had, before the present time, so far as I am aware, been discovered belonging to a period anterior to the invasion of Spain by the Arabs. The relics of the ancient or primitive inhabitants, and even those of the Roman period, have for the first time been brought to light since Captain Brome commenced his explorations.

The geological changes which the promontory has undergone during a comparatively late period, through movements apparently of upheaval and depression, have been very numerous and remarkable, and attended with great local disturbance of the Rock. These changes have been the subject of special research by that skilful observer, the late Mr. Smith of Jordan Hill, from whose essay on the 'Geological Structure of the Rock of Gibraltar' the following particulars have been chiefly derived. And as our own observations, so far as our brief stay on the Rock allowed us the opportunity of judging, led us to coincide in almost every essential point with Mr. Smith, I have the less hesitation in relying upon the information afforded by him.

The Rock, or Peninsula as it may be termed, of Gibraltar* is a detached promontory, composed principally of limestone, about three miles long and three-quarters of a mile in its greatest width, and placed in a direction nearly due north and south. On the western side its base is washed by the tidal waters of the Atlantic, and on the eastern by the tideless waves of the Mediterranean from which it rises, nearly throughout its length, in an almost sheer precipice. It is connected with the main land by a sandy, level isthmus, not more than ten feet above the level of the sea. The entire mass is divided into two primary portions, the northern, which includes three-fourths of the length, being much more elevated than the southern. The elevated portion again is subdivided into three distinct segments or eminences, separated by two irregular depressions, which are termed respectively the Northern (Plate I *a*) and Southern (*b*) Quebrada; so named from the Spanish 'tierra quebrada,'

* Plate I.

or 'broken ground;' the Rock at those depressions being much fractured and dislocated. The northernmost portion, termed the 'Wolf's Crag,' or 'North Front,' is terminated by a cliff 1250 feet high, which is naturally almost perpendicular, and where not so by nature has been rendered inaccessible by escarpment. The middle portion, 'Middle Hill,' or 'Signal Station,' 1255 feet high, forms the central eminence; whilst the southern division, the 'Pan de Assucar,' or 'Sugar Loaf Hill,' which is surmounted at the highest point of the Rock by O'Hara's Tower, rises to a height of 1408 feet above the sea. The declivity to the south from this eminence is very abrupt, but not so precipitous as to prevent its easy ascent. It terminates in the 'Windmill Hill Flats,' or plateau, a tolerably level plain about half a mile in length and a quarter of a mile in breadth. At its northern border the surface of this plateau is about 400 feet above the sea, or 1,000 feet below the summit of the Rock; and it slopes gradually to the south at an angle of about 11°; so that at its southern termination in a vertical inland cliff about 100 feet high, its height above the sea is from 250 to 300 feet. It is bounded on the east and west sides also by nearly perpendicular cliffs, whose base is about 100 feet above the sea, and some distance inland. The succeeding and southernmost portion of the Rock, termed the 'Europa Flats,' also consists of a tolerably even plain, which at the northern border adjoining the Windmill Hill escarpment is about 100 feet above the sea, from which level it gradually slopes to about 50 feet, terminating in 'Europa Point,' the southernmost extremity of the peninsula. The Europa Flats on the eastern side are continuous with the terrace, from which rises the eastern escarpment of the Windmill Hill plateau, under whose shelter is situated the summer residence of the governor. (*Vide* Plan, Plate II.) On the western side the Europa plateau rises considerably, ending in the numerous large ravines above Europa Bay and at Buena Vista. It would seem that the rocky sea bottom, where visible at the base of the eastern cliffs of the Europa plateau, and beyond the masonry by which its southern flank is covered, constitutes a rocky plain precisely of the same character as the 'Windmill Hill' and 'Europa Flats;' and this lower plain

might consequently be described as a third level or step ; and at the southern extremity of the Rock there was, I believe, formerly an extent of surface uncovered by the water, and termed the Lower Europa ; but the defensive works, executed in that situation, have removed nearly all traces of this at the present time. Whilst the eastern face of the Rock is a nearly perpendicular precipice—the escarpment of the limestone strata—its western face forms an irregular slope, interrupted here and there by longitudinal cliffs and ravines, and gradually shelving at bottom into the gentle declivities upon which the principal part of the town of Gibraltar is built. Towards the north end, and as far south as Rosia Bay, which is nearly in a transverse line with the northern border of the Windmill Hill plateau, the surface is composed almost entirely of a highly ferruginous silicious sand, termed from its colour the ‘Red Sands ;’ but, at the point just indicated, the sand for the most part disappears, and is succeeded by a hard ferruginous shale, which appears to rest conformably on limestone.

Except these silicious beds on the western base, the mass of the Rock consists of a secondary limestone, which is considered to be of jurassic age. It is very compact and hard, and wherever the surface is sufficiently exposed, is seen to be intersected throughout by ramifying fissures, which occasionally widen out into extensive caverns, either empty or filled with bone breccia or crystalline spar. The principal reason undoubtedly of this fractured condition is to be sought in the circumstance, that the strata, as has been conclusively shown by Mr. Smith, and as is sufficiently obvious to the most superficial observation, have been subjected to very great disturbances, and twisted, as it were, in different directions. This is shown very plainly in the fact, that the angle of stratification varies very much in different parts, its direction indeed being reversed at the opposite extremities of the promontory.

In the northern segment the strata dip to the west at an angle of about 19° or thereabouts, and this inclination is continued as far as the northern ‘Quebrada’ (*a*, Plate I.). But in the Middle Hill, or between the north and south

‘Quebrada,’ the inclination of the strata, still to the west, is at an angle of 38° or thereabouts; and it is continued at this angle, or near it, to the south ‘Quebrada’ (b); separating the middle from the south hill, or ‘Sugar Loaf,’ where the strata dip to the west at an increased angle of 57° ; and at the southern end of the ‘Sugar Loaf Hill’ they become nearly vertical. We then come to the great fall in height from 1400 to 400 feet, and on reaching the Windmill Hill plateau find, upon looking at its southern face, that the strata are actually turned over, and now dip at an elevated angle to the east. What the direction of the dip may be in the limestone of Europa Flats, I am not aware, but from the extremely rugged nature of the surface, from the numerous fissures and ravines by which the plain in question is bounded to the west, and from the excessively fissured condition of the Rock where recently exposed by escarpment, as in Europa Bay, and from the rocky nature of the sea bottom to a considerable distance round the southern and western end of the promontory, there is every reason to suppose that the disturbance by which the strata of Windmill Hill had been tilted over, was not less in amount, but probably much greater, in the southerly direction.

Mr. Smith was of opinion that the movements by which the limestone strata have been affected in the manner above described were of two kinds: 1. Repeated, sudden, partial movements, involving angular dislocation and uplifting of the strata. 2. Subsequent general vertical movements, by which the whole mass has been elevated and depressed. But into the facts and reasoning by which he was led to this conclusion, it would require far too much space here to enter; nor for my present purpose is it requisite to do so, inasmuch as there is no reason to suppose that any great disturbance or change of level of the Rock has occurred within the human period. The marks of marine action, it is true, and the existence on the eastern flanks of successive sea bottoms of comparatively modern origin up to the height of at least 900 feet, afford sufficient evidence of the truth of Mr. Smith’s inference, ‘that since the testaceous fauna was the same as the present, many movements, both of upheaval and de-

pression, must have taken place,' and 'that the whole mountain up to its summit has been submerged subsequently to the last of the great disturbances;' but all this appears to have preceded the advent of man upon the Rock.

As is well known, *caves* constitute a prevailing feature of limestone rocks everywhere, and in no place are they more numerous within a similar compass than in the promontory of Gibraltar, which has in fact on that account sometimes been termed the 'Hill of Caves.'

The caves are of two kinds: 1. Littoral or sea-caves, scooped out horizontally by the waves at the sea level; of which kind numerous instances are exhibited all along the base of the eastern face, and, as has been before said, successive terraces, one above another, are visible on the same face, each furnished with its line of sea-caves, exactly like those at present at the level of the water. It would seem, however, that most, if not all, of these caves owe their origin to their being situated in the line of a fissure or fracture of the rock of which the sea has taken advantage to begin its scooping action. 2. Inland caves, which do not exhibit any appearance of marine erosion, but may be described as ramified and intersecting fissures, descending more or less vertically to great depths. Consequently they are of the same nature and origin as the rents in which the bone breccia is found, enlarged perhaps in some cases by pluvial erosion, but in others, as it would seem, by actual separation of the walls. That these fissures, after their original formation, have been subjected to motions of displacement, is evidenced by the frequency with which large detached blocks of rock, evidently either broken off close to the spot where they are lodged, or which may have fallen down the vertical fissure until they were arrested in a narrower passage, are met with. It will also be observed that Captain Brome, in describing several of the caves, mentions the occurrence of very thick pillars of stalagmite, which have been broken transversely, the two fragments being displaced and sometimes re-united by fresh stalagmitic deposit, sometimes remaining quite separate.

The principal littoral or sea-caves with which I am acquainted in the rock, or which have received names, and whose respective situations will be seen in the Plan, Plate II., are :

1. Martin's Cave, situated at about 700 feet above the sea, on the eastern face of the Rock, and beneath O'Hara's Tower.

2. Fig Tree Cave, which is placed above and a little to the south of Martin's, and apparently belongs to a higher terrace.

3. Some caves just above the blown sands in Catalan Bay.

4. Monkey Cave, a very large and shallow cavern, situated on the lowest terrace, about 100 feet above the present level of the sea, immediately beyond the last Europa Advance Battery, and also on the eastern face.

5. Beefsteak Cave, which is clearly a sea-cave, but now situated far inland in the cliff which bounds the Europa plateau on the south.

6. The Genista Cave, No. 4, the opening of which is about 40 feet below the top of the eastern cliff of Windmill Hill plateau, and nearly over the stables of the Governor's cottage.

7. Poca Roca Cave, which has in all probability been widened by marine action at its entrance, but communicates apparently with extensive ramified fissures.* This cave is in the western face of the rock, in the line, or near it, of the northern Quebrada, and about 600 feet above the level of the sea.

But, besides these well-known instances, there are very many caves of the same kind, of smaller size, on the eastern face, and several are seen excavated in the modern elevated strata, behind the Governor's Cottage, where a considerable thickness of that deposit still remains. Such caves as these clearly have not connection with fissures of the limestone, to which they do not all of them reach.

The principal fissure-caves with which we have any acquaintance are :

1. The famed St. Michael's Cave, whose entrance is on the western face in the line of the southern Quebrada, and about 1100 feet above the sea.

* There is every reason to believe that the fissures connected with the Poca Roca Cave extend quite through the rock and open on the eastern face above Catalan Bay, inasmuch as they are found filled, as stated by Captain Brome, with sand of the same kind as that which forms the 'blown sands' of that bay.

2. The Genista Cave, No. 1, together with the eastern fissure with which it communicates on the Windmill Hill.

3. The Genista Cave, No. 2, about 1,000 yards distant, and to the south, and probably also connected with the continuation of the eastern Genista fissure.

4. Genista Cave, No. 3, but which is regarded by Captain Brome more in the light of a sea-cave. The opening is on the eastern side of the Windmill Hill plateau, nor far from the edge of the cliff.

From the above brief statement it will be seen, that the principal caves, and especially the fissure-caves, are placed in or near the north or the south Quebrada, or near the still greater line of disturbance, between the elevated and the depressed portions of the promontory, and where the strata from dipping to the west are turned over and dip to the east, a change that must have been attended with great disruption of the Rock.

CHAPTER II.

DESCRIPTION OF THE VARIOUS CAVES DISCOVERED OR EXPLORED BY CAPTAIN BROME, WITH AN ACCOUNT OF HIS EXPLORATIONS DURING THE YEARS 1863-1868.

THE exploration of the caves was commenced under the following circumstances :

It having been determined, in the year 1862, to enlarge the boundaries of the military prison on Windmill Hill,* and to construct for its use a large water tank, a considerable space on the eastern side of the prison was enclosed by a high wall. Within the enclosed space, and close to its south-east angle, an excavation was made for the proposed tank. This excavation led to the discovery of the first and most important of the series of caves on the Windmill Hill plateau, which it is to be hoped will be known to all time by the name which has been given to them, in allusion to and in honour of their discoverer and explorer.

* Vide Plate II.

In the progress of the great works which have been carried on in Gibraltar during the last century, in the scarping of the crags and the mining of the covered galleries, numerous objects of great interest have no doubt at different times been brought to light. But the eminent commanders under whom, at various important periods, these gigantic works have been executed, have been either too much occupied by their weighty duties in times of war, or have not had their attention directed to the interesting disclosures of the secrets that lay hid in the interior of the rock. Nor, with several very eminent exceptions, have the members of the scientific branches of the service apparently shown that interest in, or exercised that vigilance respecting, the natural products of the rock, which at any rate in time of peace might have been expected of them. Much precious material has, in consequence, been irretrievably wasted, or become so widely dispersed, as to have lost much of its value for the purposes of comparison. It is a strange fact indeed that, although at one time a museum containing a considerable collection of the natural curiosities of the promontory, and of objects of archæological interest from the neighbourhood, existed in the garrison, this has since been allowed to be entirely broken up, and the collection either lost or widely scattered. And it is a still stranger fact that, even very recently, and after the attention of archæologists and palæontologists has been thoroughly awakened to the importance of Gibraltar as a field of research, the military authorities at home have refused to sanction the very trifling expense required to fit up an appropriate room, which is already provided, as a local museum, than which, in such a spot above almost any other, nothing could be more interesting, nor, as it might be supposed, more useful, as a means of affording rational and pleasing recreation, and instruction to the officers and men of the garrison.

Fortunately when the excavations on Windmill Hill were commenced, an accomplished and distinguished officer, fully alive to the importance of science, was in command of the fortress; and it was equally fortunate that the subsequent explorations were carried on by an observer so able, ener-

getic, and vigilant as Captain Frederick Brome, at that time governor of the prison.

To the enlightened and lively interest which Sir William Codrington always took in the exploration of the caves, and to the countenance and assistance which was uniformly rendered by him to Captain Brome, and which was continued up to the time of that gentleman's departure from the Rock, by Sir W. Codrington's successor, his Excellency Sir Richard Airey, Captain Brome attributes in a large measure the successful issue of his operations.

These operations, which were unremittingly continued from April 1863 to December 1868, have of necessity required an amount of labour, and involved sometimes a degree of responsibility which it is not very easy to over-estimate. But this labour and responsibility have been ungrudgingly and most disinterestedly given and incurred by Captain Brome, who, with the aid of the prisoners and their warders under his command, has in those five years conducted with surprising success an amount of difficult exploration never before equalled, and made collections in the public interest of unrivalled value—and, it may be said, without any expense whatever to the nation. I am the more desirous of calling attention to Captain Brome's deserts, knowing well that, though substantially as yet unrewarded for his labours in the cause of science, but rather the reverse, he will have the liveliest satisfaction in finding that his merits are fully appreciated by all who have the interests of science at heart, and in feeling that he has at length fulfilled to the letter the hope and anticipation expressed by the illustrious Cuvier in reference to the ossiferous breccia of Gibraltar:—*‘ Que serait-ce si quelque naturaliste résident sur les lieux prenait la peine de recueillir et de dégager avec soin [les ossemens] qui se découvriraient pendant quelques années, comme je l'ai fait pour [ceux] de nos gypses ! D'après ce que nous allons voir, on ne peut douter qu'il n'y fit des récoltes abondantes et intéressantes. ’*

As it would be impossible to give a better or more succinct account of the various caverns, &c. explored by Captain Brome than is conveyed in his own words, they are here

given almost unaltered, commencing with his Report on the Genista Cave, No. 1, dated August 21, 1863.

1. *Genista Cave, No. 1 (Pl. III.).*

‘The Secretary of State for War having approved, at my suggestion, of the employment of the prisoners on the new works during their construction, this arrangement involved the necessity of a constant supervision on my part, which afforded me an opportunity of watching the progress of the works, and has enabled me to offer the following remarks, viz.:

‘The first excavations were commenced on November 12, 1862, for the new boundary walls and tank. The space marked out for the tank, under which the cave was discovered, was in the angle formed by the excavation for the south and east boundary-walls; its dimensions were to be sixty feet by fifty feet, and fourteen feet deep. On removing the earth from this space, which varied from two to four feet in depth, an irregular surface of compact limestone presented itself; in which the only fissure visible was an open vertical one about six feet long and five inches wide, between two large blocks of limestone; the disturbed state and peculiar position of these masses appeared to me, with the fissure, to be remarkable, and I drew the attention of Lieut. Buckle, R.E., in charge of the works, to them, who observed, that “it was merely one of those fissures in which the Rock of Gibraltar abounded.” Labour was directed to quarry out the limestone to the required depth for the tank (fourteen feet), and, about the end of February, after blasting out a portion of solid rock at a depth of nine feet from the original surface, a few bones were found in the bottom of a small fissure, under some dark mould; they were lying without order in all directions, and mostly fractured.

‘Having been led to suspect, at a very early stage of the operations, that the open vertical fissure already mentioned was connected either with a larger one below, or a cavern, I watched the excavations as they progressed near this spot with considerable interest, and on April 23 (St. George’s Day), while excavating for the foundation of the south wall,

the prisoners came upon a rock, which had evidently once formed part of a cave; it was covered with stalactites and conglomerate; near this spot a boar's tusk was found, and a few fragments of pottery, land and marine shells, &c. The prisoners were provided with baskets, and I directed them to collect carefully every specimen, *however small*, for my inspection, and this was most diligently attended to under the superintendence of the prison officers.

'The next step was to ascertain the direction and bearings of the cave, and on May 4, 1863, it was found to run off, for a distance of forty feet, at right angles with that portion of the south side already excavated, and then in a zigzag form along the whole excavation for the tank (sixty-three feet) into an oblique passage on the north side: this passage, nine feet high and four feet wide, was connected with the original surface by a closed vertical fissure of small dimensions, which, as well as the passage below it, was choked with hard red clay: in the latter there were a few animal bones found encrusted with a hard red ochreous cement.

'The upper cave, only two sides of which have been discovered, is now intersected by a wall thirty-one feet high, which prevents any further excavations to the eastward, unless they are made on the other side of the wall, where, no doubt, the ramifications of the cave extend to some distance.

'In the centre of the cave, large blocks and masses of limestone, some covered with stalagmite, are lying heaped upon each other in every direction. There is a most remarkable mass lying near the south and west sides, twenty feet long, thirteen feet broad, and nine feet high. On this mass there are no stalagmite formations, and the top of it must have nearly reached the roof of the cave. There is a perpendicular fracture down its centre, which appears to have been caused by its having lodged in its fall on some boulders which are seen beneath.

'The south and west sides of the upper cave, where most of the human and animal remains, works of art, &c. were found, were completely choked to the roof (with no intervening space between) with dark black earth, granular

and mixed with small particles of decomposed bones, with charcoal distributed throughout from the size of a pea to that of a hen's egg; and from the smallest crevices and fissures in the sides of the cave, the bones of animals, birds, fish, land and marine shells, intermixed with pebbles and charcoal, have been extracted.

‘In the south-east angle (or near it) of the cave there is a stalagmite column fourteen feet high, attached to what little now remains of the roof, which, it would appear, has been destroyed unsuspectingly in the quarrying out of the rock. There have also been two stalagmite floors on the west side; the upper one, which runs round the south side, is eighteen feet, and the lower one twenty-two feet, below the roof of the cave. Ossiferous breccia, bones encrusted in stalagmite and in a fossil state, were found beneath these floors, and are still visible in the sides. The dark mould appears to have extended to the first floor; below this, for a short distance, is a red gravelly earth, and then black mould again, which becomes gradually coarser, mixed with broken stones, to the bottom. The ground-floor appears to be formed of large blocks covered with stalagmite, upon which the hammer and pick make but little impression. In order to ascertain what is beneath them it will be necessary to blast them out.

‘On July 13, 1863, a shaft was sunk by my directions through the stalagmite floor on the south side. On removing the upper crust (two feet thick), some large animal bones were found, and as the excavations proceeded, two more similar crusts were discovered, the intervening spaces between the three, being about three feet, were filled up with loose stones and earth: in these crusts and below them bone-breccia, fractured bones adhering to each other by stalagmite, and others in a hard red cement, were seen. On reaching a depth of ten feet it became evident that the shaft was leading into another cave or fissure, one side of which, of solid rock, was covered with stalactites and rock-breccia, and through some fissures a slight current of air could be distinctly felt ascending from below, which affected the flame of a lamp when applied to it. There was little earth to excavate at a depth of twelve feet, where there were large blocks of lime-

stone thrown on each other everywhere. These I directed to be broken up by means of wedges, being apprehensive that the use of gunpowder would shake the place too much. The tedious operation of breaking these blocks occupied many days, and, at length, when a large piece was broken off the last loose block, it suddenly gave way and disappeared down an aperture which had not been observed behind it. A prisoner descended this with a rope, and reported on his return that, below the aperture, there was an open passage descending perpendicularly for a considerable distance, and that the block which had fallen into it was partially choking it up, resting on a ledge a short way down; means were adopted which succeeded in dislodging this stone, and a rope ladder was procured, and when this was fixed I descended with a warder and some prisoners to examine the locality, and perceived that it descended perpendicularly for forty-five feet to a landing. Above this there is a roof thirty feet high. Another descent of seventeen feet, by a rope ladder, reaches a cave of some dimensions, which I have named "The Victoria Hall," and the descent to it "Saint George's Passage," the cave having been first discovered on St. George's Day.

'In the centre of the cave there are some large boulders, over which it is necessary to pass to reach a passage below them. This passage, which in some places is six feet high, leads to another perpendicular descent of twenty feet by a rope ladder, near the foot of which there is a small fissure descending to a passage running in a south-westerly direction. This was very narrow in some places and difficult to pass through, but Captain Arthur Hood, A.D.C., who accompanied me in my second descent, succeeded in passing to some distance, and returned with some bones of animals and shells. These passages have been since cleared from the clay and stones which obstructed them, and have been pushed on thirty-five feet in advance, terminating at the date of this Report in a vertical fissure from three to six feet wide, thirty-two feet deep, and thirty-two feet long. At the bottom of this fissure there is a bed of clay several feet in thickness, which was excavated, as there was every indication of its being con-

nected with other fissures or caverns below it. The sides of the fissures are covered with stalagmite, and in the passage leading to it the walls are covered with the most fantastic stalactite formations, some resembling small glass tubes, hollow, and transparent, about the size of the common quill, and from four to ten inches long.

‘Embedded in the clay at the bottom of the fissure, animal vertebræ and bones, with those of birds and fish, have been found, together with marine shells, water-washed pebbles, bluish dark flints, and angular fragments of limestone rounded by attrition. About eight feet of the clay have been excavated, and at the lowest depth yet attained, 200 feet below the plateau of Windmill Hill (which is about 400 feet above the level of the sea), a fresh current of air can be felt ascending through fissures, sometimes strong enough to extinguish a lamp. The temperature here, at this date, at mid-day, is 66° Fahr., which is 12° cooler than at the surface, and small pools of water are found.

‘*Human Remains.*—These were found lying in every imaginable direction and position, without order, to a depth of ten feet, or thereabouts. Scarcely a bone has been found whole, much less an entire skeleton. Some of the bones are partly decomposed, others have been gnawed by animals, many stained a bluish black. They were also found in a semi-fossil state encrusted in stalagmite, and in a red ochreous cement; charcoal was adhering to many of the bones. Some portions of human skulls were found even close under the roof of the cave.

‘*Animal Remains.*—The foregoing remarks respecting the position and state of the human remains are applicable to those belonging to animals, birds, fish, with the exception that these have been found down to the lowest depths yet attained. Charcoal was adhering to many, but this has not been observed in the lower caverns and fissures.

‘*Works of Art.*—The flint instruments, anklet, skewers or arrow-heads, &c., were also lying without order, as also the querns and “rubstones.” As regards the latter, I have compared them with the nearest sandstone procurable at Windmill Hill, which is at the “sandstone quarry,” near

the Governor's cottage at Europa, and find that the latter is of a much coarser and different description altogether.

'With respect to the pottery, only three entire earthen pots were found, and two of these were unfortunately fractured in digging them out; the one remaining entire (Fig. 4. Pl. VIII.) appeared to be filled with clay, on removing which a scallop shell was found at the bottom. This has probably been used as a lid, as it seems to fit the mouth exactly. One of the pots which I cemented was evidently never formed by the potter's wheel. Some of the fragments are rudely ornamented, and all unvarnished. Fragments of pottery were found at a depth of twenty feet from the roof. The greater portion was found on the south and west sides.

'*Land and Marine Shells.*—The former were continually found adhering to the sides of the cave as in life—others encrusted in stalagmite. Marine shells were found from the roof of the cave to the lowest depths, together with two pieces of coral.

'Rounded and water-washed pebbles, angular fragments of limestone rounded by attrition, bluish flints, portions of sandstone, were found everywhere; also a piece of plumbago, which has a small hole in it, as if it had been worked out by the finger.

'In concluding the foregoing observations, I would beg to observe that the satisfactory progress of the excavations is owing to the great interest which His Excellency the Governor has taken in the cave since its first discovery, in temporarily suspending works which if carried out would have destroyed it, or most effectually prevented its development; and I beg to return my best thanks to His Excellency for the kind and ready assistance I have always received from him since he was pleased to entrust me with the superintendence of the excavations.'

The Report from which the foregoing extracts are taken, brings the history of the exploration of the Genista Cave down to August 21, 1863. But the excavations were actively and uninterruptedly carried on, except when stopped by heavy rains, and in August, 1864, had reached a travelling distance, bearing south-west, of 380 feet from the mouth, and

to a vertical depth of 290 feet from the surface. The stalagmitic floor of the upper cave had been broken through in two places by shafts, and other ossiferous fissures had been traced in connection with it. The ground outside the east wall, referred to in the Report as 'an obstruction,' had also been extensively excavated, and had yielded important additions to the collections. Of these progressive steps Captain Brome communicated an account in numerous letters, in one of which, dated September 21, 1863, he wrote as follows:—

'Since my Report, with plan and section, was forwarded through the Governor of Gibraltar on the 22nd ultimo, the excavations have been pushed on about 100 feet further, still bearing south-west, through passages which have been cleared, into another large fissure, the height of which is about eighty feet or upwards. In this, embedded in clay, fragments of bone, sea-shells, and small portions of charcoal have been found, which I presume must have been washed down from above. The ramifications extend about 300 feet (travelling distance), and the perpendicular depth below the plateau of Windmill Hill is, according to my calculation, about 290 feet. In fact, it would appear that the ramifications exceed those of the celebrated St. Michael's Cave, which, according to Lieut. Warren, R.E., only extends 288 feet below the entrance gate of the cavern.'

In a letter dated February 25, 1864, Captain Brome states, that 'the works are again going forward in the lower fissures, but during their temporary suspension from the wet weather, we have sunk a new shaft about ten yards behind the principal one, leading to the lower fissure and caverns, &c. On reaching a depth of eighteen feet through a stalagmite floor, an immense quantity of fractured bones, imbedded in breccia and a hard red earth, were found; and, at the depth already mentioned, we cleared out a chamber about ten feet square, in which were found the remains of a large pillar, seven feet in circumference and about nine feet high: it is not *in situ*, but inclining on one side, and attached to the roof by stalagmite. It appears as if it had slipped from a higher position, and was immediately surrounded by debris, &c., which had kept it in its upright position; there is a

crack running through its centre, which probably occurred when it was displaced. Immediately behind this pillar there was evidently a passage, but it was choked up so completely with loose stones cemented together with breccia, that it took the prisoners ten weeks to clear it to a depth of forty feet, when to my disappointment it was found to run into the lower caverns, with which it is connected by a very small passage. . . . The operations outside the east wall are going on very satisfactorily; I have made an excavation about 202 feet long, and 14 feet broad. On the east side of this excavation, extending along its whole length, is a large fissure or ravine (E, Pl. II.), with a dead wall of solid rock, over which the large broken masses of limestone lying in the fissure must have been precipitated. I have also observed that this opening appears to be in a line almost with a rugged ridge of rock which runs down the southern slope of the hill called *Pan de Assucar*, on which stand the remains of O'Hara's Tower. It is my impression that the ravine runs right across the plateau of Windmill Hill, and I intend to see if this is the case by excavating it, if I am not stopped. The ravine runs in a S.S.W. direction, and if you have a plan of this part of the rock, and can find *Jacob's Ladder*, which is a communication with the road leading to *Europa Flats*, that will be the spot where the end of the ravine must be, provided it continues in its present direction.'

In a letter dated July 31, 1864, Captain Brome writes as follows :—

'Since I last addressed Professor Busk, labour has been directed to open the vertical fissures, the discovery of which I then reported, a portion of which forms the eastern boundary of the upper cave. This fissure, which runs in a S.S.W. direction across Windmill Hill, has been opened to a distance of 350 feet, and in two places to depths of 50 and 64 feet. In the first a stone implement was found and masses of breccia with small bones and land-shells imbedded in them to a depth of fifty feet. In the second also the same appearances presented themselves to a depth of fifty-three feet; but here the prisoners came upon a mass of bones in a good state of preservation, not rolled or bearing any marks what-

ever on them. In this mass two teeth of rhinoceros were found.'

A second detailed Report of his subsequent operations, furnished to me by Captain Brome, is dated May 14, 1868, accompanied with additional plans and sections, which have been given on a reduced scale with this communication.

'The first Report' (1863), he says, 'left the prisoners excavating the clay at the bottom of fissure *m* (Pl. III.), which was done to a depth of twenty-one feet; here the sides of the fissure began to draw in, and no outlet was visible. Numerous bones and fragments of bone were found in the clay. After a careful search for an outlet, one was found at *o*, but it was closely choked with stones and earth, &c., which had to be excavated for a distance of forty feet, where it was found open, leading down into *q*, a large cavernous fissure about eighty feet high, with two clay beds at the bottom, which were excavated to depths of twenty and twenty-one feet; bones were found in this clay. The air in the fissure was quite pure, and the aneroid barometer marked a vertical depth of 248 feet from the original surface. After a careful examination of the place, no outlet was visible; some of the prisoners ascended the sides to a height of about fifty feet, but without success, and the men were withdrawn.

'The fissure *n* was the next new find, thirty-three feet in length, six feet in width, and forty feet in depth. The bed of clay in the bottom was excavated to a depth of twenty-seven feet, and bones, charcoal, &c., were found in it throughout. The sides at the bottom draw in, and no outlet appearing to exist here, the place was abandoned.

'Labour was now directed again to a careful exploration of the upper chamber. The stalagmite floor at *x* was pierced, and a descent made below it to a depth of twelve feet. Bones, broken stalactites, and breccia came up in abundance. A small chamber was excavated here, twelve feet by nine feet; and a portion of a large stalagmite pillar was found, standing almost upright. It had apparently come down from a higher position in some convulsion, and getting surrounded by debris, &c., swept in when it fell, was kept in the position in which it now stands. This portion of pillar is fourteen feet in girth, and eight feet high.

‘Near the pillar the remains of a passage were found, closely packed with hard breccia, bones, &c., and after being excavated to a considerable distance, it was found to run circuitously into E E. Another passage near the head of the rope-ladder was also excavated, and was found to run into the same place. Grey limestone was reached below the floor of the upper cave at a depth of twelve feet, which was rent in all directions. One of these fissures was just wide enough to admit a small man, who descended to a depth of twenty-four feet, but the spot was too narrow to work in.

‘The lowest floor on the west side of the upper chamber was next worked. The stalagmite being very hard, small charges of gunpowder were used to detach it: a portion was removed to a depth of six feet, down to grey limestone. Numerous bones, crusted with a white chalk-like substance, were found embedded in it.

‘On the south side of the upper chamber an excavation was made through three stalagmite floors, to a depth of nearly twenty feet, at which depth a bone needle with an eye in it (Fig. 1, Pl. XI.) was found.

‘Every part of the upper chamber and lower fissures having been carefully explored, my attention was directed to the discovery of the ramifications of the cave to the eastward, where I felt persuaded they extended. Not being allowed to interfere with the boundary wall, whose foundations came in the way, I directed an excavation to be made under the south-east angle of the wall, with the object of passing under it to the other side. As the excavation proceeded through what appeared to me to have been an entrance at some time, a sudden fall of earth from above made me apprehensive for the safety of the wall, and it was abandoned in consequence. A dry stone wall, however, was first built up, as shown in section A at B.

‘Labour was now directed to break ground outside and parallel to the east wall, at a distance of ten feet from it, commencing at the north end, near the road leading to the officers’ quarters on Windmill Hill. In a short time (a few days), a polished stone axe (Fig. 4, Pl. XII.) was found, similar to those found in the Swiss lakes. At a depth of nine feet

from the surface, a fissure was met varying from seven to eight feet in width, which was filled with red bone breccia, loose bones, &c. It was excavated to a depth of thirty feet. At this depth, the sides of the fissure bore evidence of much dislocation and disturbance. Immense masses of limestone were seen lying on each other in all directions; the lower masses were much shaken and cracked, as if the overlying ones had fallen on them from a height. A passage was excavated in this fissure to a distance of seventy feet, when further exploration was prevented by the sides contracting inwards. This passage was choked with earth, breccia, and loose stones, with water-washed pebbles intermixed, and it ran off in the direction of the upper chamber, with which it appeared to be connected. The works were here brought, however, to an untimely end by an intimation from the Commanding Officer of the Royal Engineers, who objected to further excavations on account of their proximity to the wall.

‘In no way discouraged, I determined to trace the course of the fissure more to the southward, where it was unlikely any objections would be made. After some weeks’ hard work, the continuation of the fissure was found leading in a south-westerly direction. It was a “sealed fissure” (if ever there was one), as there was not the slightest indication of its existence on the surface. Before reaching the fissure, the entire skeleton of a horse was found about two or three feet under the surface, dry, porous, and earthy, and though not at all incrusted, hardly distinguishable in appearance from many of the older fossilised bones, and in no way from those accompanying the human remains; but the feet had attached to them shoes of English make and fashion; and eventually these remains turned out to be those of a horse once the property of Captain Williamson, who was adjutant of the gallant 33rd regiment at Gibraltar in 1839.

‘As the excavations in the fissure proceeded, I observed that the sides of it bore evidence of great dislocation, vertically and horizontally. Its width varied from five to six feet, and no remains of any consequence appeared till a depth of twenty feet or thereabouts was reached; here red bone-

breccia and bones, flints, and rounded pebbles began to make their appearance. A considerable time, however, elapsed before this depth was attained, in consequence of our having to break up (piecemeal) the very large masses of limestone blocking up the fissure, and the use of gunpowder at this spot would have been dangerous to the buildings in the vicinity. Obstacles of this nature, it may be observed, were encountered throughout the entire excavations.

‘At a depth of fifty-three feet, the men came upon a quantity of red breccia with bones and teeth embedded in it; among the latter I identified two molars of *rhinoceros*. A human tooth was also here found in the red breccia, which is, I believe, the first instance of the kind on record of such remains being found in such a matrix; a flint knife was also found in this breccia, and numerous large pieces of flint. There is not the shadow of a doubt but that the foregoing objects were found in the red breccia, therefore I do not despair yet of hearing that further remains of man and his works have turned up in the same breccia.

‘The human tooth was identified by Professor Busk, who was of opinion that it was “a molar tooth which had never been cut.”’

The eastern fissure was subsequently opened to a considerable distance towards the south-west, and afforded in parts numerous fossil remains, but none apparently belonging to the human period. To what extent it reaches towards the south was not ascertained, but it probably traverses the entire length of Windmill Hill plateau. In a northerly direction, Captain Brome perceived indications, on the slope leading up to O’Hara’s Tower, on the east of the Jewish burial-ground, which led him to suspect that a continuation of the same fracture extended nearly to the summit of the ‘south hill,’ and the observations of Dr. Falconer and myself tended strongly to confirm this view. If this be really the case, the circumstance that the fissure and the Genista Cave, No. 1, which communicates with it, have afforded such an abundance of animal remains is at once accounted for by its being directly in the line in which the pluvial autumnal floods would pour from the higher ground down upon Wind-

mill Hill Flats, bringing with them the remains of the various animals which at that period inhabited the thickly wooded heights. In the course of the explorations it was clearly ascertained that the only entrance apparently into the upper Genista chambered cave was from the eastern fissure, below the angle of the boundary wall.

2. *Genista Cave, No. 2* (Pl. II. B, and Pl. IV.).

Encouraged by his success in the first discovered Genista Cave, Captain Brome resolved upon making a careful examination of its vicinity in the 'full expectation of finding other caverns on the hill;' nor was he 'disappointed in this hope,' for on November 1, 1864, he says, 'about a month after the departure of Messrs. Falconer and Busk, one was discovered.'

'On examining the ground between the large magazine on Windmill Hill and the West Cliff, I observed two small apertures, which led into a cavity nine feet deep. As appearances looked promising, I obtained the necessary sanction from the authorities, and commenced operations there on November 3, 1864.

'The place had never been explored, nor were there any indications that excavations had been made in it.

'On the removal of stones and earth, a small cavern was found, having the following dimensions:—

	Feet.
Height	9
Width	15
Length	30

'It had a stalagmite floor, which was opened in two places. Beneath this, and embedded in it, were found stone axes, flint knives, worked bone, &c. On reaching a depth of three feet a small opening was found, five feet to the eastward up the cavern. When this was sufficiently enlarged, a man crawled through, and on his return reported that the aperture led into passages which he thought extended about 100 feet, with a slight incline downwards; also that there was another aperture, through which, if enlarged, he could move still further. When the opening at the entrance was en-

larged, I went in to a distance of forty feet, which was as far as I could penetrate, and found that the passage was filled nearly to the roof with light black earth, so light in fact that, with the pressure of the hand almost, an iron rod could be pushed in easily to a depth of three feet and upwards. There was barely room for me to crawl between this earth and the roof. On removing the earth, which was a tedious operation through so narrow a passage, remains of various kinds were found in it. At a considerable distance in, the valve of a pecten was dug up, associated with human remains, consisting of some fragments of a skull and a human tooth (incisor). When the passages had been excavated to a distance of 110 feet, we came upon limestone, which prevented our continuing the work, which had occupied the prisoners about three months.

‘The remains yielded by this cave and the passages consisted of the following, viz.:

- ‘1. Human remains.
- ‘2. Animal remains of all kinds. These appeared to have belonged to ruminants only.
- ‘3. Bones of birds.
- ‘4. Bones of fish.
- ‘5. Sea and land shells.
- ‘6. Fragments of pottery of the same kind in every respect as that found in Genista Cave, No. 1.
- ‘7. A piece of sulphur.
- ‘8. Worked bone.
- ‘9. Stone axes; one was of a sea-green colour, with a square chisel at one end and a gouge at the other.
- ‘10. Flint knives.
- ‘11. Chipped flints.
- ‘12. Round, water-washed pebbles.

‘The remains presented precisely the same appearance as those found in the first cave, as regards being sun-cracked, *not* rolled or water washed, and very few with signs of having been gnawed. Everything almost was fragmentary, very few whole bones being met with.

‘The cave has its entrance at the surface, and is an inland cave. Its general bearings are N.N.E. The scattered, broken

state of everything found, together with the fact that the objects were almost invariably discovered near and under the sides of the cavern and passages, appears to me to indicate that these appearances could only have been caused by some convulsion, accompanied by flood.

‘No metal of any kind was found. The distance from the entrance to this cave from the first Genista Cave is exactly 1150 feet. The water-washed surface above is extremely rugged and wild, and not the slightest trace exists of any former pathway to it.’

3. *Genista Cave, No. 3* (Pl. II. E, and Pl. IV.).

‘This cave appears to me to have been a seaboard one. It is situated on the east side of Windmill Hill, about 150 feet from the cliff over the Governor’s cottage, and not far from the ruin of an old windmill. One of my sons was the first to draw my attention to this spot; he said that his dog had gone into a very small hole a considerable distance after a rabbit, where he could just hear his barking. I examined the place, and set the prisoners to work immediately to excavate it.

‘On clearing the entrance, and after removing two feet of surface matter, several bones of animals were found, and soon after fragments of a human skull, a few flint knives and flint chips; and the following day several portions of human remains were met with, viz. human skulls and bones, vertebræ, upper and lower jaws, and teeth. On the cave being partly cleared I measured its dimensions on the 11th January, eight days after its discovery, which appeared to be as follows, viz.

Height	9 ft. 6 in.
Breadth	25 „
Travelling distance	30 „

The sides of the cave bear evidence of much horizontal dislocation; and about the centre there was a small pillar, which was broken across near the roof,* and the lower part displaced about five inches. This pillar was unfortunately subsequently destroyed by some mischievous person; but the

* As shown at A in the Plan.
K 2

warders and myself have a clear recollection of it. Four human skulls* were found in this cave at about six feet under the surface—one I saw taken out myself; these were nearly perfect. Various fragments of skulls were found. The objects were, as in the other caves, nearly all fragmentary, more or less injured, and all found scattered in every direction round the sides of the caves. The following is a list of the remains found:

‘Four human skulls, nearly perfect, the only ones yet found in this state; human upper and lower jaws; numerous fragments of human skulls; human molars and incisors and portions of lower jaws; human vertebræ and other bones; bones of animals (apparently ruminants, goat, ox, ibex principally); bones of fish and birds; bone breccia; stone axes; flints and flint knives, chips, &c.; pottery, as usual in fragments, of the same kind as that from the other caves on Windmill Hill; worked bone; sea shells, barnacles, &c.; water-washed round pebbles, large and small.

‘The entrance to the cave is on the east side, and its general bearings run W. When it was entirely cleared out down to the stalagmite floor, this was broken through, and a perpendicular excavation was made, as at c in the Plan, which was afterwards connected with the cave on the west side. Here bones were found, and a great quantity of loose masses of limestone, &c. The excavation was pursued to a distance of eighty feet. After this, I considered the cave explored to the utmost, and abandoned it.’

4. *Genista Cave, No. 4* (Pl. II. D, and Pl. V.).

‘This is a seaboard cave, and has its entrance in the face of the east cliff (as shown in the sketch), nearly over the Governor’s stables at Europa, and about forty feet under the summit.

‘A rope-ladder was lowered down to the entrance, and the first object found was the skull of a large bird, probably a vulture. On commencing to excavate, flint knives and chips were dug up under the stalagmite floor. The cave has two passages, having a southerly direction, with a slight in-

* Two of these, the most perfect, are represented in Plate VII. Figs. 1–8.

clination downwards; it appears to run almost parallel to the east face of the cliff; there are some short pillars in it, and the travelling distance reached is sixty feet. There were no human bones found here. The articles met with consisted of the following, viz.:

‘Flint knives or flakes; bones of animals, large and small; bones of birds, and of fish; the valve of a pecten; land and sea shells; large molar tooth of deer; teeth of carnivorous animals; water-washed pebbles.

‘Here, again, everything was found in the same disturbed state as in the other caves. The bones might have been carried into this cave by vultures; but the flint knives and chips, and probably the cervine tooth, were taken there by man.’

5. *East Fissure* (E, Pl. II.).

‘Having done all that could be done in this cave it was abandoned, and labour was resumed again at the east fissure.

‘It was my anxious wish to discover the whereabouts of this fissure’s connection with Genista Cave, No. 1. I directed what appeared to me to be a closed perpendicular rent, at the north end of the northern part of the fissure, to be opened. It was just large enough for the prisoners to work in, and was excavated in a northerly direction for a distance of fifty-four feet. Quantities of red bone-breccia were here found; but the work came to an untimely end, a notification having been forwarded to me by the Commandant of the Royal Engineers, that we were undermining the new wall: the work was in consequence suspended for some weeks, as stated above.

‘In the meantime I wrote to the Commanding Engineer, requesting him to be good enough to allow an officer to inspect the excavation, and report thereon for his information, as it would have been a great pity to arrest the progress of the exploration at this point. An engineer officer was accordingly sent to examine the place, who reporting that the excavations would not affect the wall in any way, Colonel Ayre kindly gave permission to proceed, and in a very short time afterwards the prisoners broke through from the excavation into B (vide section A, Pl. III.), the spot I had built up, and where I always suspected an entrance to exist.

‘The excavations now proceeded at the north end at the bottom of the fissure, and here, embedded in red breccia, a large jawbone of a horse was found, which was taken to England for identification. Below the spot, nearly where this was found, at a depth of sixty feet, an aperture was discovered, which on being enlarged was found to lead through very narrow fissures by a circuitous route down into Q, the lowest fissure-chamber. Thus two entrances were now discovered, which clearly indicated how the remains found at the lowest depths reached that position.’

6. *Martin’s Cave* (2, Pl. II.).

‘Feeling persuaded that if the well-known caves on the rock were properly explored, they would yield interesting relics of the past, I addressed an official communication on the subject to his Excellency Lieut.-General Sir Richard Airey, G.C.B., Governor of Gibraltar, requesting permission to explore St. Michael’s, Martin’s, Fig-Tree, and Poca Roca Caves, and having received the necessary sanction, proceeded to Martin’s Cave on June 20, 1867, with a party of ten picked men.

‘On examining the condition of the cave, no traces were visible of any vigorous exploration ever having taken place, either in the bed of dark earth, or through the stalagmite floors.

‘The cave is a seaboard one, situated on the east side of the rock, about 590 feet above the sea level. It bears the name of the soldier by whom it is said to have been discovered about the year 1821. I could find no inscription of earlier date than 1822. On its first discovery, I am informed that it was almost inaccessible, and the present approach and iron gate were made by the Royal Engineers. As usual, in these cases, there is a rapid descent from the entrance (which is five feet wide), and the floor is covered with black earth.

‘I directed the prisoners to excavate the black earth all along and under the north side of the cavern, and to have it carefully searched. After a couple of hours’ work, two flint knives were found two feet under the surface, and

before the prisoners left seven more were discovered. Day after day flint knives, stone axes, fragments of pottery, were found, the latter the same as those at Windmill Hill in every respect, as regards material, appearance of fracture, &c. A party was also set to excavate under the south side, where the same objects were found. Five days after the excavations commenced, a two-edged sword was found under six feet of earth, in a small chamber on the north side, at the lower end of the cavern; it was partly under stalagmite, and was fractured in five or six places; its dimensions are as follows, viz.:

HILT:—		Feet.	Inches.
Length		0	6½
Circumference of grasp at thickest part		0	5
BLADE:—			
Length		2	11
Greatest breadth		0	2½
Narrowest breadth		0	1¾
Centre thickness of blade		0	0¼

‘The hilt was surmounted by a globular pommel, and the whole of this portion of the sword appeared to be of silver.

‘The scabbard had been of leather, lined (apparently) with wood; it was mounted with silver.* On the silver mounting at the mouth of the scabbard there was a stamped ornament.

‘The day following that on which this sword was found, another was discovered, or rather the remains of one. It was found at about the same depth as the other, but about four yards distant from it. The hilt is of the same form as the first, with a globular pommel; it is of iron, and the mountings of the scabbard of copper. It was found fractured in seven places, and was of the following dimensions, viz.:

HILT:—		Feet.	Inches.
Length		0	6¼
Circumference of grasp		0	5
BLADE:—			
Length		3	2
Greatest breadth		0	2½
Narrowest breadth		0	1¾
Centre thickness of blade		0	0¼

* Mr. Franks thinks it is more probably tin, but it certainly looks very like silver.

‘The above sword was not in so good a state of preservation as the former one.

‘A short time after the discovery of the swords, a copper plate was found under eighteen inches of hard stalagmite, close under the south side of the cave. When it was brought to me it was covered with verdigris. It is about one and a half inch long, with a circular hole stamped or punched through each corner. Some of my friends thought it was a portion of some military appointments of the present period. I removed the incrustations as carefully as possible, and something very white appeared. In a short time an enamelled surface was visible, having depicted on it something like a bird in the coils of a serpent, which has been identified by Mr. Augustus Franks as a dragon. The plate is said to be of “Limoges” work, and of the same period as the swords.* The colours on this plaque are still visible, and must have been very brilliant.

‘The remains collected from this cave were as follows, viz.:

‘Human remains; animal remains (ox, chiefly, goat, sheep, ibex); bones of birds; bones of fish; bones of reptiles; fragments of pottery; sandstone querns, made of a material not to be found at Gibraltar, nor in the neighbourhood; stone axes; flint knives, numerous; one beautiful specimen of a flint core; worked bones; sea and land shells; round pebbles; rubstones of sandstone; charcoal, distributed above and below the stalagmite floors.

‘At a depth of five feet below the black earth a stalagmite floor was found and broken through, beneath which, and embedded in it, were found the bones of animals, birds, fish, charcoal and pottery, sea shells (limpets principally).

‘The dimensions of Martin’s Cave are as follows, viz.:

	Feet.	In.
Extreme length from entrance	114	0
Greatest breadth	73	2

‘Martin’s Cave having been now pretty vigorously explored, and no new outlets from it in any direction discovered, the party were withdrawn.’

* Probably of the end of the 12th or beginning of the 13th century, according to Mr. Franks.

7. *Figtree Cave* (Pl. 3, II.).

‘The cave thus named was the next explored. As it had no name before, I gave it the above, temporarily, from the fact of its having a Figtree growing out of the rocks above its entrance. It is a seaboard cave, situated not far from Martin’s Cave, but about 200 feet higher up. There is no regular path to it, but from the polished state of the stalagmite at the entrance it has evidently been much used at some time.

‘The following are the dimensions of this cave, viz.:

	Feet.
Length	58
Breadth at centre	14
Average height	24
Width of entrance	17

‘The exploration of Figtree Cave was commenced on July 21, 1867, and the excavations were begun all round the sides. In a short time the men came upon human and animal remains, fragments of hand-made pottery, &c.; the work proceeded through two stalagmite floors down to a depth of five feet, where we came upon the gray limestone. The cave is an extremely dry one, and the bed of earth in it is nothing but dust. There were no traces of any exploration through the earth or stalagmite floors. There is another cavern, smaller and lower, running nearly parallel to this; and they both seem to meet at the ends, which are too contracted to allow one to pass through; but here no remains were found.

‘The remains found consisted of—

‘Human remains; animal remains; birds’ remains; fish remains; flint knives and chips; fragments of home-made pottery; sea shells; charcoal.

‘A fragment of a very regular moulding, made of pottery, was here found, pointing to a comparatively advanced stage of ceramic art. The party were now withdrawn to explore the far-famed cave of St. Michael’s.’

8. *St. Michael’s Cave* (Pl. 1, II., and Pl. VI.).

‘The following extract from the report of Professors Busk and Falconer, prepared for the meeting of the British Association at Bath, 1864, will best explain the features of this remarkable cavern, viz.:

‘It is situated high up, but below the summit, at about 1,100 feet above the sea, and nearly equidistant from “Signal Station” on Middle Hill and “Sugar Loaf.” The entrance is contracted, being about five feet wide, leading by a rapid slope of in-fallen or in-thrown earth to a spacious hall, 200 feet long by sixty feet high, the roof of which is, as it were, supported by massive stalactite pillars, like a Gothic cathedral. This outer chamber conducts to a long series of caves, of difficult access, by a steep or vertical descent. The fissure has been explored to a perpendicular depth of about 300 feet, without reaching the end of it. The most conflicting statements have been made whether fossil bones do or do not occur in this cave, &c.’

‘After a careful examination of the upper chamber of the cavern, I could discover no traces of anything like vigorous exploration having been attempted, either in the black earth or through the stalagmite floors. Nearly at the extreme end of the upper chamber, traces of blasting are indeed visible; but this appears to have been done merely for the purpose of procuring the crystalline material locally termed “congeal,” which is used for the manufacture of various articles. The main explorations of St. Michael’s Cave have been almost solely confined hitherto to that of the lower ramifications, with a view to discover their extent. Many and most praiseworthy attempts in this direction have been made; and amongst those whose names are most worthy of record as explorers of late times may be mentioned those of the late Dr. Litle, R.N., and his commander Captain Risk, R.N., in 1844; Sir George Douglas, Bart., in 1847; Lieut. Warren, R.E., the late Captain Goodall, and Lieut. Brown, R.A., in 1865, who appears to have penetrated to the greatest depth hitherto reached. The animal remains, however, collected by these numerous explorers, have been very few, and were merely recent bones apparently washed in by the rains with the surface soil. Lieut. Warren, R.E., a most accomplished officer, since so distinguished by his researches in Jerusalem, carefully explored the lower series of caves and ramifications on several occasions. In a note to me on this subject, he says:

“ The bottom of the cave is 288 feet below the entrance of the gate.

“ I found no bones, shells, or osseous breccia in the cave; a little recent matter washed in by the rains was all that was to be seen.”

‘ Lieut. Warren informed me also that he “ obtained the depth accurately, both by measurement and with the aneroid barometer.”

‘ The upper chamber, from the entrance gate to the front of the rapid slope, has a bed of black earth of various thicknesses. Along the north side, an immense number of limestone boulders and small stones were lying as if they had been thrown there to get rid of them, perhaps when clearing the cave. On the right hand side, at a distance of seventy-three feet from the entrance gate, is seen the well-known aperture through which so many explorers have passed on their way to the lower caves. In front of this aperture my first excavations commenced, where, after a few hours’ work, a human molar tooth and clavicle, with some fragments of the usual pottery, were found. As the excavations were continued all along the south side, through two or three stalagmite floors, abundant remains came up—human and animal bones, pottery, flint knives, &c. On concluding the exploration on the south side, labour was directed to the north side. The vast number of stones there which had to be first removed occupied some weeks; at length earth was reached, which had been covered by the loose stones to a depth of at least five feet. As the exploration went forward, the same results attended it as on the south side as regards the objects found.

‘ At the lower end of the north side, after removing nearly seven feet of earth and stones, my attention was drawn to a small hole in a stalagmite wall, through which could be felt a strong current of air. I had the opening enlarged, and a cluster of stumpy pillars became visible. Several objects, including human and animal remains, were found near this, including a stone axe, the remains of an anklet of shell, all behind, between, and under stalagmite. The party working at the aperture were ordered to follow the current of air,

and, after a fortnight's hard work here, the men broke into a passage filled with earth nearly to the roof, which was of rock coated with stalagmite. There was no room for a man to enter here, so one of my young sons crawled in with a lantern to some distance, and on his return said that the passage seemed to continue downwards. He could just see over the earth, and that was all. I had the passage enlarged, and one of my warders, a man of spare dimensions, got through. He described to me that he passed through some passages, which terminated in a large cavern on the left hand; that his measurement of the full distance travelled was 200 feet; that after searching for about twenty-five feet, he found all the other passages and cave clear and nearly free from obstructions; he said the whole thing was so beautiful that it was out of his power to describe it.

'The following day, the aperture having been sufficiently enlarged to admit me, I went down. I found there was a passage from the entrance with a rapid incline downwards, which led into another about eighteen feet long; then passing through an opening between some stalagmite pillars, we got into a long open passage, averaging in width about fourteen or fifteen feet, and about twenty feet high. At the end of this passage there was a small hole on the left hand about five feet high, on going through which another passage was entered about forty-five feet long. The roof here is low, and it was necessary to stoop a little. At the end of this passage an opening which we broke through led into the cave No. 1, the dimensions of which are as follows:

	Feet.
Height	25
Length	106
Breadth	44
Bearings N.N.W.	

'Nothing can exceed the beauty of the stalactite formations in the cave and passages; they form clusters of almost every imaginable shape—statuettes, pillars, capitals, foliage, and figures; and, by the concurrent testimony of all who have visited these newly-discovered caverns, it would seem that their beauty is almost unrivalled. Even the

numerous Americans who have entered have been compelled to acknowledge that, as regards beauty and picturesqueness, neither the celebrated "Mammoth Cave" in Kentucky, nor any other in their country, could come near them.

'On reaching the first new cave, I immediately set to work to seek for outlets, air-holes, &c. We found at the top of the ascent, on the west side of the cave, a vertical fissure varying from six to ten inches wide. I observed that one side of this fissure was covered by a thick coat of stalagmite, the other being solid limestone. I had the stalagmite removed, as being the easiest way to enlarge the fissure, and in a few days a very slim prisoner managed to get through with some difficulty. He was absent a considerable time, and told me on his return such a wonderful story of what he had seen, that, in order to satisfy myself of the truth, the following day I sent in one of my little boys (about twelve years of age) with the same man. The boy being absent nearly two hours, nothing can describe my agitation, and the anger I felt with myself for sending him in. The moments were those of torment, but, happily, out he came, corroborating all the prisoner had stated.

'Additional labour was now directed to the enlargement of the vertical fissure, to enable me to go in; this occupied three weeks' hard labour, the men lying on their backs in water, but working with that energy, spirit, and good feeling which British soldiers always exhibit when there is anything extra to be done. On September 2, 1867, the fissure was reported to be large enough for me to enter, when, after two or three attempts without success, I made a triumphal entry, accompanied by Dr. James, R.A. On our getting through the fissure, which is about four yards long, by a slight ascent we entered a long passage, with a large cavernous hollow branching off to the left; we then came to a very steep descent, which led into cave No. 2. There was evidence of great disturbance here; large blocks of limestone had fallen from the roof, most of which were covered with stalactites of all sizes. Halfway between the entrance to the passage and the extreme end there is a descent of fifty feet, about

four feet square. By breaking away some pillars on the right hand of the descent, we entered cave No. 3, which is of the following dimensions, viz. :

	Feet.
Height	50
Length	132
Breadth	33
Bearings N.N.W.	

‘Though its dimensions are larger than No. 1, in the formation of its floor it resembles that cave. Nothing can surpass the beauty of the stalactitic formations. The air is pure, and there are two pools of water visible. The stalagmite which covered these places was broken at some time by masses falling from the roof. There is evidence of disturbance here and there, probably from some convulsion of the past. On searching for outlets, a small cavity on the right hand or east side was broken through, which led into cave No. 4. This is a long narrow fissure about eighty feet in length, and six or seven feet wide. The floor of this cave is about nine feet higher than that of No. 3, and No. 2 is about ten feet lower still.

‘To facilitate our getting down the passage leading to No. 2 cave, I had some steps, or rather notches, cut into the stalagmite all the way down. While performing this operation, the men found bones of animals and birds imbedded in it. The same were also found in performing a similar operation on the ascent in No. 1 cave.

‘Parties of men were distributed in various parts of the cave, with orders to excavate and seek outlets or passages. A passage, part of a fissure, was found under No. 2 cave, extending no less than 304 feet. The passage was too contracted for me to attempt to enter it, but a careful warder succeeded, and measured the place. He reported that it was too confined to work in, and that there was also danger of some of the masses hanging overhead getting detached.

‘I was commencing to break through the floor in No. 2 cave, when an order arrived from the War Office to discontinue the employment of the military prisoners on the cave explorations, which were consequently abandoned.’

9. *Poca Roca Cave* (Pl. II. 8).

‘A few weeks before the prisoners were withdrawn from the caves, I went with a party to explore Poca Roca Cave.

‘This cave is situated at the north end of the rock, at an elevation of 689 feet above the level of the sea. It is a large cave with a very deep slope from the entrance. The exact measurements had not been taken when the order came for the withdrawal of the prisoners. What I particularly remarked was that it was filled with a light-brown silicious sand, which I had not met with in any of the other caves. It appears to extend a considerable distance under the rocks, and it was excavated in a horizontal direction to a distance of forty feet. In the sand were found bones of animals, &c., and several of these were found under a stalagmite floor. Some of the same kind of pottery was found here also as in the other caves. It has occurred to me that probably this cave may have some connection with the sand hills above Catalan Bay, as the sand is of similar kind.

‘This cave was fitted up or prepared, it is said, for the Governor of Gibraltar during the siege, but was not used by him. There are evidences of blasting operations having been performed, which appears to me to have been done to raise the roof of the passages. No traces of exploration (*i.e.* below the floors or earth) are apparent.’

‘During the exploration of Poca Roca Cave, the excavations at St. Michael’s still continued. Another small cave, No. 5, was found, near the spot where the first aperture was discovered, which led to No. 1. It is a small cave, twenty-five feet by eighteen feet. The floor has not yet been broken through.

‘The remains collected at St. Michael’s Cave consisted of the following, viz. :

‘Human remains of all kinds, embedded in stalagmite or under it, and loose in the earth ; remains of mammals, birds, fish, and reptiles ; numerous fragments of pottery, hand-made, like that found in the Genista caves ; fragments of

armlets or anklets; worked bone needles; querns; rub-stones; moulding of pottery, similar to that found in Figtree Cave; stone axes; flint knives and chips; eleven Roman coins near surface in earth; sea and land shell, numerous, of all kinds; some red bricks of unusually large size, in the earth.'

10. *The Judge's Cave* (Pl. II. 7).

This cavern, sometimes also termed the Glen Rocky Cave, which has received its appellation from its being situated under the house and garden of Sir James Cochrane, the present chief justice of Gibraltar, is situated at a level of between 200 and 300 feet below the Windmill Hill Flats, in one of the numerous large ravines which, as before noticed, exist in the southern and western sides of the promontory.

More than twenty years ago Sir James Cochrane discovered in his own garden, under a considerable thickness of soil, the entrance into a vertical fissure, which, after descending to a depth of about forty feet, ended in a wide cavern, from which several narrow passages appeared to lead in various directions. One of these passages which opened into the wide chamber, at a height of about six feet from its floor, was entered and found to run to a length of about twenty feet, where it terminated in a second cavernous chamber. It was close to the termination of this passage in the second chamber that Sir James Cochrane came upon the remains I am about to describe, and which were brought to England in the year 1864 by Captain Sayers, the police magistrate and well-known historian of Gibraltar. It would appear that since the cavern was first partially explored by the learned judge, it has been but very rarely visited; and on this account it became an object of great interest to Dr. Falconer and myself on our visit to Gibraltar to inspect such an interesting locality, which from the account we had received of it promised to yield important results.

In this, however, we were disappointed, since, on our visit to it, in which we were most zealously and kindly assisted by General Frome and several other officers of the garrison, the not very easy or agreeable descent into its depths was not rewarded by the discovery of more than a few scattered bones.

The entrance through which the exploring party passed, and which was too narrow to admit without considerable difficulty the person of Dr. Falconer, is placed immediately under the doorstep of Sir James Cochrane's house, and it consisted of a narrow vertical shaft, down which the descent was made, partly by means of a rope and partly in the manner of chimney sweeps, by placing the back against one side and the feet on the other. This vertical shaft ended in the large vaulted chamber which had been originally entered by Sir James.

The floor of this chamber was tolerably level, and covered with fine soft sand, upon which irregular, angular blocks of limestone were scattered. On one side, at a height as before said of about six feet above the level of the floor, was a narrow chink or opening which formed the commencement of a contracted and very irregular passage, at the end of which was a second wide chamber, from which again passages of various dimensions proceeded in different directions. One or two of these were entered, and one, which descended at a rapid inclination, terminated abruptly at the edge of a steep vertical precipice that formed one side of a very large and apparently profound hollow. By means of a rope several engineers, officers, and men descended into this gulf, and found bottom at a considerable depth. Unwilling myself to risk the chance of a difficult ascent had I gone down, I requested the party to search in every direction for animal or other remains. But none were there met with. The only relics of animal life, as I have said, lay scattered about the termination of the first narrow passage.

The most diligent search disclosed no other entrance into the cavern than that already mentioned, although it was evident that in many parts the roof could not be far below the vegetable soil, as we observed numerous roots of trees, some of enormous length, depending from it.

It remains consequently a curious question relatively to the Judge's Cave, as to the way by which human beings and animals had formerly gained access to its interior. The only external entrance at present disclosed is that which I have described, which is extremely narrow, quite vertical,

and until the house was built and garden laid out, covered with a considerable thickness of soil. It should be remarked also, that no remains appear to have been met with in the first large chamber, all having been found at the end of the internal passage, which is so much constricted as with difficulty to allow of a man's creeping through it at full length, and whose entrance, moreover, is so high above the floor of the first cavern as to render something in the shape of a ladder necessary to reach it.

It is difficult to account for the position in which the human remains occurred, unaccompanied as they were, so far as we could learn, with any relics of works of art or of domestic animals, or any vestiges even of charcoal, except upon the supposition that they belonged to individuals who had sought shelter on a sudden emergency in the more secret recesses of the cavern, and there perished.

As no record seems to exist of the exact number of the human bones met with, it is impossible to conjecture how many individuals they may have belonged to, or whether all the bones of the different skeletons were there.

The bones we had an opportunity of examining, through the kindness of Sir James Cochrane and Captain Sayers, comprise—(1), a nearly perfect cranium; (2), a lower jaw belonging to another individual; (3), several *tibiæ*, all more or less presenting the platynemic character; (4), one nearly entire, and portions of a second *fibula* of the same type, but belonging to different individuals; (5), a nearly entire male *os innominatum*; (6), some *vertebræ*, portion of a *sacrum*, &c.

Most of these bones, but not all of them, were more or less covered with a hard greyish argillaceo-calcareous concretion, containing numerous shells of *Helix*, *Bulinus decollatus*, &c. Whilst others were merely coated with a uniform crystalline deposit of carbonate of lime, having, however, the same grey colour as the indurated calcareous mud of which the more massive matrix was formed.

The cranium especially and one of the *tibiæ* were imbedded in a very thick and solid mass of this substance. But the matrix, notwithstanding its hardness and great thickness, was easily detached from the bones, whose surface was left

smooth and entire, and to all appearance remarkably little different in consistence from moderately recent bone. The colour of the bone is a pale yellowish brown.

In fact, when the skull was freed from its covering it appeared quite fresh and more like a well macerated and carefully prepared bone, than one which had lain so long in the bowels of the earth. It contains abundance of animal matter.

The cranium is nearly perfect, and with the exception of a crack above the right squamosal suture, and on that side of the skull which probably lay uppermost, and of a fracture, and the absence of part of the right zygoma—wholly uninjured.

The most important deficiency is that of the lower jaw, the one accompanying it evidently having had another owner.

The conformation of this cranium is altogether different from that of the more perfect crania found in the Genista Cave, No. 3, as will be seen at once from the figures of it given in Plate VII. Figs 9, 10, 11, and would have been rendered perhaps still more evident had there been room in the plate to admit of a side view as well.

Fig. 11, however, shows that the Judge's Cave cranium is much lower than either of the others on each side of it, and figure 9 that the alveolar border is more prominent, and the zygomatic arches rather wider.

From its size and general aspect, it may be judged to be that either of a female or perhaps of a small male, at an age when the third molars are fully cut but quite unworn. The remaining teeth are the three molars on each side, the first and second of which are worn flat and smooth in the usual ancient and savage way; and the sockets of the other teeth, from their perfect condition and regularity, show that the individual had been in full possession of an 'excellent set of teeth.'

The skull is perfectly symmetrical, brachycephalic (792)—slightly prognathous, but with vertical teeth—aphanozygous.*

* The photograph, from the distance at which it was taken, gives more of the zygomata and alveolar border than is seen when the skull is held at arm's length

The forehead is well arched, and the supra-orbital border slightly elevated. The orbits rather square, and the nasal opening elongated and pyriform. The sutures are all open and much serrated, and on the right side there is a rather large Wormian bone. The following are the principal dimensions :—

1. Length	6·9
2. Breadth	5·4
3. Height	5·4
4. Least frontal width	3·7
5. Greatest frontal width	4·4
6. Parietal width	5·1
7. Occipital width	4·2
8. Zygomatic	4·9
9. Frontal radius	4·5
10. Vertical radius	4·6
11. Parietal radius	4·7
12. Occipital radius	4·2
13. Maxillary radius	3·5
14. Fronto-nasal radius	3·55
15. Circumference	19·5
16. Longitudinal arc	13·8
17. Frontal transverse arc	11·8
18. Parietal „ „	12·2
19. Occipital „ „	11·2

The lower jaw which accompanied the skull is that of a much older individual of larger stature. It presents no special character requiring remark, except that the angle is everted and the chin well formed. The teeth are all much worn but quite sound.

Enerusted with a precisely similar matrix, and when uncovered presenting exactly the same appearance as regards colour and consistence, was a tibia of a highly platycnemic conformation. The condition of the bone itself, and the nature of the matrix, would seem to justify the conclusion that this bone belonged to the same individual as the cranium, and we are thus enabled to obtain a glimpse, as it were, of the cranial form of some of the platycnemic people.

Besides the human bones, the collection from the ‘Judge’s Cave’ includes those of several species of ruminants, some of

and viewed with one eye, which is the position I assume in speaking of the prognathous or phenozygous aspect or the reverse.

which are apparently in much the same condition as the human, whilst others are evidently more fossilised, and belong in all probability to a different epoch. The bones which in their condition most closely resemble those of man belong to a species of Ibex. The principal remains of this animal, are an old and a young mandible and a perfect tibia, which, though slightly covered with a crystalline deposit in one part, is otherwise wonderfully fresh and recent in appearance. Those bones, which from their more fossilised condition would seem to belong more properly to the true ancient bone breccia period, are those of *Cervus elephas* (var. *barbarus*). These are mostly cannon bones, and exhibit the same fine fissuring or crushing which is so frequently to be seen in the bones embedded in the ancient red breccia, from the deeper parts of the Genista—and other fissures in the rock.

CHAPTER III.

REMARKS ON THE HUMAN REMAINS, ETC. FOUND IN THE GIBRALTAR CAVES.

IN conclusion, I have to offer some remarks upon the remains of man and his works, which have been disclosed by Captain Brome's labours, previously to which the very existence of such relics on the Rock of Gibraltar had, so far as I know, except in the instance of the 'Judge's Cave,' not been suspected.

What I have to say applies more particularly to the remains found in the Genista Caves, whose contents have been the most abundant and varied, and will afford a perfect illustration of the nature of the contents of the other caverns.

1. *Genista Cave, No. 1.*—The human remains found in the first discovered cave on the Windmill Hill, together with the implements of bone and stone, articles of earthenware, and certain of the mammalian, fish, and bird bones, as well as the greater part of the marine shells, were all contained in the highest part of the cave, and principally above the uppermost of the several stalagmite floors noticed in Captain Brome's account of the cavern.

The space thus occupied varied in depth from the roof to the floor, from fourteen to eighteen feet, and the greatest depth in it, at which human remains were met with, was little more than ten feet. The greatest depth marked on any of the fragments, and these are few in number, is eleven feet.* It is obvious, therefore, that the floor of this cavern had been covered to some depth with a deposit before any human remains had gained admission into it. It would further appear from several indications, that this lower material was different in character from that with which the upper portion of the cave was entirely filled. Some of the human bones, as stated in the Report, were encrusted in stalagmite, and embedded in a red ochreous cement; and this statement is confirmed by the appearance of many of the osseous fragments which are covered with a very thin, red, calcareous, crystalline crust, and have some red ochreous cave earth adhering to them, but which for the most part is readily washed away. But upon referring to the depths marked on the fragments so distinguished, they all appear to have come from the lowermost part of the upper chamber, that is to say, from a depth of eleven or twelve feet. It may, therefore, be concluded that these fragments, which in other respects also appear (or at any rate many of them) to be more fossilised than the great bulk of the human bones, represent the oldest, or the earliest which had gained admission into the cavern, and which from their position had been more exposed to the infiltration of water in the rainy season, which would naturally lodge longer in that part of the cave than at a higher level. With these exceptions, the human and other bones associated with them in the upper cave were not

* It should be remarked, however, that as regards the occurrence of the human remains only above the stalagmite floor, a very large quantity of human remains, and of the different species of animals usually found in association with them, was met with in the 'Pillar Chamber' (shown in Plate III., to the left of the upper portion of the Genista Cave), as it is stated, below a stalagmite floor. But this floor appeared, in all probability, to have been deficient at one part where the remains were discovered lodged in dark earth. It should also be mentioned that a human molar tooth—the third lower molar in germ—was found at a considerable depth in the eastern fissure, and, as Captain Brome satisfied himself, beneath the level at which some rhinoceros remains had been discovered. But in a vertical fissure, the descent to any depth of such a small object is not much to be wondered at.

covered with any calcareous deposit, and but slightly infiltrated with mineral matter. They are, for the most part, dry and friable, adherent to the tongue, and have attached to them and contained in their hollows a blackish or cinereous mould-like earth, copiously intermixed with small fragments of charcoal.

As regards the chemical condition of the bones, all that can be stated is, that it appears to differ very considerably in different specimens. Although all contain enough animal matter to render them black when burnt, the quantity of that constituent is very much below the natural standard of recent bone. The results of numerous experiments showed that the animal matter varies in amount from about six to about twelve per cent., whilst that of carbonate of lime is increased to twenty or thirty per cent. of the dried bone, or at least double the standard in recent bone, that salt, as is usual, appearing to replace in part the animal matter removed.

Most of the mammalian bones immediately associated with those of man in the Genista Cave present precisely the same general characters, and differ notably in this respect from the older, more fossilised bones in the red breccia from beneath the stalagmite floors, and in the deeper parts of the cavern and fissures connected with it.

The mammals thus bearing intrinsic evidence of their close association with man are:—

1. *Bos taurus*, of various sizes.
2. *Capra hircus*.
3. *Capra ibex*.
4. *Sus scrofa*.
5. *Mus rattus* (?)
6. *Arvicola* : Sp.
7. *Lepus timidus*.
8. *Lepus cuniculus*.
9. *Meles taxus*.
10. *Canis vulpes*.
11. *Phocæna* : (Sp. ?).

To which may be added, from Genista Cave No. 2, a species of

12. *Herpestes* (?).

Together with these are numerous bones of fish, amongst which those of the Tunny are the most prominent; and of several birds, amongst which are species of duck or goose, hawks, and smaller forms. Amongst these remains, and indubitably belonging to the human period, are also to be included numerous marine shell-fish, belonging to the genera *Murex*, *Buccinum*, *Patella*, *Cardium*, *Mytilus*, *Pecten*, &c., all apparently of edible kinds; and, together with these, numerous land shells of the common existing forms, of which it may be supposed that some, at any rate, as *Helix pomatia*, might have formed part of the diet of the prisca race. The remains of articles of earthenware were extremely abundant, although for the most part in a very fragmentary condition. Amongst them, however, there were found in the Genista Cave several perfect or nearly perfect small vessels, of which figures half the original size are given in Plate X. Figs. 1, 2, 3. Within fig. 1 was found a large scallop shell, which from its size and form might, as supposed by Captain Brome, have formed a lid to the little pot. A very cursory inspection suffices to show that the pottery to which these fragments belong differs very widely in make, material, form, and ornamentation.

A large portion of the fragments show that the articles were made by hand, and without the use of the wheel; and these are also composed of a very coarse and imperfectly burnt dark or black clay, reddened however to a slight depth. Of this kind are the vessels and fragments shown on Plate X., except fig. 8, which appears to have been made on the wheel, whilst in Plate XI. are fragments of vessels, most of which have probably also been made with the aid of that implement, but are yet ornamented in the same rude fashion. The articles which have been so fashioned are also composed for the most part of a finer and more carefully prepared material, and they also appear to have been more thoroughly burnt. Some among them, as figs. 3 and 5, must have formed portions of considerable sized jars, of a not inelegant form. Belonging apparently to the same stage of ceramic art is the fragment represented in fig. 1 on the same plate, which is taken (half size) from one amongst numerous instances of similar kind in the collection from St.

Michael's Cave. The figure gives three views of the perforated spout of a drinking vessel. No instances of the same sort occurred in the Genista Cave, and no vessel with the same kind of spout is, so far as could be ascertained by the most careful inquiry by Captain Brome and the Roman Catholic Bishop of Gibraltar, at present made use of by the inhabitants of the neighbouring country, nor by the Moors on the opposite coast; nor in my limited experience of such things have I noticed vessels of similar construction figured in any work, except quite recently in the 'Antigüedades prehistoricas de Andalucia' of Don Manuel de Góngora y Martinez, in which (p. 45, fig. 47) a precisely similar perforated spout, *extraño piton*, as he terms it, is represented. The drawing might have been made from many of the specimens discovered by Captain Brome in St. Michael's Cave. In the British Museum there is an earthenware vessel with a very similar² spout from Peru.

Although, as I have said, drinking vessels of this kind are not known to be now in use in the south of Spain, nor in Morocco, it would seem that they are still made and used by the Kabyles in Algeria; and through the kindness of Sir John Lubbock I am in possession of a sort of jug with a long perforated spout, evidently intended for the same purpose, which he has recently procured, together with other earthenware objects, from that country.*

Other fragments again, composed of a fine, well-burnt material, of bright red colour, with smooth surface, and evidently skilfully made on the potter's wheel, denote the existence in the Genista Cave of pottery of a far more modern date than that to which the specimens above referred to would mostly seem to belong. Amongst these is a fragment of a shallow saucer-like vessel, perforated with accurately round holes, and portions of large jars or wide-mouthed *amphoræ*, with well-made handles, such as are shown in Figs. 1, 2, 3, and 4, in Plate XII.

The remains of pottery, in fact, like the human bones, show

* I have since been informed that vessels of a similar kind are in common use in Brazil; and I have recently seen one from Algeria, still more like the Gibraltar specimens than the one given to me by Sir John Lubbock.

beyond doubt that the contents of the upper chamber of the Genista Cave must have been gradually introduced through a very long period of time, and include the relics of probably several successive populations. Some belonging to a rude and primitive epoch; whilst others, as remarked by Mr. Franks, may very probably be referred to the Roman or even to much later times.

Besides the articles of pottery, several implements of various kinds were met with, intermixed confusedly with the broken pots and bones. With one exception these implements are all of *stone* or *bone*.

The exception is a bronze fishhook, shown of the full size in Plate VIII. Fig. 9. This hook, with which we may suppose the tunny or the porpoise was captured by the ancient cave-dwellers, is, as it seems to me, rather peculiar in wanting either a hook or an eye for the attachment of the line, the shank being merely a little flattened towards the end. Mr. Franks is of opinion that this bronze implement belongs in all probability to a not very ancient period, and that it may be regarded as Roman or of the Roman time.

The bone implements found in the Genista Cave consist of (1) a long slender bodkin (Plate IX. Fig. 5); (2) a rude sort of scoop or spoon; (3) a portion, apparently, of a human fibula (though this is not certain), fashioned into a spike at one end; (4) a small bone needle (Plate IX. Fig. 8), and with respect to which I would remark that it differs from the bone needles found so abundantly in the Dordogne caverns, in the circumstance that the sides of the shaft above and below the irregularly shaped eye are channelled, in the same way as a modern packing needle is made, the eye in the otherwise more highly finished French needles being a simple round perforation. (5) A long stylet, probably a hair-pin, with a head consisting of several beads.

The other bone implements represented in Plate IX. are from amongst those found in Martin's and St. Michael's Caves.

Bone implements of the same kind are, as is well known, common everywhere; and Don Góngora y Martinez figures two from caves in Andalusia, which exactly represent some of those of which I have given drawings.

The implements and articles of stone found in the Genista Cave consist of (1) several polished *haches* (Figs. 4, 5, and 8, Plate VIII.), which in size and form closely resemble some of those met with in the Swiss lake-dwellings: they are formed out of a sort of hard greenstone. One, however, is peculiar (fig. 8) by its smaller size and its being ground, chiefly on one side, to a fine edge, so as to form a sort of chisel. This implement is made of a different material, fibrolite, and is particularly interesting perhaps on that account, inasmuch as stone implements made of it have occurred in all parts of the Peninsula, and are recorded by M. da Costa as occurring in Portugal. One of those from St. Michael's Cave (fig. 9) is of the same material, and we found among the remnants of an old collection of antiquities in the Governor's town residence (The Convent) a beautiful *hache* of the same kind of stone, which it was stated had come from one of the ancient tumuli on the shore of the bay, near the site of the ancient Carteia, and of which Mr. Smith makes cursory mention as containing 'stone hatchets and daggers,' and as placed not more than ten feet above the sea level. (2) Another class of stone implements are those formed of flint or rather chert, of which many have been met with in the Genista and other caverns; one from the former is figured in Plate VIII. Fig. 3. (3) Numerous remains of coarse stone querns and corresponding pestles or rubbers were met with in the Genista and other caverns, but the querns were all more or less broken, and may not improbably have been thrown away as useless. It should be remarked also, that, besides the manifestly fashioned mullers, many large round pebbles, which must have been purposely brought, were met with which might have been used for the same purpose. (4) A single specimen of a peculiar implement, which was met with in the Genista Cave, is shown of the full size in Plate VIII. Fig. 2. It belongs to the class of objects which some have regarded as whetstones, others as amulets or ornaments of some kind, but of which it does not seem very easy to assign the true object. That here shown is made of an excessively fine and soft sort of sandstone, which does not occur in any part of the rock itself, but which we noticed *in situ* at the head of the bay in

the neighbourhood of the ruins of Carteia. It is perforated at each end, and from the softness of the material, which can be rubbed off with the point of the finger, it would appear ill qualified either as a whetstone or to wear suspended. Don Góngora y Martinez figures a very similar object, only that it is not perforated, and which he terms '*alisador de piedra,*' but says nothing about the sort of stone of which it is made. Perforated stone implements of exactly the same kind, as it would seem, are figured in Sir Richard Colt Hoare's '*Ancient Wiltshire.*'

(5) Amongst the articles of stone is also a large portion of what appears to be an armlet or bracelet made of alabaster, and apparently much worn. It is shown in Plate VIII. Fig. 1. It is remarkable, if this ornament should really belong to a very ancient period, that the circle of which it once formed a part is quite perfect, and it is difficult to conceive how it could have been made except in a lathe. (6) Amongst non-descript objects found among the human remains, and the use of which it is difficult to surmise, unless it were used to blacken the eyelids, is an irregular shaped piece of coarse plumbago, on one side of which is a rounded pit such as might have been made by constant rubbing with the point of the finger.

As connected with these implements and utensils amongst which there is no trace of iron, it is curious to remark that among the animal bones associated with them is the cannon bone of a small ox which exhibits several incisions, both on the anterior and posterior sides, evidently made by chopping blows with a sharp and well-tempered metallic implement, and which, as I have tried, can be exactly imitated in a recent bone by blows from a sharp axe or sword. Nothing like them can be made either with a knife or by any stone implement I have seen. It is further remarkable that this is the only bone in the whole collection upon which any indubitable marks of human agency are manifest. From the position of the cuts it might almost be guessed that they had been inflicted in an attempt to hamstring the animal, as is sometimes done at the present day in the Spanish bull-ring.

Human Bones.—The human bones found in the upper

chamber of the Genista Cave must have belonged to at least thirty-five or thirty-six individuals, and these were of all ages and apparently of both sexes. All the bones, with the exceptions already alluded to, are in pretty much the same condition. A great many of them are much gnawed by a rodent having teeth the size of those of the rat or vole, but some among them exhibit apparently toothmarks which might be supposed to correspond with those made by a fox.

Bones belonging to nearly every region of the body were found, but by far the larger portion of the collection consists of fragments of crania, and of the bones of the upper and lower extremities, the latter far predominating.

With respect to them generally it may be said that hardly a single bone is entire, although some few would appear to have been broken either in their extraction from the ground or since. But the fractures are almost all evidently of very ancient date, indicating apparently that the soil in which they were deposited had been frequently and much disturbed.

Crania.—A large part of the collection consists of fragments of crania, which amount to between 300 and 400 in number. Out of this mass of fragments, scarcely any of which exceed four inches in diameter and most are far smaller, it has, as yet, not been found possible to construct any considerable portions of more than four or five *calvariæ*, and of these only one is sufficiently entire to allow of any approximation being made to its form when complete. This imperfect cranium is comprised of eight fragments, all evidently separated at a remote period, and found apparently at various depths in the earth of the cavern, as will be seen in the list of the numbers on each fragment.

No. 1, no depth given; 2, roof of cave; 18, 2 feet; 32, 4 feet; 35, 4 feet; 52, 6 feet; 84, 8 feet; 88, 6 feet; 121, 2 feet. And the other incomplete crania, of which it has been possible to put together any portion, are similarly composed of fragments found at various depths.

The greatest depth, as before stated, marked upon any fragment is eleven feet. There are about thirteen fragments of various sizes marked as occurring between nine and eleven feet, and of these seven undoubtedly belong to one and the

same cranium, although they cannot be pieced together. All those deeper seated fragments, as above remarked, are distinguished from the more superficial ones by their greater specific gravity, and their being coated inside and out with a thin, hard, crystalline, calcareous deposit of stalagmite. Though none of these fragments can be fitted together they suffice to show that the skull must have been of large size and great thickness, and with the muscular impressions strongly marked. Two other fragments, one found at seven and the other at ten feet, also belong to one and the same cranium, so that there can be no doubt the ground must have been frequently disturbed after the skulls had been broken. But to what cause are we to assign such a complete and universal comminution as these bones have undergone?

The portions of the frontal bone exhibit no peculiarity worth notice, and in scarcely any is there any elevation of the superciliary ridges, nor in the site of the frontal sinuses; on the contrary, these bones are rather remarkable for their uniform smoothness and evenness of outline, and in all the forehead is well arched.

The teeth in the numerous jaws, both upper and lower, are in most cases much and evenly worn, and generally speaking quite sound. None of the *maxilla* exhibit any tendency to prognathism. As our examination of the Genista Cave bones took place shortly after the time when the world was resounding with the fame of the Moulin-Quignon jaw, we paid particular attention to the lower jaws, of which numerous specimens were afforded in the collection. Without detailing the particulars, all that it now seems necessary to remark is, that the characters presented by these mandibles showed that they might be about equally divided into those with an inverted and those with an everted angle; and, moreover, that the angle formed by the ascending and horizontal branches varied from 130° to 108° , or quite within the normal limits. One mandible, however, particularly struck us from its close resemblance to that upon which so much perhaps undue importance had been placed.

2. *Bones of the Trunk.*—Very few of the bones belonging

to the trunk were contained in the collection first sent to England. There were a few vertebræ of small size, one or two fragments of ribs, and two or three clavicles, one entire, and all of small size and delicate form, and probably female. One entire *os innominatum* of a young male was noticed.

3. *Bones of the Upper Extremity.*—The bones belonging to the upper extremity were principally twelve *humeri*, of which nine were of small size and three larger; none of them presented any characters calling for remark.* Of the forearm, we received portions of five or six *ulnas*, and some fragments of the *radius*, all of small size. Besides these were numerous metacarpals and phalanges.

4. *Bones of the Lower Extremity.*—One of the most remarkable parts of the collection of human bones from the Genista, and also from the other Gibraltar caves, consists of those belonging to the lower extremity. The number of bones of this class found in the Genista Cave was very great, and they were computed to have belonged to at least thirty-five or thirty-six individuals. There were about thirty

* It should be noted that none of the *humeri* found in the Genista Cave were perforated above the condyles. But in St. Michael's Cave, the lower two-thirds of a humerus of remarkably small size, and with a perforation, was found. The only perforated humerus I have noticed in the Royal College of Surgeons is that of a Bushwoman, which in that particular, as well as in its diminutive size, bears the strongest possible resemblance to the Gibraltar specimen. It would seem, however, from the remarks that fell from several speakers at the meeting of the Congress in Paris, that the perforated condition of the humerus in collections from caverns and ancient sepulchres of much later date, is far more common than could have been supposed from the examination of more modern remains, in which, except in the Hottentots and Bushmen, such a condition is excessively rare. For instance, M. Broca states that he, in conjunction with M. Papillard, had noticed perforation in four and a half per cent. of the arm-bones collected in the 'Cimetière du Sud' at Paris; and that in the Grotto of Orrony, whose contents are referred to the Bronze period, as many as eight *humeri* out of thirty-two were perforated; but this extraordinary proportion, he thinks, might be due to the cavern having been a sort of 'family vault.' Again, M. Dupont found thirty per cent. of perforated bones in the caves of the Valley of the Lesse, belonging to the Reindeer period; whilst M. Leguay, in a sort of dolmen, '*allée couverte*,' at Argenteuil, observed twenty-five per cent. to be perforated; and M. Pruner-Bey found twenty-six per cent. in the same condition in bones from Vauréal. And lastly, to come to a more recent date, MM. Hamy and Sauvage noticed 4·6 per cent. in bones removed from a cemetery in the Rue des Innocents. Nor should it be left unnoticed that M. Pruner-Bey states that condition to be common in Guanche skeletons.

thigh bones, and from eighteen to twenty tibias, but, strange to say, portions of only three *fibulæ* were observed.

Not only were these bones very numerous, but some of them presented such remarkable characters as to attract our special attention. As a similar conformation to that I am about to describe has since been frequently noticed, more especially in France, where M. Broca has paid particular attention to it—the surprise that the first aspect of the carinated femurs and platymeric *tibiæ* excited in Dr. Falconer and myself can now hardly be imagined—but at the time bones of this type, which till then appear to have been altogether unnoticed, seemed to us of the utmost interest. And so in fact they really are.

1. *Femur*.—In the first place as regards the long bones of the inferior extremity it may be remarked, that, omitting the very young or immature specimens, they exhibited the greatest diversity in size. About half the number being of a comparatively large type, and the others, corresponding more nearly with the arm bones, small.

With respect to the thigh bones, one of the most remarkable characters presented in a great many consisted in the enormous development of the *linea aspera*, which in these bones forms a sort of prominent ridge, or keel, of great height and thickness, in many cases extending from one end of the bone to the other, and in some limited to the central portion of its length. In several instances this prominent keel is so enormously developed as to give the bone an aspect altogether unlike the human. Five or six of the larger thigh bones from the Genista Cave presented this character in a marked degree and four of the smaller sized bones. The carinated bones, with one exception, are not more curved than usual, and they are perfectly natural and healthy otherwise in external appearance. Several of them, however, when cut across were found to be extraordinarily thick, so that the medullary cavity was reduced to a very small size. In sections prepared for the microscope it was found that the substance was so infiltrated with calc spar that it was difficult to make out the structure, but what could be seen of it presented nothing unusual.

2. *The Bones of the Leg.*—Of these about half, or in the same proportion as the thigh bones, exhibited a very remarkable conformation. This peculiarity in some of the bones existed to such an extent as to lead several experienced anatomists to whom they were shown almost to doubt their being human tibiæ.

The form in question—which is now well-known and has been fully described by M. Broca*—arises from an extreme lateral compression of the shaft, in consequence of which it loses its natural subtriangular form, and presents an acute edge both in front and behind.

Though flattened to such an extent, none of the tibiæ so affected present any other morbid appearance, and they are nearly all perfectly straight. A circumstance which alone is almost sufficient to refute the notion, at one time, I believe, entertained by some distinguished anthropologists, that the condition was due to a rachitic affection. In cases of rickets, the bone, though doubtless occasionally even more compressed than in the platyenic form, is invariably more or less curved. Numerous instances of similar thigh and leg bones have been discovered in nearly all the other caves from which Captain Brome has obtained human remains.

I have stated that, amongst the very numerous fragments of crania afforded by the upper chamber of the Genista Cave, I had been able to put together any considerable part of only one skull. This part includes, however, sufficient to show in some degree the probable form that the skull would have presented when entire, and from its appearance there is no doubt that it belonged to the same type as the more perfect ones discovered in Genista Cave, No. 3, in association (as will be seen in the list given by Captain Brome, p. 128) with similar animal and other remains. I will proceed now, therefore, to describe the crania in question, which amply suffice to show the cranial conformation of the primitive inhabitants of the rock.

In Plate VII. will be seen representations of two of the most perfect of these crania, and these figures will demon-

* *Mémoires sur les Ossements des Eyzies*, pp. 14–21. Paris, 1868.

strate not only how closely they resemble each other, but also that they exhibit anything but a low type of conformation.

Their dimensions, stated in the order I have elsewhere followed, are as under :

	No. 1.	No. 2.
1. Length	7·35	7·35
2. Breadth	5·5	5·6
3. Height	5·7	6·1
4. Least frontal width	3·9	3·8
5. Greatest frontal width	5·0	4·9
6. Parietal width	5·4	5·4
7. Occipital "	4·45	4·5
8. Zygomatic "	5·2	5·2
9. Frontal radius	4·7	4·75
10. Vertical "	4·8	4·9
11. Parietal "	4·9	5·1
12. Occipital "	4·25	4·9
13. Maxillary "	4·1	4·0
14. Fronto-nasal radius	3·75	3·65
15. Circumference	20·6	20·8
16. Longitudinal arc	14·0	15·3
17. Frontal portion of longitudinal arc .	5·2	4·8
18. Parietal " "	4·8	5·6
19. Occipital " "	4·0	4·9
20. Frontal transverse arc	12·5	12·2
21. Vertical " "	13·2	13·2
22. Parietal " "	13·3	13·8
23. Occipital " "	11·4	11·6
24. Cephalic index	·748	·761
25. Altitudinal "	·774	·809

From these measurements it will be seen, that the crania are almost exactly alike in every respect, and the other two found with them in the same cave exhibit but little diversity, except that one is considerably smaller and probably that of a female. The numbers placed against each measurement prove that these crania from the Genista Cave, No. 3, differ very widely in almost every particular from that found by Sir James Cochrane in the Judge's or Glen Rocky Cave, as has been already noticed (p. 144).

The crania are perfectly symmetrical, and from their size and general conformation would at once be pronounced to belong to a high type. They are dolichocephalic, quite orthognathous, and wholly aphanozygous. In one of them the frontal sinuses are considerably more developed than they are in the other, but in neither is there any thickening, properly

speaking, of the supraorbital border. In one the *ossa nasi* are broken away too much to allow their original size and form to be estimated, but in the other they are long and prominent, and probably betoken that the owner had a prominent or aquiline nose.

They are both the skulls of men in the prime of life, although one appears to be older than the other, as the teeth are considerably more worn. But, in both, the remaining teeth are perfectly sound, and are worn flat and even.

As regards the race to which these crania may have belonged, of course, anything that can be offered is merely conjectural, and as I have but little confidence in conclusions derived from the comparison of minute characters, I think it needless here to enter into much detail in the matter, simply stating that, so far as I can judge, these crania bear the closest possible resemblance to the type of Basque skulls which have been so well and so minutely described by M. Broca.*

On the return of Dr. Falconer and myself from Gibraltar through Spain, we had an opportunity, through the kindness of the late Don Casiano de Prado and of M. Graells, of inspecting an extremely interesting specimen of a human skull which had been found in some ancient copper mine workings in the Asturias, together with hammers made of stags' horn, and other rude implements, and which, from its bright green colour, had evidently been long resident in the situation where it was discovered. This cranium was exactly of the same conformation as those from the Genista Cave.† And besides this, M. Broca's account of the Basque crania from Guipuscoa leaves no doubt whatever that they belong to the same type. All the characters assigned by that acute observer to the dolichocephalic form of the Basque crania, are plainly exhibited in the Gibraltar specimens, and at this meeting of the Prehistoric Congress I have

* Sur les caractères des Crânes basques, 1862, and Mémoire sur les Crânes des Basques de St.-Jean-de-Luz, 1868.

† A brief notice of this ancient copper mine, which has of late years been again opened, will be found in Don Casiano de Prado's *Descripcion física y geológica de la Provincia de Madrid*, 1864, p. 218.

been glad to have the opinion I had previously entertained, with respect to the affinities of the Gibraltar and Basque crania fully confirmed by him after careful inspection of the skulls themselves. The characters assigned by M. Broca to the dolichocephalic type of Basque crania may be briefly stated:—

I. That although dolichocephalic, even to a higher degree than the average of French crania, they are distinguished by the circumstance that the length of the cranium is due to development more in the hinder or occipital region than in the frontal; they present, as M. Broca terms it, a '*dolichocéphalie occipitale*' due as well to the increased development of the posterior cerebral lobes, as to the smaller size of the anterior region. But, at the same time, though in this respect showing an approach to the Negro type, he considers that they differ from that type, and from all the African races, by the smallness of the maxilla and the slighter development of the cerebellar fossæ, and the attendant relative atrophy of the occipital protuberance, and the remarkable want of development of the occipital spine. And these characters, according to him, differentiate the Basque crania also from other European races.

Without pretending to decide how far M. Broca's statements may be borne out upon more extended comparisons with other European crania than he appears to have instituted at the time he wrote, I will content myself with saying, that whatever may be true with respect to the Guipuscoan skulls studied by him, is equally true of those from the Genista Cave.

M. Góngora y Martínez, in the memoir already cited, gives numerous figures of crania found by him in various caverns and dolmens in Andalusia, which, though on almost too small a scale to admit of accurate judgment, would seem to show that the ancient inhabitants of that part of the Iberian peninsula had crania of the same type as those here described; so that I imagine there can be little doubt that a pretty uniform priscean race at one time pervaded the peninsula from one end to the other, and that this race is at the present day represented by at any rate a part of the

population now inhabiting the Basque provinces. The interesting question then arises as to the derivation and affinities of this aboriginal Iberian race. Although one of a wholly speculative nature, and for whose solution we are at present scarcely in possession of sufficient materials, it seems to me that the view suggested by M. Broca is probably not very far from the truth. He says that if the origin of the Basques is to be sought beyond the confines of their own country, the inquiry should be directed, not among the Celts, nor among the other Indo-European races, but rather in the direction of the northern zone of Africa. And he remarks that it is highly probable that in the paleogeography of our continent, Spain was once continuous with the North of Africa, and consequently there is no cause for astonishment when we find close analogies between the primitive populations of the two regions, even were it not well known that, from the most ancient times, migrations have taken place across the Straits of Gibraltar.

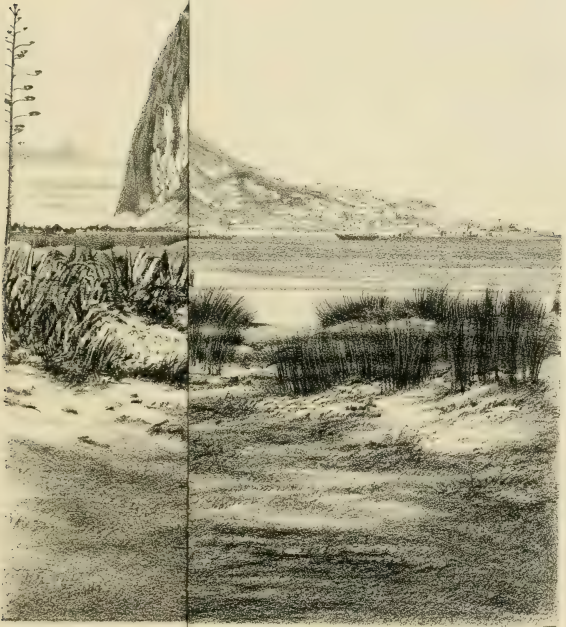
Nor do I think it unreasonable to expect that it may eventually be shown that the Kabyles of North Africa are the immediate representatives in that region of the prisca inhabitants of Gibraltar and Andalusia. The curious coincidence I have pointed out between the spouted water-pitcher from Algeria, with many of the fragments found in the Gibraltar and Andalusian caves, deserves attention in this regard; and I may also mention that, when our attention was first directed to the peculiar conformation of the thigh- and leg-bones from the Genista Cave, M. Pruner-Bey was good enough to forward to us a femur and tibia evidently of great antiquity, and which he referred to the Berber race—of which bones the former is strongly carinate, and the other decidedly, though not very much, compressed.

As regards the question of the use to which the various Gibraltar Caves were put by the ancient inhabitants, little remains to be said. Some of them might probably have been used as habitations, and some merely as places of refuge on sudden emergencies of danger; as, for instance, the Genista Cave, No. 4, which, from its situation at a considerable distance below the edge of a vertical cliff, could scarcely have

afforded a convenient habitation for daily use. Others again, and this I conceive is especially the case with Genista Cave, No. 1, were in all probability merely sepulchral. It is hardly conceivable that a cavern could have been inhabited which contained such an enormous mass of human bones, and which, moreover, was apparently filled to the very roof with the broken bones of men and animals imbedded in earth. I say apparently, because, as has been noticed, it is evident that a large portion of the original rocky roof of the cavern had fallen in at some very remote period. The concussion of such a falling mass would also account in some measure, perhaps, for the displacement and comminution of the bones, but it is equally if not more probable that this might be due to the disturbance by reiterated interments. Nor is the presence among these remains of the stone implements, ornaments, pottery, charcoal, &c., opposed to this view, inasmuch as these articles might well have been introduced as tokens of affection, or as forming part of the funeral rites. The case of the cavern of Orrony, noticed by M. Broca,* appears to afford a striking corroboration of this view: its human contents, in the brief account given, seem to have been in much the same condition as those of the Genista Cave. The cavern of Aurignac is another instance of the same kind.

It would seem that, even at the present day, caves or hollows very similar to those on the Windmill Hill Flats are still utilised; for in a letter from Mr. Green, a resident of Tetuan, to Captain Brome, it is stated that 'in the neighbourhood of Tetuan, where the rocky district is said much to resemble Europa Flats, there are numerous fissures and caves, some of which are inhabited, or rather used as workshops, by tile makers.'

* *Compte rendu du Congrès international, etc.*, 1re livraison, 1868, p. 145.



Hill, by
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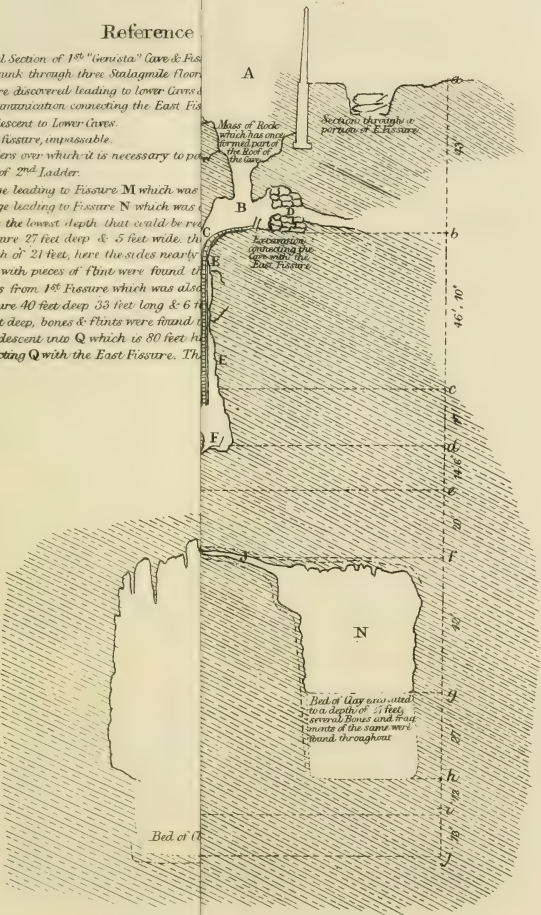
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ates the old caverns, as follows, viz
 Michael's" Cave
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ates the position of the "Genista" Caves at W. M. Hill.
 a. Cave N^o 1. C. Genista Cave N^o 3.
 D^o N^o 2. D. D^o D^o N^o 4.
 E. Deep ossiferous Fissure.
 ra's Caves 700 feet to N. N. W. of S^o Michael's.

Reference

- A. Vertical Section of 1st "Grotto" Cave & Fissure
- B. Shaft sunk through three Stalagmite floors
- C. Aperture discovered leading to lower Caves
- D. 1st Communication connecting the East Fissure
- E. First descent to Lower Caves.
- F. Small fissure, impassable.
- G. Boulders over which it is necessary to pass
- H. Head of 2nd Ladder.
- I. Passage leading to Fissure M which was
- J. Passage leading to Fissure N which was
- K. Marks the lowest depth that could be reached
- M. A Fissure 27 feet deep & 5 feet wide, the bottom a depth of 21 feet, here the sides nearly vertical. Bones with pieces of flint were found throughout
- O. Egress from 1st Fissure which was also
- N. A Fissure 40 feet deep 33 feet long & 6 feet wide, 27 feet deep, bones & flints were found throughout
- P. Steep descent into Q which is 80 feet high, connecting Q with the East Fissure. The

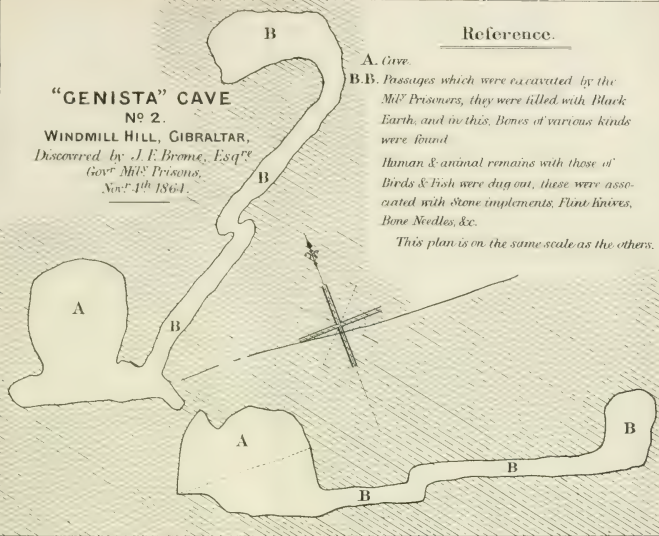


"GENISTA" CAVE

N^o 2.

WINDMILL HILL, GIBRALTAR,

Discovered by J. F. Brome, Esq^{re}
Gov^r Mil^l Prisons,
Nov^r 4th 1864.



Reference.

A. Cave.

B.B. Passages which were excavated by the Mil^l Prisoners, they were filled with Black Earth, and in this, Bones of various kinds were found

Human & animal remains with those of Birds & Fish were dug out, these were associated with Stone implements, Flint knives, Bone Needles, &c.

This plan is on the same scale as the others.

A. Section of "Genista" Cave N^o 3. on F.G.

B. Entrance to cave.

C. Excavation, from which Red Breccia & bones were found.

Human & Animal Remains were found in this Cave associated with Stone Hatchets & Flint-knives with remains of Birds, Fish, Pottery, Bone Needles, Sea shells, charcoal, &c.

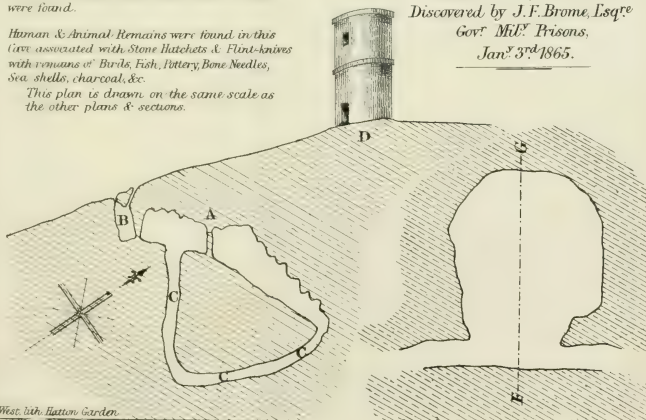
This plan is drawn on the same scale as the other plans & sections.

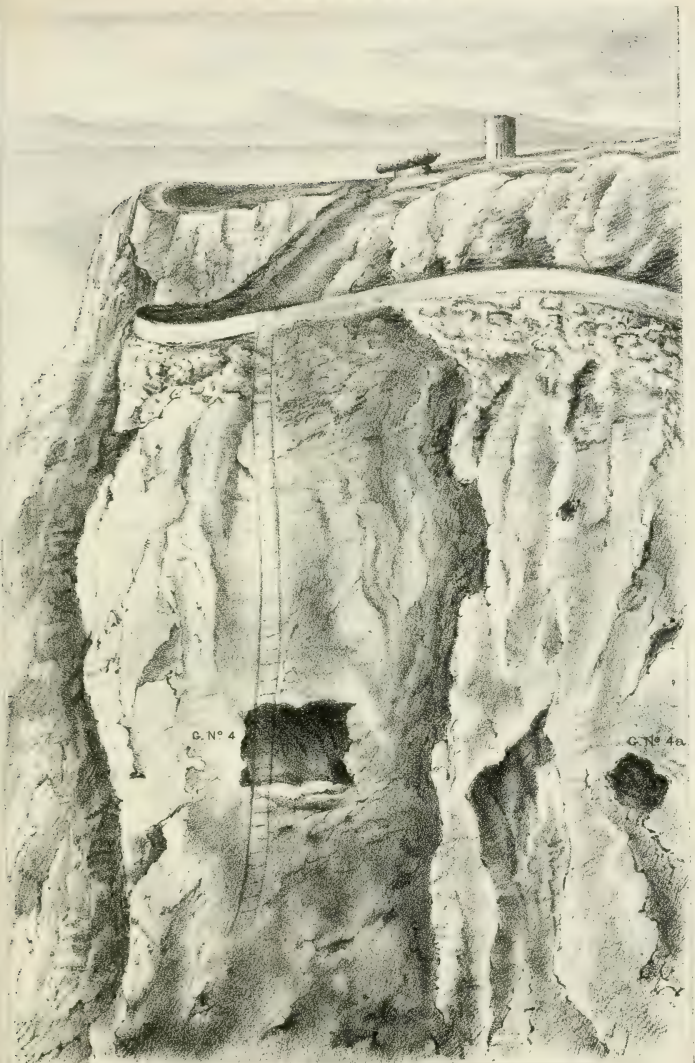
"GENISTA" CAVE

N^o 3.

WINDMILL HILL, GIBRALTAR.

Discovered by J. F. Brome, Esq^{re}
Gov^r Mil^l Prisons,
Jan^y 3rd 1865.





W. Westlith Flatton Garden.

FIG. 1.



FIG. 7.



FIG. 2.

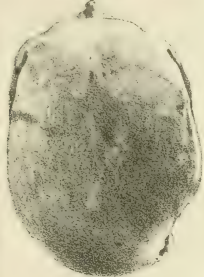


FIG. 9.



FIG. 6.

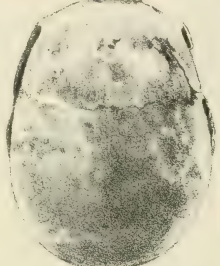


FIG. 3.

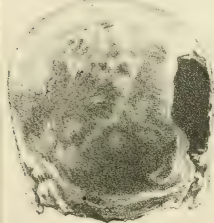


FIG. 10.

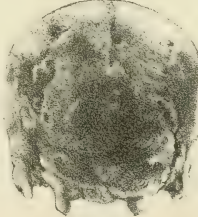


FIG. 5.

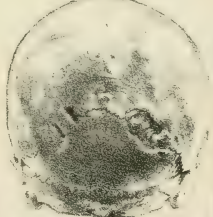


FIG. 4.



FIG. 11.

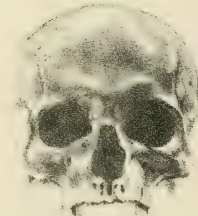
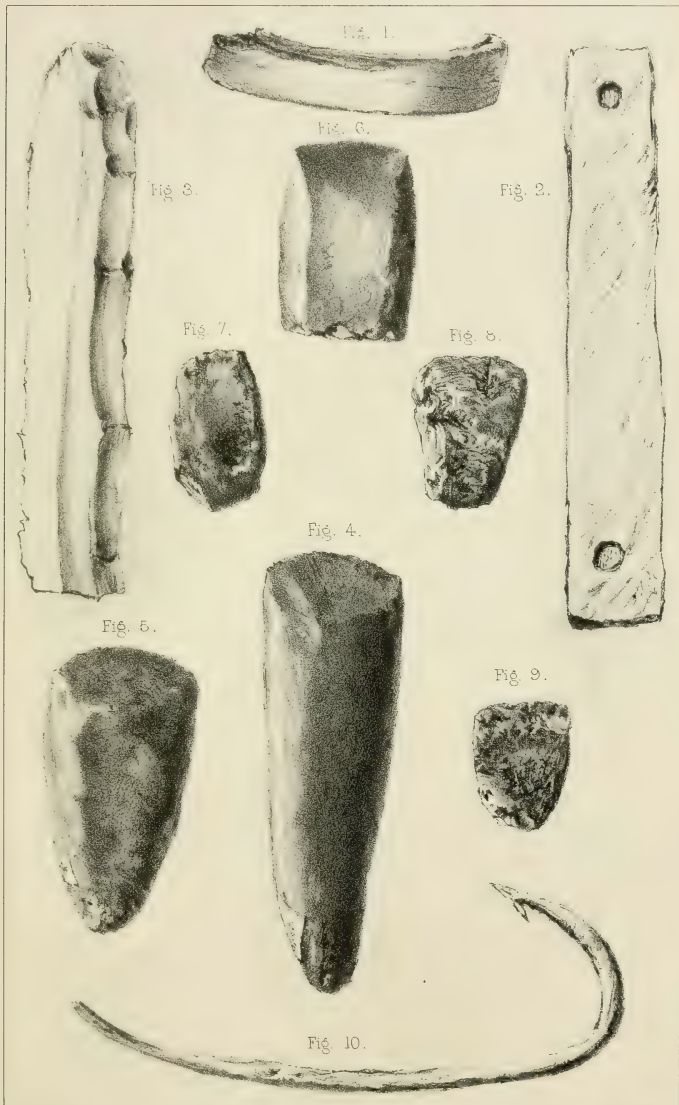
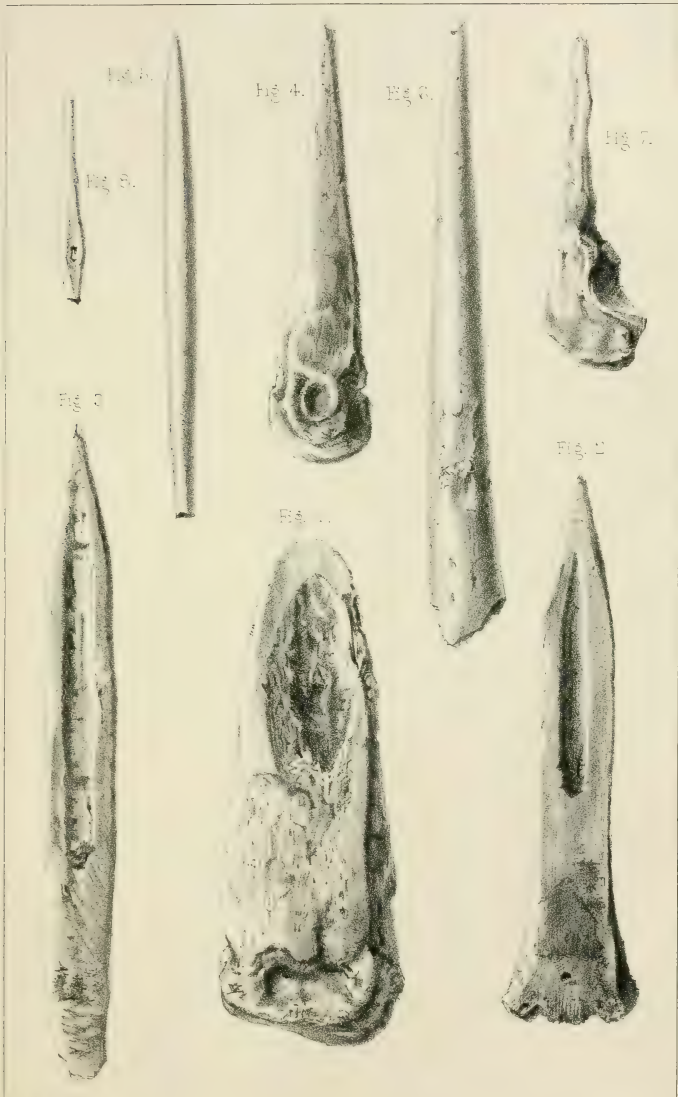


FIG. 8.







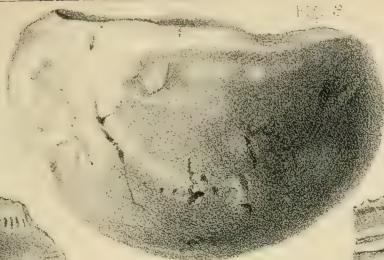


FIG. 1.



FIG. 4.

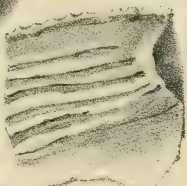


FIG. 3.

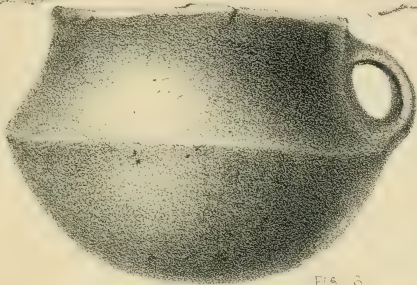


FIG. 2.

FIG. 2.



FIG. 5.

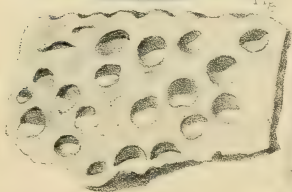
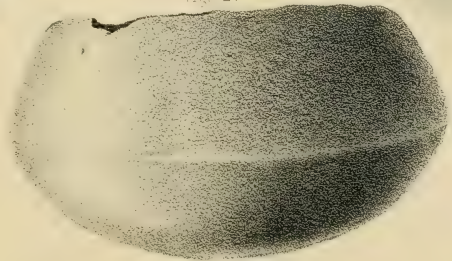
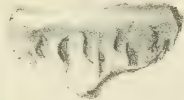
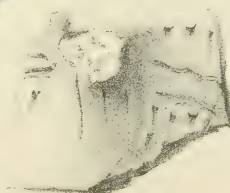
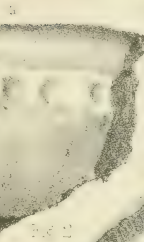
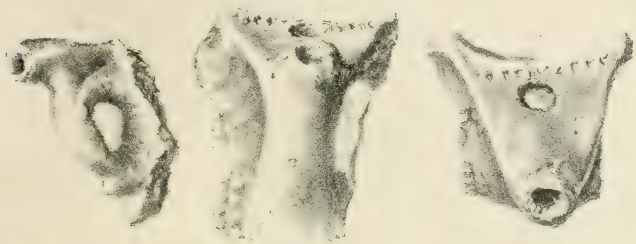


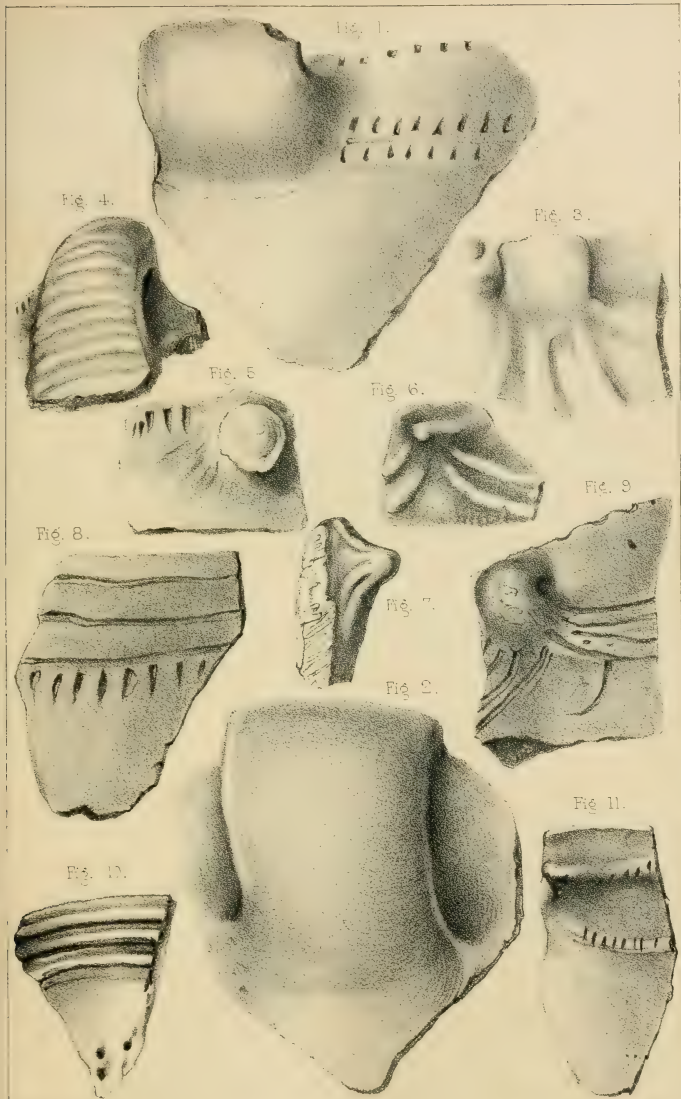
FIG. 2.



FIG. 7.







Description of Plates.

- Pl. I. View of the Western Face of the Rock of Gibraltar.
- Pl. II. Plan of the Rock, showing the Situation of the various Caves.
- Pl. III. Vertical Section of the Genista Cave, No. 1.
- Pl. IV. Vertical Sections and Plans of Genista Caves, No. 2 and No. 3.
- Pl. V. Sketch showing the Position of the Entrance of Genista Cave, No. 4.
- Pl. VI. Plan and Section of Part of St. Michael's Cavern, to show the Chambers and Passages discovered by Captain Brome, and named the 'Leonora's Caves.'
- Pl. VII. Figures of Crania from Genista Cave, No. 3, and from 'Judge's Cave.'
- Figs. 1, 2, 3, 4. Cranium from Genista Cave.
- Figs. 5, 6, 7, 8. " " "
- Figs. 9, 10, 11. " " Judge's Cave.
- Pl. VIII. Fig. 1. Portion of Armlet of Alabaster, half size.
Fig. 2. Amulet or Whetstone, natural size.
Fig. 3. Flint Knife, natural size.
Figs. 4-7. Polished Stone Implements made of a kind of Greenstone, half size.
Figs. 8, 9. Polished Stone Implements made of Fibrolite, half size.
Fig. 10. Bronze Fishhook.
- Pl. IX. Figs. 1-7. Various Bone Implements.
Fig. 8. A Bone Needle.
- Pl. X. Various Specimens of Pottery.
- Pl. XI. Various Specimens of Pottery.
Fig. 1. represents the Spout of a Drinking Vessel.
- Pl. XII. Different Varieties of Handles.