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DENEHOLES, AND ARTIFICIAL CAVES WITH VERTICAL ENTRANCES.

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(Continued.)

It is clear to me that the recent "mysterious" subsidences on Blackheath belong to the class of earthworks which I have been considering. Active pipes in the chalk below the waterline are impossible; and it is a mere supposition without probability of Mr. De Rance that "the ancient chalk pits" (where they are he does not say) had drift levels a mile in length! It is also a supposition of equal value that immediately under the "disturbances" is an "outcrop of the chalk against the Thanet sand," whatever that may mean. I have shown that the shafts are spread over the whole district, and that there is no line of demarcation such as is required by the geological theories of their origin; while the evidence of the late excavations, which I carefully inspected, together with a general knowledge of the behaviour of these shafts, is in favour of their artificial nature, and tells me that they belong to the local series whose varieties I have endeavoured to describe. The greater depth of the caves in the neighbourhood of Eltham and Blackheath lying near the great roads near London, the clayey nature of the soils there, with the late type of the excavations, suggest the likelihood that they may be the deep shafts alluded to by Pliny,¹ and to which no others seem to correspond.

¹ N.H., xvii. See page 70.

I have not been able to find or hear of these holes in Surrey for certain. But at Peckham¹ something like them is referred to in the following: "In a field, called Wellhill, were the evident remains of three large wells, 35ft. in circumference. They had become choked up [fallen in?] but the occupier of the field had the rubbish cleared out of one, when he found the sides very nicely covered with smooth cement, and at the depth of about 40ft. he came to a floor of lattice work, resting on large upright timbers, and on the floor some straw. This floor completely filled the well, so that it is evident that it was not sunk for water; it seems to have been designed for a granary. The others were not opened."

Gen. Pitt-Rivers,² Mr. Tyndall, Mr. Willett³ and Mr. Park Harrison⁴ have explored the now well-known mines at Cissbury, in Sussex. Shafts were sunk of a depth varying from 17 to more than 42 feet. The width of the simplest shaft decreased from 18 feet at the top to 4 ft. 6 in. at the bottom, but other shafts were sunk with terraces and burrows at various depths as seams of flint were cleared out and followed. At each terrace the shaft narrowed until from a maximum width at the top of 66 feet in one case, that of 10 to 20 feet at the bottom was found in general. The bottoms of the shafts are more or less square, and like the small galleries below were regulated by the cleavage of the chalk. As the shafts varied in dimensions without and within the camp, so their relative distances varied from an average of 12 yards apart without, to a much greater distance within.

It appears probable that the pits within, if not later than the first or outer camp wall, are at least older than the pits beneath and without it. No shafts have been described as having foot holes or steps. It was clearly the aim of the miners within the wall to reach the same level of flint, as it was also that of those without; which being reached, caverns and galleries in pursuit of the layer of flint extended in all directions. They present a marvellous network, with chambers and small apertures or windows between them.

Barriers were erected here and there, Mr. Park Harrison⁵ says: "though nothing was found in the galleries to indicate that they were used as permanent habitations," yet "large blocks of chalk of which there were many in all the galleries would, also, no doubt have been placed when requisite at the entrances from the shafts, and in cases of emergency the occupants of the galleries could have retreated behind other barriers of a similar kind, or have made their escape by one of the outlets in the walls."

The ages of all these works are not the same, and the signs of habitation, burial, &c., point to a lengthened occupation of the spot. After the mines and the manufactory had become noted, and the desire to possess them raised in hostile tribes, then probably a bank was raised, later still another one within it, thus making as Gen. Pitt-Rivers says: this British camp the largest in this part of England.

In Wilts, at Highfield, one mile south of Salisbury, on the high chalk ridge between the Avon and Nadder valleys was discovered by Mr. Adlam, a collection of pits. About one hundred in five or six acres

¹ "Manning and Bray, Hist. of Surrey," vol. iii. p. 402.

² Col. Lane-Fox in "Archæologia," xlii, 53, and "Journal of the Anthropol. Institute," v, 357.

³ "Archæologia," xlii.

⁴ "Journal of the Anthropol. Institute," vol. vii.

⁵ l.c.

were examined by the late Mr. E. T. Stevens¹ and Dr. Blackmore, from whose letters I am able to describe them. Their depth varied from 7 to 15 feet, the width below from 6 to 12 feet, they were all circular. The entrance to each pit or set of pits was a circular descending shaft measuring at the top from 2 feet 6 to 3 feet 6-in. in diameter, with nearly the same measurements as to its depth before widening out into the cave, as seen in the best preserved examples. One group of pits, consisting of three circles and one semi-circle had but one shaft. They were evidently filled in with surface rubbish when not in use, and re-excavated when required; this was a measure of precaution against the instability of the drift gravel in which they were dug. Besides this gravel the chalk was penetrated from one to three feet. It does not appear that the diggers were very clever. Yet it must have been a matter of choice that the caves went down no further, when it is considered that a trench fully 15 feet deep "cut in the chalk having very steep sides" was explored for a very long distance, which "defensive ditch" surrounded part of the settlement enclosing an area somewhat square in shape. There was another ditch enclosing a much smaller area close to it.

Professor Boyd-Dawkins² considers the Neolithic age "of these pits proved." Dr. Blackmore thinks they were open from the Neolithic to the Early Iron age. It appears to me that the Bronze age from its beginning to its end marks their period, and that they cannot safely be prolonged back into the pure neolithic age.

Dr. Blackmore has drawn attention to the marks of metal saws on the bones and bone combs. The pottery appears to me to accord with the period I suggest.

The flint that was accidentally dug from the pits was used to chip into implements, but was not mined. The chipping exhibits a decay in the art as if it were being superseded. It does not appear that in any case fire was kindled below; but on the surface, burnt earth, bones, and pot-boiler stones were abundant.

The covers which constitute a peculiar feature in these caves were of clay made on a framework of wattles. They stood on the cave mouth, elevated above the ground a foot or 14-in. the upper opening 6 or 8-in. the lower suited to the diameter of the shaft; the thickness of the clay was from 1½ to 3¼ in.; they were partially burnt, but some better than others. Many of these caves communicated below with each other by means of tiny window-like openings, and by this means, some of the entrance shafts were less worn away than others which were regularly used.

The supposition that these pits were winter habitations is a very likely one, and the remarkable prolongations of the shafts upwards, for keeping out the cold at night, and warding off the smoke from the cooking fires, entirely supports this. Dr. Blackmore tells me that "the pit people" were undoubtedly cannibals, small detached pieces of human bones mixed with other food refuse, split and marked precisely as the bones of horse, ox, &c., could point to nothing else." This is perfectly consistent with Canon Greenwell's³ observations in tumuli of the period to which I assign the pits, though the Canon has doubts on the subject of his

¹ E. T. Stevens in "Flint Chips," p. 57,
also Report of the "Blackmore Museum,"
part ii, p. 152.

² "Early Man," p. 268

³ "British Barrows," p. 544.

own observations as to cannibalism. Grain, including wheat, was much used as food, rubbing and pounding stones being abundant. As agriculture entered into their avocations granaries were needed, and this perhaps is an explanation of the groups of caves, the chambers remote from the shaft being employed as stores.

I do not think these "pits" at Fisherton "may be taken as typical of the whole series" of hut circles, as Mr. Dawkins¹ considers them, but that they are in plan and furniture rarer than common; and in fact, are one extreme form of a series which finds its most perfect examples in some of the deep caves of Kent.

Next to Kent, perhaps Essex has the most interesting of these remains. They are abundant in the strip of country which lies between East Tilbury and Purfleet.

Camden in his "Britannia" says: "Near Tilbury are several spacious caverns in a chalky cliff, built very artificially of stone to the height of 10 fathoms and somewhat strait at the top. A person who had been down to view them gave me a description of them." He adds, "much like the following," the following being a very Chinese-like outline, in which Camden's imagination plays a large part, yet they are very interesting sketches, as being the first effort to pourtray them, and the only one.

Morant² mentions one with a horizontal passage in Cave Field in East Tilbury. This latter is not now visible. The cliff mentioned by Camden exists however, but the caves have either been filled in or cleared away for chalk. This I think to have been the case with some, as their remains were traceable in 1865, and perhaps now. The situation is remarkable, for the caves appear to go below the level of the tide in the river, which approaches very near, and in fact I believe has prevented the chalk from being worked as low as the bottoms of the caves, which are filled with ashes, soft pottery, bones, &c. Morant³ says in connexion with these: "There was a bubble of the bubble year 1720 started, for opening up the supposed gold mines here, on the strength of a tradition and a sentence of Dr. Robert Plot's;⁴ it is this, " * * lost like the gold mine of Cunobeline in Essex discovered again temp. Henry IV, as appears by the King's letters of mandamus dated May 2, an. 2, and since then lost again.' "

The cluster of caves at Hangman's Wood, described by

¹ W. Boyd-Dawkins, "Early Man in Britain," p. 267

² "Hist. Essex," ii, 229.

³ "Hist. Essex," i, 228.

⁴ "Natural History Oxfordshire," p. 164.

Dr. Derham in 1706, which is partly in Stifford and partly in Orsett, fills only a portion of the wood, where they are so thick as scarcely to leave room beneath the surface without communication, yet they do not do so. Mr. Meeson¹ says that persons may be heard in the next cave when knocking at the wall. Mr. R. Ll. Williams² has given a map and described this cluster from personal inspection. He speaks of the number as 50 only, yet there are really 72, of which six shafts are now open. Those in the western portion of the wood are mapped in the "6-in." Ordnance map; the eastern division, perhaps from some red-tapeism, being unmapped, though if anything they are the most conspicuous holes.

Others in clusters of three or four are to be found on either side of the little valley leading from Hangman's Wood southward to the Thames.

To the north of Tilbury, in Mucking Woods, Mr. Williams says that within the last few years some have been partly filled up, "but these were in sand." They once, however, extended down to the chalk. Mr. R. Meeson³ described some deneholes in the neighbourhood of his house near Grays, and one in particular as containing a large number of Roman urns, which were crushed by the fall of the roof. One vase he extracted nearly perfect, containing the bones of a female and child, with bronze armlets and a spindle whorl of lead.

Mr. Williams⁴ tells of a denehole partly filled up in Stifford chalk quarry, adjoining the Clapperfield previously alluded to. From Stifford along the Mardyke, or Merydike, stream to Purfleet these caves are found on either side, the chalk being white on the surface. The ground around them near Purfleet is covered with neolithic flakes, which may be scraped up by the hand. The pits now filled in completely must have been of very slight depth, otherwise they would have been below tidemark, as the land now lies, when dug. The pits down by the Mardyke stream have had one or more ditchways leading to the point of land on which the powder magazines stand. That and the Beacon Hill appear to have been neolithic

¹ Rev. W. Palin, "Stifford," p. 41.

² In same work.

³ *Archæological Journal*, xxvi, p. 191.

and W. Palin, "Stifford," p. 41.

⁴ In Mr. Palin's "More about Stifford," p. 39.

dwelling sites, for which they were well suited, if only from the signs of flint chipping to be seen there plentifully.

I do not know of deneholes in other counties where they might be expected to occur. Mr. John Evans tells me that such a method of getting chalk for the land is employed in Herts, but the pits are very shallow. Arthur Ashpitel¹ has mentioned the custom in Bucks, and it is said to be also in use at present in Berks and Middlesex after a fashion.

The cave called Royston Cave² and called by Stukely Roisia's Oratory,³ has been lately excavated to its true bottom; it was once such a cavern as those in Kent, for though a later Mediæval opening has been made to it, the old one with the foot-holes still exists. An engraving of this is published in Gough's Camden.⁴

After a careful enquiry I have been unable to hear of deneholes in Cambridge or Suffolk. There are, however, places in Suffolk which I think deserve attention.

At Brandon, however, on the borders of Norfolk are Grimes Graves,⁵ "surrounded by a semicircular entrenchment." Blomefield⁶ says, "Grimes holes or graves (from A. S. *Grafan* to dig, excavate) in Grimeshoe hundred is a very curious Danish encampment, in this space are a great number of large deep pits."

Canon Greenwell⁷ tells us that the graves number 254, and are irregularly distributed about 25 feet apart over a space of 20 or 21 acres. The pits are circular 20 to 65 feet in diameter, filled in to about 4 feet of the surface, and in some places confluent. The shaft of the pit examined, for they were not properly speaking caves, passing through one layer of unsuitable flint, stopped at another suitable one, and branching into galleries was found to communicate at the depth of 40 feet with the shafts around. An unpolished flint chisel (the marks of its use were visible in the chalk) and picks of deer horn were found in the workings. These galleries were dark, and amongst many interesting discoveries made by Canon Greenwell were cups of chalk⁸ which served as lamps to work by, one of which rested on the ledge of chalk as placed by the workman! From the usual evidences above ground we perceive that the diggers lived on the surface, and that they might not be inconvenienced, the refuse from the new shaft was cast down an old one.⁹

Caves as well as mines appear to have existed elsewhere in Norfolk, though until I mentioned the probability in 1867 they were overlooked; thus,¹⁰ "In 1779 in an enclosure near Broomclose, which is half a mile from North Elmham, the ground sunk in three places circularly several feet; in one of them the hole was nearly 12 feet wide and the depth 20."

"Near the site of the Saxon cathedral, which is still visible, are some old wells and many more filled up." Bishop Brisus established¹¹ his

¹ "A. A." in "Notes & Queries," 2nd series, xi, 16.

² "Clutterbuck," Hertfordshire, iii, 562.

³ "Iter Curios," &c.

⁴ "Gibson's Camden," i, 361.

A Report &c., by Joseph Beldam, F.S.A. sold on the spot.

⁵ "Gough's Camden," ii, 117.

⁶ "Parkyn's Blomefield's Norfolk," ii, 148.

⁷ "Journal of the Ethnological Society of London," new series, vol. iii.

⁸ I was enabled by the kindness of Canon Greenwell to exhibit these objects before the Institute. The access to these pits was undetermined, as no shaft was fully emptied, and as the diameter was very great, this is to be regretted.

⁹ The modern flint pits at Lingheath, Brandon, are described in a memoir of the Geological Survey by Mr. T. S. Skerchley.

¹⁰ Gough's "Camden," ii, 117.

¹¹ Blomefield's "Norfolk," ed. 1739, i, 2.

bishopric here in A.D. 673, and it was thus early a centre of great civilization.

Mr. King mentions¹ such places on Mousehold Heath, and I have heard of cavities being opened near Norwich when excavating for chalk, in which many stags' horns were found, probably the ancient picks. Near the turnpike just outside Norwich, on the Aylsham road, amongst a collection of such depressions as I have described, a mass of soil fell in some years ago, a horse and plough going down also, to the depth of about 20 feet, and seven or eight yards across. Another similar pit fell in near Stratton Strawless in the high road, and the driver of the old Cromer coach informed me of one that fell in near Marsham on the same road. Many depressions are to be seen in the fields round Marsham, Aylsham, and south of Norwich, near Boyland Hall.

Very similar in respect of the excavations I have been describing is that part of the Continent of Europe which lies nearest to England.²

Cæsar says the Belgæ were sprung from the Germans,³ and in other places he mentions many tribes, inhabiting almost the whole of France north of the Seine, "*uno nomine Germani appellantur.*" This definition is of special interest when we remember the names of the same tribes (Belgæ, &c.) are found on both sides of the Straits of Dover, and that thus early the Gallo-Germans came over. The people of Cantium, it is specially stated, possessed all the civilization of those Gallic-Germans, which included much Roman culture. They, of course, enjoyed the full use of iron. But the Britanni (Celts), whom they partly displaced, were apparently a rude race.

It is of these true British pre-German born-in-the-island tribes that Diodorus⁴ speaks: "They say that its aboriginal tribes inhabit Britain, in their usages keeping the old ways of life, for in their wars they use chariots, and they have mean habitations, constructed for the most part of reeds or wood, and they gather in their harvest by cutting off the ears of corn and storing them in subterraneous repositories."

The above distinction also applies to the account of Pliny,⁵ who, besides mentioning other marls in use in Gaul and Britain, says: "*Alterum genus albæ cretæ argentaria est, petitus exalto in centenos pedes actis plerumque puteis, ore angustatis, intus ut in metallis, spatiente vena. Hac*

¹ "Munimenta Antiqua," i, 53, &c.

² Compare "Cæsar B. G.," v, 12 and 13. "Strabo Geog.," lib. i.

³ "B. G.," ii, 4.

⁴ "Geog.," v, 21.

⁵ "N. H.," xvii.

maxime in Britannia utitur." Pliny treats Britain as an "outlier" of Gaul, and therefore connected in its arts with the customs of the parent country. I do not think that the deep holes in England were originally dug for chalk as a top-dressing; it was a late improvement, recently introduced from France not long prior to the arrival of the Romans.

This appears to be the explanation of Pliny's account, which was drawn up at a critical period of our history. The use of chalk as manure is an advance in the art of agriculture improbable before its colonization by the Galli-Germans, whose arrival preceded that of the Romans but a short time.

Tacitus, describing the Germans of Germany proper—not those who, dwelling on the Rhine, had imbibed agricultural habits from their neighbours—speaks of them as disdaining to manure the land or expect the seasons. Their dwellings were "*discreti*," somewhat scattered collections of huts of unwrought timber, daubed with a clear and shining earth, apparently chalk.

"*Quædam loca diligentius illinunt terra ita pura ac splendente, ut picturam ac lineamenta colorum imetetur. Solent et subterraneos specus aperire, eosque multo insuper fimo² onerant; suffugium hiemi et receptaculum frugibus, quia rigorum frigorum ejusmodi locis molliunt, et si quando hostis advenit, aperta populatur, abdita autem et defossa aut ignorantur aut eo ipso fallunt, quod quærenda sunt.*"

So I take it these true Germans lived in their caves and employed the same dwellings as stores, the only recorded use they made of the material excavated being to ornament their dwellings. But the more civilised Germans, no longer living in their holes, employed them as granaries and for agricultural produce, throwing the chalk over the soil, and even digging it for manure. They only inhabited them temporarily when hunted to the death.

Varro says³ of the Gauls on the Rhine: "*In Gallia Transalpina, intus ad Rhenum cum exercitum ducerem aliquot regiones accessi, ubi nec vitus, nec olea, nec poma nascerent ubi, agros stercorearent candida fossicta creta.*"

¹ Tacitus, "Germania," c. 16.

² Limo?

³ Varro, "R.R.," i, 7.

Reynier¹ makes some very interesting remarks on this subject, but he describes no deep holes, and it appears from a paper by M. Lavillegille² on *Les Mardelles*, that the marl was obtained from the large, open, shallow pits common in France, which he chiefly studied in Berry, Indre, Cher and Normandy. These are called Mardelles, Margelles and Marges. He cannot explain the term, but thinks they were dug for ambuscade. I find the word to be merely the O. H. G. and Norse, &c., word *mergil* of which the form given by Pliny *marga* and the A. S. *merg*; fat, marrow, mean the same. The old French *merle*, our *marle* and *marllera* of mediæval times are corruptions. The modern French *marne* has become so changed as to have given the above authors much trouble for a meaning to *marge*. The relics of such excavations in Belgium and on the French border have been little studied, which is the more remarkable in consequence of the notices by classic authors.

But the Neolithic flint mines at Spiennes are of pre-eminent interest, though doubtless not unique examples.

They were first remarked in 1847, and in 1858, in consequence of shafts for flint required by a porcelain manufactory having been sunk among them; and an increased interest being awakened M. C. Malaise³ described them, but it is from the account of MM. Cornet et Briart⁴ they are best known to us.

The shafts are circular from 60 c. m. to 80 c. m. in diameter, and are frequently very close together. They pierce the superficial soils and the chalk, and are in places 15 metres deep. They seem to have penetrated the chalk until a suitable seam of flint was reached, the galleries then followed the layers of flint. Their dimensions are very irregular from m. 0.5 to m. 2.0 in width and 1 m. to 2½ m. in height. From more than 25 shafts which were met with in the railway cutting between Frameries and Chimay it was seen that they were arranged in straight lines. In the galleries were found deer horn hammers and flint chisels, but no picks. The shafts were filled with rubble and rubbish, and resembled in general those of Cissbury and Grimes Graves. The flaking was conducted above ground, where the people mostly lived. The small size of the shafts would allow of descent by foot-holes.

In a letter to me from M. Bernard of Caen, he speaks of some old shafts as still open between Charleville and Gembloix, and after describing the shafts specially mentions "*Vastes chambres qui ont pu alors servir tant au refuge qu'à la fabrication de ces utensiles nécessaires aux premiers habitants, &c.*"

M. de Lasteyrie⁵ in his admirable paper on "*Des fosses propres à la conservation des grains*" printed by way of preface to M. Rollet's work, mentions the ancient usage of "*souterrains*" in France, north of the Seine, for preserving grain. He cites the improved examples, viz.: the "*Poires d' Ardres*," near Calais, as of doubtful age,—and later on says that at St. Quentin and Metz (as also in Burgundy) holes in the sand, previously coated inside with straw are used at the present day as granaries.

¹ J. L. Reynier, "De l'économie publique et rurale des Celtes et des Germains."

² "Mem. de la Soc. Roy. des Antiquaires de France," xiv, 144.

³ "Sur les Silex ouvrés de Spiennes," Bruxelles, 1866.

⁴ "Bult. de l'Acad. R. de Bruxelles," 2nd series, 25, p. 126, 1868.

⁵ See "Aug. Rollet Memoir su la Meunerie." In future when M. Lasteyrie's name occurs it refers to this work.

There are very large numbers of "*souterrains*" on both sides of the Somme from its mouth to Peronne and St. Quentin, and L' Abbe Lebœuf¹ does not doubt that many more exist than those with which he is acquainted.

Only one of great extent and greatly improved and specialized construction is described with care. The central shaft descends 30 feet, there are avenues with little caves branching off from them.

The more elaborate excavations, "*Sous le nom de caves*" have been known since the tenth century, when they augmented the name of the village of *St. Marchel Cave* among other places. M. Lebœuf thinks they were dug in the seventh century on the invasion of the Huns. Many have entrances into parish churches. The smaller "*trous*" are of very great antiquity and from their rudeness have been neglected and misunderstood.

At Villeneuve le Roi (Seine et Oise) M. Barranger² describes a pit 3 m. deep by 2 m. across the bottom and 8 c.m. across the top of the vault. The opening, 5 c.m. wide, communicated with the surface of the ground; this had been coated with wattles and burnt, turning the interior walls into brick; much burnt wood, bones, and fragments of tile and pot were found in it; it was filled with black earth; eight sugar-loaf shaped *favisæ* were found near it, one of which had pierced its vault; their depth was m. 1.5 by m. 1.6 in width at the bottom. It is compared to the "*Creutes*" of *La Creuse*. M. Tholin³ described some *crozes*, as they are called, in the *Lot et Garonne*. They are artificial caves in the Tufa, consisting of narrow galleries communicating with little cells. He also describes *Silos funéraires* containing seated skeletons, &c. in the same place.

The *Cros a Leojac*⁴ in the *Tarn et Garonne* is one of many artificial caverns dug in the soil. Others exist in Haute Loire.

Baron J. de Baye,⁵ speaking of the artificial grottoes of Aveyron, Finisterre, Seine et Oise, and above all La Marne, describes a very large number of *grottes* resembling them at Razet and the country round Petit Morin in Champagne. There are caves in the chalk connected by passages, of a type advanced far beyond those at Spiennes to which he compares them. He supposes they were once dwellings as well as places whence flint was obtained for making implements.

Baron de Baye does not give sufficient particulars as to the mode of digging them, and the utter want of plans and measurements in his book is strikingly behind the times; yet they appear to be connected with my subject, inasmuch as he speaks as the galleries being accessible by "*plusieurs puits*." Many flint implements were found and near the *Grottes*.

If the subterreanean dwelling of a somewhat complicated form in Finisterre,⁶ at Rugéré, does not truly belong to the series, inasmuch as it is not certain that the cave was entered from above, yet the presumed entrance is by a steep drop into a lengthened curved passage whose purpose

¹ "Histoire de l' Academie R. des Inscriptions," tom. xxvii, p. 279, and plate.

² "Rev. Archæologique," i, 431.

³ G. Tholin, "Materiaux pour l'histoire xiv, 89.

⁴ "G. de Mortillet, Materiaux pour l'histoire de l'homme."

⁵ "Archæologie Préhistorique," p. 134, &c.

⁶ "Bull. de la Soc. Archæologique de Finisterre," i, pp. 111, 123.

is precisely the same as the long central shaft. It would appear as though, south of the Seine, a type of caves existed resembling yet differing from those to the north; the main entrances being more or less sloping, with the vertical holes reduced in diameter, suitable to the passage of a man as at Razet, too small for ventilating apertures as at Rugère.

Though Mr. Stevens¹ called attention to the resemblance between these caves in Finisterre and those at Fisherton, they exhibit marked differences. I am indebted to M. Le Men for recent information on the Finisterre caves of Rugère and La Tourelle.²

In the department La Sarthe, M. Souligny³ describes some excavations which he calls old "*fouilles*." They are very numerous, and more so in some parts than others. He says: "*En descendant jusqu'à quinze pieds, terme de la plus grande profondeur, on trouvait la couche de marne qui leur servait de support.*" As the pits were full of rubbish and refuse of an offensive nature, not many (perhaps but one) were opened. Inexact as he is, the author is much exercised by finding the head (no other bones) of an *urus*, concerning the identity of which he leaves us in no doubt, and remarks with astonishment on the antiquity of holes containing the remains of a creature which had for so many centuries disappeared from the country. He calls them *marne* pits, and from the description I understand these deep holes could not be enlarged into caves until the chalk was reached. He believes this cretaceous rock was used for manure.⁴

Lasteyrie says that in Touraine and Loiret the habit of storing grain in silos is still continued. In the department of the *Pyrenées Orientales* the silos or granaries were the same as in Spain, but no use of them is made at the present day. They are known in Languedoc. In the neighbourhood of Toulouse they dig holes about 2 metres deep and about four feet wide, in the form of a bottle, with an opening sufficiently wide to admit a man. The corn being filled to the mouth, they are closed with earth.

Thus almost over the whole of France, in the province of Picardy, in Champagne, Loraine, Isle de France, Cotes du Nord, Bretagne, Sarthe, Touraine, Bourgogne, Le Querci, Gascony, and Languedoc grain has been or is now preserved in *fouilles* and *souterrains*.

M. de Lasteyrie ascribes to the Moors the introduction of the custom in France, but I have shown that it is older than the Roman day, and its universal spread over Lusitania or Spain, ancient or modern perhaps gave rise to the belief.

These subterranean granaries are mentioned by Varro⁵ in Hither Spain, and by Pliny,⁶ who calls them "*siri*." This, Lasteyrie says is the same as *silos* as used by the Castilians, *sitias* by the Catalans, and *matamores* in general.

Originally scattered or in small groups, these silos were constructed in later times near towns, and in grain bearing countries, in large numbers close together on spots set apart for the purpose, or in public places and under the streets of towns. Lasteyrie saw at Barcelona a collection of 59 surrounded by a wall, another at Bursasot in Valencia. Their depth is usually 10 or 11 metres and 12½ feet wide below. The mouth at its

¹ E. T. Stevens, "Flint Chips."

² "Caves at La Tourelle and Keredan," by R. F. Le Men, Arch. Cambrensis, 3 & xiv, p. 205.

³ "Annales d'Agriculture," xvii, 376.

⁴ Compare Reynier, l.c.

⁵ "Zoiros, Varro, R. R.," i, 57.

⁶ "N. H.," xviii, c. 73.

narrowest is 6 or 7 decimetres, and at the top widens a little to $2\frac{1}{2}$ feet; into this fits the stone which covers the mouth. The widening of the cave begins at 3ft. 3in. from the surface, though this varies with the soil. They are common in Granada.

The Mauritians of old, the Moors, and the people of Morocco, Barbary, and Northern Africa employ them to-day.

Mr. Geo. Maw incidentally gives a drawing of some matamores, which he and Sir Joseph Hooker¹ saw in Morocco. Mr. D. Urquhart² says the grain is treasured up and concealed in these matamores in the spot where it is harvested and threshed for great lengths of time, and gives many interesting particulars about them.

M. de Lasteyrie says that in Northern Africa, especially in Algiers and Tunis, they are generally of a square form, and from 30 to 40 feet deep, the shaft just admitting a man.

"In the plain of Boghar," says Canon Tristram,³ "we found it rather dangerous to diverge from the path, owing to the silos, or *mottamorrhas* as the Arabs call them, in which, under the protection of the fortress, the surrounding tribes hoard their grain. There were scores of them together, circular pits, each about 6ft. deep and scooped out until they were somewhat of the shape of a stout earthen pitcher."

Sometimes they are found in hundreds, the smallest containing 400 bushels.⁴

Hirtius⁵ says that it was the custom of the people of Africa to deposit their corn privately, in vaults underground, to secure it in time of war, and that Cæsar having intelligence of this, organized an excursion to Agar (perhaps the modern Souza), and obtained by this means barley, corn, oil, and wine.

Pliny⁶ says: "Utilissime servantur in Scrobibus quos *sivos* vocant ut in Cappadocia et in Thracia, in Hispania et Africa ante omnia ut sicco solo fiant, mox ut palea substernantur, præterea cum spica sua conduntur." The Latins used the word *sirus*, borrowed from the Barbarians (people of Barbary?), says M. de Lasteyrie, quoting Quintus Curtius.

Though I do not know if the interval between Northern and Central Africa affords signs of the continuation of the custom, in Southern

¹ "Morocco," by Sir J. D. Hooker, p. 454.

² "Pillars of Hercules," i, 409.

³ "Great Sahara," p. 58.

⁴ See T. Shaw's "Travels," 2nd ed., p. 139.

⁵ "Commentary on the African War," lxy and lxvii.

⁶ "N. H.," xviii, 30.

⁷ T. Shaw says that this latter usage had ceased at his visit.

The word *matamore* is spelt in a great number of ways. It is used in all lands round the Mediterranean, in France, and in England. A writer to "Notes and Queries" ("Notes and Queries," 3S, vi, 530, signed W. E.) thinks that the Arabic *matmuret*, vulgo *matmure*, a subterranean granary, a crypt, is the true form; but that the Arabic *muzmer*, a hiding place,

may also have been applied to the same or kindred excavations. By this means is explained the term *massymore*, also the *mazmorra* of Tollius (*post*), applied to the prison in Chrichtoun Castle alluded to by Sir Walter Scott ("Marmion," note 45), who says the name was used commonly in Scotland for such places, being brought by the Crusaders from the east by merchants who had become acquainted with their interiors when captured in Spain, Morocco, or Barbary. It is recorded with great exactness that an ambassador of England was confined in such a "mortimore" ("Gentleman's Magazine," 1749, p. 560) in 1749. This method of spelling the word probably gave rise to the explanatory and fearful word, "moorkillers," which had so contradictorily been received as a synonym.

Africa a very remarkable form of dwelling is described by H. M. Stanley.¹

After complaining that for some time previously "the country is deserted; not one native can be seen," he says: "our foragers here obtained for the first time a sight and hearing of some natives" then near Mount Gordon Bennett. "Some hiding places of the natives were discovered by accident amongst the tall grass beyond the fields; a little way from the village we found many deep pits with small circular mouths, which proved on examination to lead by several passages from the mouth of the pit to more roomy excavations, like so many apartments. These underground dwellings were numerous in Southern Unyoro." The veritable *Troglodytæ*² of Ethiopia!

In Egypt, though we know almost nothing of the domestic and agricultural life of the early Egyptians, and much less of the aboriginal tribes, no use of such caves could have been made as granaries, the soil being too low and damp. But the plate given by Dr. Kitto³ presents a series of domed buildings having steps up to the top; the corn was carried up and shot through a hole; thus these buildings closely resembled the corn pits raised above ground, and carried out the idea! The modern corn bins, I am informed by the Rev. W. J. Loftie, are greatly degenerated, and resemble "cowls" made of clay of the height of a man.

For the tomb was reserved the deep shaft. Tombs consisted of three parts—the upper chamber, the shaft, and the cave below. The upper chamber, originally a rock shelter and horizontal adit, afterwards a pyramid or other building, had a shaft sunk under it, sloping or perpendicular, with a cavern below, containing the sarcophagus or mummy. Mr. Loftie tells me there is no ready access to the bottom of the pit in the oldest sepulchres; and the later modifications it is unnecessary for me to examine.

Mr. Flinders Petrie, however, tells me that many of the shafts, which are always square (compare those of Tunis, &c., according to Lasteyrie), have at the corners holes to ascend by, most of the shafts being too wide to straddle across. He is, however, of opinion that these footholes are altogether later than the original shafts.⁴

Lasteyrie says: These granaries are met with in Italy, chiefly in Tuscany and Naples where they are called "*Buche*," and resemble the Spanish ones; they are found in Calabria but not in Rome.

At the foot of the Aventine at Rome, however, a tomb⁵ was found which is 51 feet deep with a circular chamber below, from the centre of which rises a shaft, called by the author I quote a Ventilator! but which retains the foot-holes in its sides. A gallery is cut in the rock round the cave, and a staircase leads to the surface. These latter arrangements belong to the time of its conversion into a tomb. Another like instance is engraved⁶ under the title "tomb of the *Equites Singulares*," and still others exist with vertical shafts. These are distinct modifications of pits adapted to their present uses by the ancient Romans, but originally dating from a time before Romulus.

¹ "Through the Dark Continent," p. 432.

² Comp. "Quintus Curtius," iv, 7, Pliny, "N.H.," ii, 106, and v, 5.

³ "Bible History of Palestine," p. 122.

⁴ References to these tombs in works on

Egypt are so numerous that I make no selections. There is, however, an interesting paper in the "Quarterly Review," vol. xix.

⁵ "Bartoli. Gli Antichi Sepolchri," pl. 50.

⁶ "Moses Vasea," pl. 115, &c.

As on the coasts so in the Islands of the Mediterranean are these granaries found, in Sicily,¹ Malta,² which, however, Col. H. Yule thinks are of the sixteenth century, and in Gozo.

Strabo³ says that the reason why the inhabitants of Ægina were called *myrmidones* was because they lived in holes which they dug under the soil, and throwing up the mould obtained by this means were enabled to cultivate the ground.

It will be convenient for me in examining Asia to begin at the East.

In India⁴ corn pits are common in many parts, but not all over the Peninsula; they are called "*khaus*." Maize is preserved in such holes⁵ which are often deep.

I am told that deep holes for grain are common near Delhi and in the central provinces.

M. Lasteyrie says the Chinese have been acquainted with holes dug to keep corn and rice in, to which they give the name "*teou*," he possessed several drawings by Chinese artists representing them.

When damp is feared they are lined with straw, and dry spots are chosen with care. In the mountainous country and in Chinese Tartary no other method is known there; the natives having dug the hole, throw in brambles, and firing them, bake the surface within, which makes it firmer and drier. The corn is thrown in and covered with mats with which, or with straw, the sides are sometimes covered. The earth excavated is piled on the top and rammed hard into a little mound.

The peoples of the whole of Central Asia are well known to use this method of hiding corn. Dr. E. Browne⁶ says that at Clesch, near Toopolchan, when the Turks and Tartars invaded the country, the people retreated into the large and deep caves underground, where they were completely hidden.

Alexander the Great⁷ was in great distress when on the Oxus, in consequence of the country people hiding their corn in underground granaries, to which none but themselves had the clue.

Xenophon for a season,⁸ in a deserted town of the Carduchi (Kurds), stored wine in plastered cisterns underground. He simply calls those he found by the name (*λακκοις*) they were known by at home.

In the cold, high lands of Armenia he describes even the dwellings as little better than store pits. "Their houses were underground; the entrance like the mouth of a well, but spacious below. There were passages dug into them for cattle, but people descended by ladders." Ainsworth⁹ confirms this, saying however, "The descent by wells is now rare"; in fact, it may be said the people are rising to the surface by degrees. This habit extends into Persia.

Mr. Ainsworth¹⁰ at Utch Kilissa, in an arid plain of chalk, found curious cavities hewn in the rock in the form of a pear. The bases were from 8 to 12 feet across; the depth from 12 to 20 feet. The aperture was small and round, generally covered with a single stone. They were

¹ Compare tombs in Syracuse. "Saint Non. Voyage Pittoresque en Sicile"

² C. Tucker in "*Journal Archæ. Inst.*" v, p. 197. Note.

³ "*Geog.*," viii, 6, 16.

⁴ Lasteyrie, l.c. L. Reynier, "*Economie Rural des Cartageniens*" "*Notes and Queries*," Jan. 21, 1865.

⁵ "The Tropical Agriculturist," p. 207.

⁶ E. Browne, "*Travels*," p. 12.

⁷ Quintus Curtius, "*Life of Alexander*."

⁸ "*Exp. Cyri*," iv, 2. Another allusion to buried wine occurs.

⁹ W. Ainsworth, "*Travels*," p. 178.

¹⁰ "*Travels*," i, 286.

coated inside with mortar ; some were filled with chopped straw for cattle and horses. These cavities may have been for corn or water, but he thinks that they were granaries, from the circumstance that similar cavities, though less carefully constructed, are still used in different parts of Syria for that purpose.

Canon H. B. Tristram informs me that corn pits, having the same general characters as those in North Africa, occur in Northern Syria and Mesopotamia. They are usually from 10 to 25 feet in depth, of the shape of a short-necked globular flask, with the neck very short, in hard soil. They are found both near villages and towns, and in plains and the most unexpected places. They are descended by a rope placed over a pole at the mouth. They are quite distinct from sepulchres, for which they can never be mistaken.

Cornelis Le Bruin¹ mentions some wells for preserving corn and oats, of perhaps unusual depth, near Rama, for he says, "*Nous jettames dans l'un deux qui ait fort profond plusieurs pierres, qui en tombant aux fonds faisaient en haut un bruit fort extraordinaire et fort creux.*"

This is a near reminder of such pits in England ; how close a resemblance too between Europe and Western Asia does the following appear. Dr. Alex. Russell² says : "The corn (near Aleppo) is transported to the granaries, which are large subterraneous grottoes with one round opening at top. Sometimes they are found on the verge, nay, even in the middle of the highway, and, as they are often when empty left carelessly uncovered, travelling near the deserted villages in the night becomes exceedingly dangerous." He might be describing the country round Jorden's wood in Kent !

In Palestine these granaries are universal and are frequently referred to by travellers. The pit into which Joseph was dropped was of this kind. Lieut. Conder³ says : "In this continuation of the plain of Esdralon is the hill called Dothan where Joseph's brethren were feeding their flocks ; it is noticeable that there are to this day numerous cisterns still existing hewn in the rock into which he (Joseph) might have been dropped, they are shaped like a bottle with a narrow mouth."

They are frequently mentioned in the Old Testament writings, as repositories for stores,⁴ as hiding places,⁵ as prisons⁶ and as pitfalls,⁷ a few of which I append.

Professor Robinson⁸ describes many in South Palestine having great peculiarities, and which perhaps served for Anchorites to live in as was a common custom in the east.

In Arabia where they are frequent these pits are referred to as serving the purposes of Mahomet.⁹ The story is, that Mahomet persuaded a man to go to the bottom of a pit which was near a great highway, and to cry aloud when he should pass by in company with the great multitude which commonly followed him "Mahomet is the well-beloved of God ;"

¹ "Voyage en Levant," p. 251.

² "Aleppo," i, 77.

³ "Our work in Palestine," p. 199.

⁴ Jer. xli, 8-9. 1 Chron., xxvii, 25.

⁵ 1 Sam., xiii, 6. 2 Sam., xvii, 13-19.

⁶ Jer., xxxvii, 11.

⁷ 1 Chron., xv, 22. Is., xxiv, 18. Jer., xlviii, 43. Frequent mention of these pits occurs in Josephus, (Bell. "Jud.")

and in one of them Josephus himself sought refuge. Compare also Calmet's "Dictionary." Dr. Kitto's, "History of Palestine," p. 261. King, "Munimenta," p. 46. Articles in the "Investigator" on the agriculture of the Jews.

⁸ "Biblical Researches," ii, 353.

⁹ Bayle's, "Dictionary," article, Mahomet.

which being done, he thanked God for a testimony so remarkable, and prayed the people instantly to fill up the pit and build over it a mosque in memory of the miracle.

In Cappadocia¹ Lydia² and most parts of Asia Minor the custom prevailed in ancient times and is continued now. The early christians availed themselves of the troglodytic habits of the "wretched" Cappadocians, and hermit's cells are attached to several rock temples in that country with the shaft remaining still. This has given much trouble to travellers who, finding the shafts communicating with the barren mountain sides were at a loss, yet gave them the name of ventilators.

C. Texier calls them *martyriâ*, or retreats for early christians, and describes some, giving an engraving of one which had been turned into a tomb and contained niches and the burial.

Very deep caves are employed for stores in Mingrelia,³ such have also figured in history as refuges in Cuban⁴ on the Black Sea.

Lasteyrie describes these subterranean reservoirs as well known in southern Russia, in Lithuania and the Ukraine. There they throw straw into the hole in order to bake the walls by firing it, and when filled with corn, covered with earth and the plough passed over it, the corn is hidden and preserved for a great length of time.

This method is employed also in Hungary, Transylvania and Poland. Sometimes the sides are covered with straw, and sometimes with wood when it is plentiful.

Ephorus⁵ says, the Cimmerians (around the Palus Mæotis) "dwell in underground habitations named by them '*argillas*'⁶ and that these communicated with one another by subterranean passages."

The *Sataρχæ*, a people of the Crimea, lived in artificial holes. Pomponius Mela⁷ says, "*ob sæva hiemis admodum assidue demersis in humum sedibus specus aut suffossa.*"

Perhaps it was after the custom (or an adaptation of the excavations) of this people that the Greeks formed the remarkable shafted tombs which were explored at Kertch,⁸ and which yielded such splendid rewards to the explorers. These wonderful tombs were vaulted chambers, 10 feet by 12 feet in area and 8 feet high or larger, some simply dug and some with plastered sides and niches. They contained bodies and vessels and ornaments. These caves were entered at the sides by shafts three feet in diameter, which, after passing through several feet of made earth, penetrated the rock for about 21 feet to the level of the opening of the tomb, which was closed by masonry. The ornaments worn by the persons buried closely resembled those known in England as Anglo-Saxon, and Dr. Macpherson calls them Varagian.

Dr. E. Clarke,⁹ digging near the church at Yenikale, found a pit of a cylindrical form containing a stone sepulchre. This was entered by an opening like the mouth of a well and covered by a slab of marble; this was bell-shaped below.

¹ Varro, i, 44.

² Pliny, "N. H." xviii. Drummond's "Origines," vi, 7.

³ C. Texier, "L' Architecture Byzantine" p. 39.

⁴ J. Chardin, "Travels," i, 38. Lasteyrie, l. c.

⁵ Strabo, "Geog.," v, 4-5.

⁶ Compare note on "*Margelles*," p. 26.

⁷ Mela, ii, i, 66.

⁸ D. Macpherson, "Kertch," with a large plate, p. 83, &c.

⁹ "Travels," i, 418.

From Pliny we learn of these corn pits, wine cellars, &c., in Thrace;¹ and under the terms *λακκος*, *βοθρος*, and *σιρὸς* they were known in Athens and old Greece.

As might be expected, they are still employed in Turkey in Europe. J. Tollius,² in his pedantic style, speaks of such places in Austria, where in one town is a "*Carcer subterraneus sive ut Mauri appellant Mazmora Custodie Turcarum inserviens*," and another where "*Coguntur omnes captivi sub noctem in ergastula subterranea quæ Turcæ*." "*Algezirani Vocant Mazmorras*." This is in Styria.

"In the broad plains of Hungary," says Dr E. Browne,³ "they use not barns nor stacks, but have many large and deep caves underground" in which the grain is stored.

It is to Scythia, and the lands about the Ister or Danube, that Virgil⁴ alludes—

*"Ipsi in defossis specubus secura sub alta,
Otia agunt terra," &c.*

After speaking of Xenophon's account of the well-like entrances of the Armenian dwellings, Georgius Agricola⁵ says—

"In maritimis quoque Germaniæ, quibusdam urbibus, sicut in Prussis Dantisci, et in Saxonibus Lubeci, bona vulgi pars sub terra habitat in testudinibus, super quas extractæ sunt magnificæ domus quæ a dominis incoluntur." An explanation of this is required.

The country I set off from is again reached, and little difficulty will be experienced, I hope, in connecting the caves of England with those of the countries that have been traversed by the links I have collected.

Man has employed caves for shelter and habitation from the earliest times. In cold countries he early chose rocky districts to dwell in, visiting the flat plains in summer for hunting. In winter he built up the caves and rock shelters, which were insufficient for his needs, with stones and branches, scraping them further into the hillside to make more room. This led the way to digging holes and covering them with branches in land which afforded no better shelter, and where he was far from his rocky home. The deeper the pit and the thicker the covering of branches and earth, the warmer and safer the hut-hole, until it became wholly subterranean. As a dwelling-place it would remain so only on the compulsion of northern cold or tropic heat.

The pits of Fisherton are an illustration of this deep hut, and in Kent almost every gradation may be traced between such and the deepest caves with narrow shafts.

Light, small size, and easy access, with slight depth,

¹ See Ainsworth's "Travels in Search of Xenophon's Retreat."

² Jac. Tollius, "Epist. Itin.," pp. 147, 243.

³ "Travels," p. 12.

⁴ "Georgics," iii, 376.

⁵ Georgius Agricola, "De animantibus subterraneis."

are needed in dwellings ; but darkness, secrecy, and great capacity are necessary for stores. Nevertheless, originally the shallower pit-dwelling was likewise the store, and the separation of the repository from the dwelling and its special manner of construction were but steps in civilization. The old connexion was, and is, revived in times of trouble, when the granary becomes the refuge.

The most renowned caves of Kent and Essex are so dug as to be lofty chambers, separate from each other, as is the custom all over Europe, Asia, and Africa for stores and granaries. Sometimes they are thickly clustered where much storage was required, but individuality in each case was preserved. Every direct effort is made to increase their size. Limestone rocks afford peculiar advantages for vaulting, and chalk, in which they are so often dug, is that in which they have received their greatest development and proved the most permanent, not only in England but in other parts of the world. From the period of the use of stone chisels and picks of deerhorn to that of bronze and iron picks a direct relation may be traced in the increase of size, &c.

The only direct mention of the storage of corn by the Britons records that they stored it in the ear ; this, as I understand it, means the grain for men, the straw for cattle. I have traced the use of grain pits in ancient times and at the present day in foreign lands from France to China and from Spain to Africa, and our little island forms no exception to the widespread rule in this matter.

Even in very early times, when men were chiefly flesh-eaters, fodder was absolutely necessary in winter. Domestic or semi-domestic cattle have been traced as accompanying the men of the late stone and bronze ages, and though doubtless hunting was pursued all the year and cattle were raided, yet times would come when these resources would fail ; then the tame cattle, which had been fed, would be required for the support of the community. Even they were not always sufficient, and cannibalism was commoner than the delicate sensibilities of some of our anthropologists will permit them readily to admit.

Beyond the inference from Diodorus's account above mentioned, it is not recorded, even in the dawn of history, that hay and straw were stored as a separate branch of

husbandry, yet of course this was done.¹ Stacks, which were perhaps unknown, could not have been used from their liability to take fire, and because their size would betray them and the whereabouts of the village to the enemy. Hay and straw or corn and fodder would occupy much space. Thus those tribes possessing the largest and securest storage would be the best off in the struggle for life.

I have shown that shafts were employed in flint mines, for dwellings, and for stores. They were likewise, according to Pliny, the means of obtaining chalk for manure. This I consider a secondary result of these excavations, a measure of precaution and safety first, for the spreading abroad of the excavated material would the sooner dissipate it, preventing the easy detection of the store, and of utility afterwards, for on heavy soils it would soon be found that the lime would lighten them; then it would be spread with care, and even excavated by shafts for this purpose, as was done where it lay very deep. But it is evident that where the land is white with chalk the pits of great depth so often found there could not have been dug for manure, and the natives of Kent in such situations scout the idea as absurd.

Had Pliny known what Tacitus described later as to the use of whitewash by the Germans, doubtless this compiler would have said the holes were also dug for that purpose!²

In those parts of Kent with which I am acquainted these pits are not dug for manure now. That at Plumstead was for a tile works. Those at Wickham and Crayford were for brickmaking. Though Mr. John Evans says they are dug for manure in Herts, he has never seen the method practised in France.

As to secondary uses, we have seen that if dug in the

¹ Keller, "Lake Dwellings." Cattle were kept on platforms on the water, and there was evidence of fodder, with the other stores of dried fruit, corn, &c.

²T. Pennant ("Journey from London to Dover," i, p. 55) mentions inscriptions in Zealand as referring to certain traders in limestone and chalk from Britain, quoting Keysler's (J. G. Keysler, "Antiquities Septentrionales," p. 235) remarks on the subject. Pennant first suggested that the

chalk might have been obtained in Kent from the great chalk cliffs on the Thames near Gravesend. This is possible, though unlikely, for the Yorkshire cliffs offered greater facilities; yet he was more careful than to suggest that the chalk was afforded by the Kentish shafted caves (which he describes), as has been done by Mr. Roach Smith ("Gentleman's Magazine," March, 1867.)

stone age for shelters the flint met with was extracted and utilized.

I have alluded to the possibility that these pits might have been used as pitfalls. Their connexion with ditches and hedges favours this supposition, nay suggested it, and it would particularly apply to those which were somewhat ruinous and condemned to less noble uses than that of storage. When the aperture was lightly covered with reeds and turf and the banks were lined with a hedge of brush, animals might easily have been driven along the ditches and over the pit. I even consider that at Jorden's Wood a special arrangement with this view was planned in connexion with the ancient roadway there. The different ditches which join the main way on the south from outlying districts would enable the cattle to be driven into the deeper ditch which led over the pit F (plate I), at the corner of the square camp, where, by the diversion of the ditch, it is evident an old cave lay and is still to be seen. By the use of a swing hurdle or gate the direction of the animals could be regulated, and even beasts from the opposite quarter could be driven past the pit until they reached the deep hollow at G, then fronted and turned they could be driven back (the way they came having been meanwhile stopped by the gate) over the pit westward.

There is no improbability here, and though in this country accounts of this manner of hunting are rare,¹ sufficient may be learnt of the method to justify my supposition.

It will be remembered that Professor Rolleston² alludes to this custom as probably that carried on in Gaul in Cæsar's³ time.

Mr. Austen's⁴ essay on capturing deer is very interesting, especially in the description of guiding hedges, often miles in length, such as were I think used in Kent, and may, nay must, have been constructed in late Saxon times, if the method of hunting the boar mentioned in Archbishop

¹ The frequent mention of pitfalls by early and mediæval writers in this country shews by their familiarity with them how recently they were in use.

² "Journal Anthropological Institute," vi, 22.

³ "Cæsar's B. G.," vi, 28.

⁴ "Reliquiæ Aquitanicæ," i, p. 217. The reference to mardellen as pitfalls is not at all clear. See F. Keller, "Lake Dwellings," by J. E. Lee, i, p. 478.

Aelfric's colloquy is to be read in its simple sense: "*Hundas bedrifon hyne to me and ic thæer togeanes standende færllice ofstickode hyne.*" Perhaps highly trained dogs assisted the early hunter as they did the Saxon one.

Matamores offered convenient places as prisons, and in all countries they have served this purpose. In England at one time it was the only meaning attached to the word. They may have been used by the Romans as *ergastula*, or places to put slaves in at night, but there is no proof of this, notwithstanding that Dr. Bell thought so and supported it by reading a paper before the Essex Archæological Society in 1869, entitled "The Chalk Pits of Chadwell the Ergastula of the Romans," in which his evidence was against himself.

At the clockhouse at Greenstreet Green, Darenth, Kent, is a subterranean dome-shaped chamber, to which a passage leads half way up the well. The aperture at the top is grated. The whole is constructed in brick, and appears to have been made in the seventeenth century. Whether it is constructed on the numerous chalk holes around, which it somewhat resembles, or was actually one much improved, I cannot say, but it was, according to tradition, the prison attached to the mansion of a former Sheriff of Kent.

These store pits have been frequently employed as refuges in times of persecution and of war, whole nations having been recorded as seeking retreat in such places. Everywhere robbers and outcasts have sought their shelter, and smugglers have availed themselves of them very largely. Their final obliteration has generally happened from the facilities they offered for the deposit of rubbish or the disposal of the vanquished dead after a fight. The abandoned shafts served the Romans well, as *Favissæ* and *Puticoli*, such as those in which the poor were buried, &c.

Some excuse may be allowed I hope for the length of this paper and the tedious manner of its arrangement, on considering that it is the first attempt to collect the evidence and treat the subject of deneholes at large.

The subject is by no means worn out either here or abroad. It is evident that there is room for careful enquiry in almost every country concerning the caves under discussion, more especially in their primitive stage,

and I shall be much obliged for any further information bearing on the matter.

I am indebted to many correspondents, whose names are mentioned in this paper, besides many other friends for their assistance, to whom, and particularly J. G. Hepburn, Esq., of Baldwyns, Bexley, for the "freedom" of Jorden's Wood, most cordially granted, I return my best thanks.

NOTE.—In Stankey three shafts have been accidentally omitted in the map of Jordens Wood. Two between the "Y" of Stankey and "2" and one, filled up, about 25 yards south of No. 4.

In Stankey the dots on the left hand nearest to the figures indicate the shaft required.