

FIG. 1.-ROMAN ALTAR TO JUPITER DOLICHENUS AND BRIGANTIA (SEE P. 176).

## VII.-CORSTOPITUM : REPORT ON THE EXCAVATIONS IN 1910.

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## i.-Introduction.

Work was begun for the season on 11th July, 1910, and continued till 9th October. The reserved area was a space of considerable extent, lying between the ground excavated in 1908 and the east hedge of the field. It had been expected that this part of the site would yield valuable results, and to a large extent this expectation has been fulfilled: the work of 1908 had made it clear that only a part of the 'forum' (site xi) had been uncovered, and during the past season the remainder of this remarkable building was explored and planned. Unfortunately the eastern courts of the south range were found to be in almost as fragmentary a condition as those to the west; but the east range, consisting of a single long, narrow chamber, was in a fair state of preservation. Its walls do not at any point stand more than two courses above the foundation, but the external plinth of the main east wall was found in position for a distance of one hundred and forty feet, together with the return at the south-east corner-the only angle where more than the foundation course remains. The site of the entrance, leading from the street to the great internal court, was also traced, and a fine stone drain of considerable dimensions was discovered under the roadway.

The ground on the east side of site xI was from one point of view less productive. We had hoped to find the 'forum' flanked on this side by some other important building, but no.
definite trace of contemporary foundations was discovered, and the buildings unearthed in this part of the field seemed to be comparatively late in date and poor in quality. In other respects, however, the results were of great interest. Two parallel ditches, running approximately north and south across the reserved area, were traced and planned, and the pottery found in them seemed to indicate that they were of early date, though probably later than the time of Agricola. It is possible that they formed part of the defences of a fort planted here about the end of the first or beginning of the second century, but until excavations are carried out in the adjoining field on the east, it is impossible to form any definite views on the subject.

At any rate, these ditches hạd been filled up during the Roman occupation, and the western kerbs of a road, as well as the fronts of several buildings abutting on it, had been carried along the site of the eastern ditch, which was discovered through the consequent subsidences. The road in question, which does not appear to be of early date, heads approximately northwards, and may perhaps be found to link up with the 'supposed Roman road' shown on the site plan printed as the frontispiece of the report for 1908, and with that section of the Dere street which stretches up Stagshaw bank to Portgate and the Wall.

Apart from the buildings, undoubtedly the most interesting find of the year was the altar (fig. 1) which was found on the south side of the 'forum,' where it had formed one of the kerbs of the fourth century street. It is described by professor Haverfield on a subsequent page. The fragments of 'Samian' and other pottery have been of considerable importance: these and the bronzes and other small objects will be dealt with in a separate section.

The excavations were again superintended by Mr. R. H. Forster, and, as in previous years, Mr. W. H. Knowles under.took the planning and measurement of the buildings and struc-
tural remains. Valuable assistance was also given by professor Haverfield, Mr. H. H. E. Craster, and others, and it is hoped that the staff of helpers will be still further increased during the coming season. Our thanks are again due to Captain J. H. Cuthbert, D.S.O., for his continued kindness and support.

The work will be resumed in July, 1911, on a portion of the west field adjoining the site at present occupied by the temporary museum. This space lies immediately to the north of the rubbish-pit area which produced many valuable finds in 1907, and it is probable that more pits of the same kind will be discovered. It should also be possible to trace the main east and west street, which runs in front of the 'forum' and granaries to a point at which, presumably, it joins the great road leading up the hill from the bridge, to check Maclauchlan's survey of the western boundary of the town, and to obtain some evidence as to the character of that quarter of corstopitum.
I.-SITE XI.

The first piece of work undertaken was the further excavation of the large building on this site (popularly known as the 'forum') to the east of the portion discovered and examined in 1908. The line of the south wall was followed from the point to which it had been traced in the year mentioned, and at the same time trenches were cut with the object of finding the remains of the east wall. This was done on the assumption that the original building had been approximately square, and this theory proved to be correct: the main east wall was found in a very short time: the east range was proved to consist of a single long, narrow court or chamber, which was completely cleared for a distance of about one hundred and fifty feet, and beyond that point the foundations of the main east wall were traced to the north-east angle. The foundations of the outer and inner walls

of the north range were with some difficulty followed to a point very near the line which formed the eastern boundary of the 1908 area, and the remains discovered Tined up with those found two years previously; but though some evidence of cross walls was obtained, it was too slight to justify any conclusion as to the exact design of this part of the building.

The main entrance was found in the centre of the south range, and here there were at least two road-levels, one contemporary with the original building, and the other about three feet higher. Trenches were cut in the eastern half of the great central court, but only one building was found (as shown on the plan) in that part of the site, and this did not appear to have any connexion with the original design of the principal building.

A certain amount of work remains to be done before the excavation of this site can be regarded as complete, and there are several controversial points in connexion with it which may profitably be left for discussion in a future report. However, the general plan and principal details of the building have already been made clear. The 'forum' consists of a large central court; measuring about one hundred and seventy feet square, surrounded by the remains of four ranges of buildings which completely enclose it. The west range, excavated in 1908, was divided into nine, or more probably ten, small courts or chambers, measuring seventeen feet north and south by twenty feet six inches east and west, with doorways, thirteen feet wide, opening on the central court. The south range has the main entrance in the centre, and on each side of this are five courts or chambers, which appear to have had doorways opening on the street to the south of the building, and not on the central court. The east range consisted of a single chamber, of the same length as the east side of the central court, with a doorway opening on the latter close to the south end; possibly another doorway in a corresponding position near the north end formed part of the
original design, but the remains at this point are too scanty to confirm or disprove the theory. The north range was about one hundred and sixty-five feet long and twenty feet wide, but its interior arrangements are uncertain.

The west range and the western half of the south range have been described in the report for 1908. In the present report we have to deal with the remainder of the south range, the long eastern building, the eastern half of the north range, and the remains found in the central court.

## 1. The South Range.

The work of 1908 included tracing the outline of chamber 5 of this range, and it was found during the past season that this chamber adjoined the main entrance, which led from the street on the south side of the building into the central court. As recorded in the report for 1908, chamber 5 contained a number of dressed stones of considerable size, and more were discovered when the space was cleared in 1910 . It is possible that they formed part of a gateway erected, or partly erected, over the entrance, and this supposition is supported by the discovery of a large lump of rubble concrete, of such a character as might have been used in the vaulting. Many of the stones had been laid out with some regularity, as though to form a floor, and this seems to have been done during the last period of the Roman occupation, as about forty burnt coins, ranging from Gallienus to Constantius II, were found scattered in the soil immediately below them.

The entrance was a passage, twenty feet long by sixteen feet wide. The foundation courses of the outer and inner walls have been continued across the ends of this passage to form sills, but unfortunately the only masonry remaining above the foundation is a portion of the first course of the wall dividing the entrance from chamber 6. The contemporary roadway of gravel and
chippings was on a level with the sills: the later road was nearly three feet higher and of similar, though poorer, construction; it had been carried just over the top of a large block of dressed stone, which had been left lying on the earlier road


FIG. 3. - CORSTOPITUM : ENTRANCE TO SITE XI, EAST SIDE.
in the middle of the entrance. A coin of Constans (A.d. 348-350) was found in the metalling of the later road.

The most striking feature of the entrance was a large and well-constructed stone drain, found under the earlier roadway and clearly forming part of the original design; at either end it


FIG. 4. - CORSTOPITUM: DRAIN UNDER ENTRANCE TO SITE XI.
was carried under the sill, or continued foundation course, which on the south side had been checked or rebated to allow its passage. At this end the drain measured internally two feet in height, and one foot eight inches in width. The flooring stones had been laid on a bed of stiff clay, somewhat longer than the drain itself, and at each end the pressure had squeezed the clay up to a level higher than the lower surface of the last stone. This may be taken as an indication that the drain was never continued, either to the north or to the south, at any rate by work of a similar character, and this is in accord with the fact that it was found practically empty and showed no sign of ever having been used for the passage of water. The sides of the drain were constructed of single slabs of stone, a little over a foot thick, with a backing of clay, and the cover-stones, which were from twelve to fourteen inches thick, had been rebated at each end, to prevent the side stones slipping.

Chamber 6.-Of this chamber, only the clay and cobble foundations of the south wall remained, but on the north two courses above the footings were in position, and at the northeast corner one stone of the first course of the east wall was found. This chamber had a gravel floor-level, slightly lower than the top of the footings, and presumably of the same date as the original building. About four inches above this was a floor of thin flags, with a burnt layer above it, and higher still was a cement pavement, the upper surface of which was on a level with the top of the first course above the footings of the north wall. On this pavement a number of dressed stones-some of them showing mouldings-had been laid out in much the same manner as has already been noted in the case of chamber 5 . A coin of Hadrian was found in the filling below the gravel floor, on which a denarius of Faustina I occurred. A silver coin of Julian (A.D. 360-363) was found between the flag and cement floors, and seems to indicate that the latter was constructed during the
latest period of the occupation. Several pieces of bronze scale armour were found between the gravel and flag floors (fig. 41).

Chamber '7.-This chamber was of similar dimensions. The north wall was found standing one course above the footings, with a foot or two of the second course at the north west corner : one stone of the first and the greater part of the foundation course of the east wall remained, but the south wall could be traced only by means of the clay and cobbles. The earlier floor level, at about the height of the top of the footings, had been made up with flags, roughly cut gutter-stones, and other débris. Six inches above this was a bed of chippings, with a thin layer of white cement covering a small area in the centre of the chamber; on the cement and chippings a stone floor, four to six inches thick, had been laid, its surface being two feet eight inches below the present ground level. A denarius of Galba was found in burnt matter about the earlier floor level, and coins of Marcus Aurelius, Septimius Severus, Claudius Gothicus, and Carausius, came from below the later stone floor.

Chamber 8:--This chamber was of similar size and character. Here again only the north wall showed masonry standing above the foundation course, and at the point of junction of the north and east walls three courses were found in position, though the second and third were represented only by single stones, one of which bore a mason's mark on its eastern face. Nothing remained of the first course of the east wall, but at the point of junction one of the stones of the first course of the north wall had been curiously checked, so as to allow the second course of the cross wall to be bonded in; the first course of that wall had been slightly thicker than the first course of the north wall, and had been butted against it.

This chamber showed a somewhat simpler stratification, but about four feet below the present surface, and six inches above the level of the top of the foundation course, was a layer of
chippings, gravel, and small stones, in which was found a well preserved sesterce of Commodus, dated a.d. 183-186. Those chippings did not appear to be the product of the original work, and may possibly point to a resumption or restoration of the building towards the close of the second century or early in the third.

Near the north-west corner of this chamber was a small, horseshoe-shaped structure, resembling a furnace or oven, and apparently of later date than the original building: it was three feet long, two feet six inches wide and two feet high at the mouth and one foot eight inches high at the back; it was built of rough stones set on edge, and had a gravel floor, on which was a layer of black burnt matter containing charcoal. Above this it was filled with greyish clay to the top.

Chamber 9.-This chamber again was similar to those already described. The whole of its north wall was standing one course above the foundations but, as in most other places, the south wall was represented only by clay and cobbles; the foundation course of the east wall remained, but had subsided owing to its being laid on made ground. There was some trace of burning on the original floor level : a foot above this was a gravel floor, on which lay one to two inches of black burnt matter, and then three to six inches of burnt sand. About the middle of this chamber were the remains of a masonry wall of later date than the original building, which probably was connected with the late structure to be mentioned presently in dealing with the east range. A denarius of Pius was found in the lower stratum, and coins of Gallienus, Tetricus, and Constantius II came from the higher level.

Chamber 10.-This chamber occupied the south-east angle of the building, and had its north and east walls standing one course above the foundations: the latter formed part of the main east wall of the 'forum,' and had a moulded plinth on the
exterior, similar to that found on the main west wall. At the south-east angle the return and the mitre of the plinth were in position, but at a distance of six feet six inches from the angle,
 the return ended in what appeared to be the lower part of a door jamb, the face of which had not been dressed flush; at a short distance from this jamb nothing remained but the clay and cobbles. The doorway, if symmetrically pläced, must have been nine feet four inches in width. In the north wall, which also formed the south wall of the east range, the foundation course had been placed at a higher level than that of the adjoining main east wall (see fig. 5), and the level had been regained by checking the upper bed of the stone marked E .

There were two clearly marked occupation levels in this chamber. On or near the earlier floor were found denarii of Vespasian, Titus, and Antoninus Pius, and bronze coins of Trajan, Hadrian, and Sabina, while a coin of Julia Mammaea came from the upper part of this earlier stratum. The upper level produced coins ranging from Claudius Gothicus to Constantine the Great.
The whole of the south range appears to have been built on made ground, probably because the site originally had a more pronounced slope from north to south, so that a certain amount of levelling was necessary in laying out so large a building.


FIG. 6.-CORSTOHITUM : SITE XI, MAIN EAST WALL.

The following section, taken from a trial pit sunk in the east side of chamber 10, may be regarded as fairly typical:

From the top of the footings of the east wall:

| Clayey loam ... | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | eleven inches. |
| :--- | :---: | :---: | :---: | :---: | :--- |
| Builder's rubbish | $\ldots$ | $\ldots$ | .. | $\ldots$ | one and a half inches. |
| Clay of poor quality | $\ldots$ | $\ldots$ | $\ldots$ | two inches. |  |
| Gravel $\ldots$ | $\ldots$ | . | $\ldots$ | $\ldots$ | six and a half inches. |
| Mixed earth.. | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | two feet four inches. |
| Clean sand. |  |  |  |  |  |

## 2. The East Range.

This, as already stated, consisted of a single long, narrow chamber or gallery, measuring one hundred and sixty-nine feet by nineteen feet four inches, separated from the central court by a continuous wall, 2 feet 8 inches thick, with a doorway near the south-west corner; possibly the design included other openings which cannot now be traced. The remaining doorway is eight feet nine, inches wide, and has rock-faced projections on the ends of the stones forming the jambs. The second course of the northern jamb has been formed of two stones, about four feet eight inches long, placed longitudinally along the wall; only one of these remains, and it has been moved a little out of position. The foundation course had been carried through to form a sill; it was covered with banker chippings, which were very abundant in this part of the building.

The east or exterior wall stands two courses high for a distance of one hundred and ten feet from the south-east angle, the outer face of the first course having the fillet and torus plinth, but many of the stones have not received their final dressing. At the extreme south end of the interior face of the east wall, at the point marked $B$ on the plan and fig. 4, there is a recess, four and a half inches deep by three feet six inches wide, and at the point marked $c$, is a stone only half the thickness of the wall, and dressed flush on the interior face. Probably a stone is mis-


FIG. 7.- CORSTOPITUM : SITE XI, OVERTURNED EAST WALL.
sing here, and this, like the northern jamb of the doorway, forms an exception to the general system of building adopted, under which each stone is carried through the entire thickness of the wall.

The inner wall of the east range stands two courses high for a distance of forty-four feet to the north of the doorway, and the first course remains in position for a further distance of thirtyfour feet. The upper beds of the last four stones of the first course have not been dressed fair; they have been only roughly scabbled, and left projecting above the level of the rest of the course. The same feature may be observed in the case of the northernmost remaining stones of the third course of the main exterior wall of the west range.

From a point one hundred and twenty-two feet to the north of the south end of the east range the foundation and plinth courses of the outer, and the foundation course of the inner wall, had been overturned, and this seemed clearly to have been the result of deliberate destruction and not of accidental subsidence. Apparently the entire space between the two walls had been excavated to a depth of from two to three feet; the clay and cobble foundations of both walls had then been cut out to the extent of more than half their thickness, and the stones had been prised over with some form of crowbar, which in several instances had left clear traces of its use on the angles. Several of the plinth course stones were found standing on end, and some had been completely overturned; on the other hand, the southernmost of the displaced stones of the plinth course had been shifted from its original position but still remained at the proper level. Time did not allow of the complete clearance of the disturbed area, but a broad trench was cut from wall to wall, and the facts already set out make it reasonably certain that the damage was deliberately done, though nothing was found to show when or by whom it was carried out. The cutting away of the clay and cobble foundations was calculated to make any
restoration of the building very difficult, and perhaps may be taken as evidence of a hostile intent, in which case we may ascribe the destruction tentatively to one of the disturbed periods during the second half of the second century; but further work is needed in this quarter, and possibly clearer evidence will be obtained. No stone belonging to any course higher than the plinth course was found on this part of the site.

To the north of the disturbed area only the masonry foundations of the inner and outer walls remained, and in the case of the inner wall, the upper beds of the stones had not been dressed fair. Here again more excavation is needed before some of the most important problems connected with the 'forum' can be adequately discussed, and we propose to leave these questions to be dealt with in a future report.

The southern portion of the east range seems to have been occupied till late in the fourth century, but the traces of the various periods are somewhat difficult to distinguish. The lowest stratum produced a series of coins ending with Lucius Verus, and this agrees with other evidence, pointing to some year not very late in the second half of the second century as the date of the foundation of the 'forum.' In some parts of this range a burnt layer occurred about a foot above what appeared to be the original floor level, but the most clearly defined later floor was about eighteen inches higher, or on the average three feet six inches below the present surface. A denarius of Commodus was found just below this floor, and a denarius of Septimius Severus in the clay bottom of it. The coins found in the upper stratum range from Gordian to Gratian.

At a comparatively late period-possibly the latest-the site of the southern part of the east range, and part of the site of chamber 10 of the south range, had been covered by a building of much rougher construction than the original. work: the east wall was immediately above the remains of the main east wall
of the 'forum,' but the west wall was about three feet to the west of the line of the inner wall of the east range. The north wall was forty-nine feet three inches to the north of the wall dividing chamber 10 from the east range, and fourteen feet nine inches to the south of the north wall were the remains of another cross wall of somewhat better masonry (possibly re-used material) but, to judge by the levels, of the same date, the base of either wall being about three feet below the present surface. All these walls had foundations of a similar kind. Apparently at the date of their construction all this part of the 'forum 'was covered with soil, and the foundations were laid by digging a trench and filling it with rough stones of small size; in the case of the east wall of the late building, this loose stone foundation rested on the upper surface of the existing remains of the original main east wall. On this foundation (except in the case of the inner cross wall) there had been laid a course of heavy stones, some of which were simply waterworn boulders, while some were dressed or partially dressed 'forum' stones; and the north wall included two large blocks, evidently in the state in which they had been brought from the quarry, but of a size suitable for dressing for the original building.

Between the two cross walls were the remains of a floor of opus signinum, at an average level of three feet eight inches below the surface. As this is some inches lower than the base of either cross wall, it appears to belong to an earlier period, possibly the middle or latter part of the third century. If that supposition be correct, the rough building may perhaps be assigned to the latest period of the Roman occupation.

About six feet to the north of the southern cross wall was a curved fragment of masonry, about three feet long, and eight to eleven inches thick; it was fourteen inches high in the centre, the top being three feet six inches below the surface, and the hottom a foot above the original floor level.

## 3. The North Range.

The masonry foundations of the chamber or court occupying the north-east angle were found in position, but beyond the line of the west wall of this chamber the foundations of the main
-north wall continued for only twenty feet. In either case the line was traced by means of the clay and cobbles almost to the centre of this side of the building, but about the centre no clear indication even of this layer could be found. It is possible that at this point a projection northwards has been constructed or designed, and more work will be needed to prove whether this was the case or not; but on the whole, if other evidence is taken into consideration, it is more probable that the foundations of this part of the building were never finished.

The clay and cobble foundations of a cross wall were traced on a line fourteen feet to the west of the west wall of the northeast corner court; but though several other trenches were cut, no definite traces of the foundations of any other cross wall were discovered. Whatever may be said of the west, south, and east ranges-and this is one of the principal problems in connexion with the site-it seems possible that the north range was never finished, and that this part of the building was never advanced beyond the stage nepresented by the remains discovered during the past season. Not far to the west of the north-east angle an occupation level of undoubtedly Roman date had been carried right across the masonry foundations of the main north wall, at a height of only a foot to fifteen inches above their upper surface. On this level were found some small coal, two bronzeworker's crucibles, and a number of small bronze objects. Coins of Vespasian, Trajan, Hadrian, and Antoninus Pius were found on this part of the site, together with others of Theodora, Constantius II, Valentinian I, and Gratian. The latter series had probably worked their way down through the soil.

## 4. The Central Court.

The western half of this court was examined in 1908, and the investigations of the past season were concerned with the eastern part. Several trenches were cut in the northern portion of this area, but no foundations were discovered. It was found, however, that much of this section of the site had originally been covered by a shallow pool, which had left a bed of silt, about five inches thick, resting on the undisturbed gravel. It seems probable that this pool remained in existence for many years after the commencement of the building, as the silt produced a small but very curious and interesting silver fibula which is referred to in a subsequent section. This find seems to indicate that, at any rate, some part of the central court remained in its original natural condition for some considerable time after the commencement of the main building, and perhaps affords additional evidence that at least the northern part was never completed.

Further to the south, in the position shown on the plan; the remains of a building, measuring forty-nine feet north and south by sixty feet east and west were uncovered. The east wall, and possibly more, had been entirely removed, and the internal arrangements were difficult to trace, but the building seems to have had a central court or yard, with a range of chambers on the north and south sides, and probably at the west end. In the north-west corner were the remains of an opus signinum pavement, with a quarter-round fillet against the base of the wall. The walling stones were of small size, but in most cases fairly well dressed and laid. Towards the west end of the building there had been a considerable subsidence, and two rubbish pits were found here, one under the west end of the central court, and the other under the chamber in the south-west
angle. The former produced a bronze coin of Domitian, dated a.d. 86 and very little worn, and from each pit came fragments of 'Samian' and other pottery of an early type. Several other early coins were found at low levels within the building, while the coins found in the upper soil ranged from Severus Alexander to Gratian. On the question of the date of this building and that found in the central coürt in 1908, Mr. Craster sums up the numismatic evidence as follows:

[^0]- On the whole, the other evidence lends support to Mr . Craster's suggestion. It is, no doubt, true that the foundations of this central building are something more than a foot above the floor level of the east range of the 'forum,' but the trenches cut farther to the north seemed to indicate that the original level of this part of the site was higher than the level chosen for the floors of the various courts or chambers of the main building, and that while the site of the south range was artificially made up, farther to the north some excavation must have been necessary in order to maintain the level. The disappearance of the east wall of this central building points the same way; if the building were in existence before the 'forum' was laid out, the removal of this wall would clearly be necessary. There were no indications that the north and south walls of the central building had been butted against the inner wall of the east range; they terminated in broken ends under the late rough wall which has already been described, and the inner wall of the east range was completely cleared before the central building was discovered.


## 5. General Remarks.

There are several important questions in connexion with the 'forum' which must be left for further discussion in a future report, as a closer examination may bring to light additional evidence. The first has regard to the character of the building. Was it intended to be a 'forum,' or was it designed as a great military storehouse and arsenal? Either theory may be supported by illustrations from other places. The plan shows some resemblance to that of the 'forum' at Caerwent: on the other hand, there is also a similarity to two buildings in the legionary fortress at Carnuntum on the Danube, which seem to have been storehouses.

Another important question may be briefly stated. Was the building ever finished in accordance with the original design, or was the work interrupted by some period of disaster during the latter part of the second century, and afterwards resumed on different lines and a less ambitious scale? If the latter alternative be correct, to what stage had the various parts of the building been carried when the interruption took place, and what was the character of the later occupation?

A further point has been raised with regard to the 'rockfaced' or rusticated masonry. Were the bosses or projections part of the design, or was it intended that they should eventually be dressed off? This and other points are worthy of careful investigation, and it is hoped that those who come to Corbridge during the ensuing season will give them special attention. The 'forum' is certainly one of the most interesting Roman relics that the country possesses, and deserves the most minute study.

With regard to the probable date of the building, we will simply quote the conclusions which Mr. Craster has drawn from a study of the coins, as the other evidence seems to be fairly in accord with his opinion.
'The main building, apart from the two central buildings, which are probably earlier, may on the cumulative evidence be assigned to about the middle of the second century, and on the strength of the coin of Pius found in the chippings of the original floor of west court 2, to a date after, but not long after, 140. The first period of occupation ended in destruction and burning, as appears from the burnt stratum below the later floor of the east gallery and traces of burning in the west range. While it is possible that this destruction may have come in the reign of Commodus, the evidence provided by two denarii of Severus, one of which was found in the burnt stratum, tends to put it later than 198-i.e., immediately preceding Severus's British expedition of 208.

Rebuilding can consequently not be earlier than the close of the reign of Septimius Severus, and may have been carried out by one of his immediate successors-Caracalla, Elagabalus, or Severus Alexander. Two coins found in the south range are important for its dating, namely the sesterce of Commodus found in the masons' chippings on which the later floor rests, and the sesterce of Julia Mammaea (not earlier than 222) found below the later floor of chamber 10. Whether the re-occupation extended to the whole building cannot perhaps be definitely decided without completely excavating the northern range, but the fact that the burnt stratum containing two coins of Mark Antony extended over the foundations of the western wall near its northern extremity makes this decidedly improbable, and it may be surmised that the occupation of the second period did not extend to the northern range or to the northern portions of the east and west ranges, but embraced the whole of the rest of the site.

The second destruction was also caused by fire, as appears from the burnt stratum between the second and third floors of the south range, and the coins found in it place the disaster after the accession of Magnentius (350), while the siliqua of Julian, found below the cement floor of chamber 6, seems to carry it forward another ten years at least. This accords with the hypothesis, otherwise probable, that the second rebuilding is the work of the elder Theodosius (circa 369), and receives slight support from the presence of a late Constans coin in the metalling of the latest entrance road.

The third occupation, apparently of a slight character, would appear to have been limited to the south range, though portions of the east and west ranges may have been converted into shelters. No burnt stratum has yet been discovered which can be associated with the final sack of the town, but the general coin series stops short at about the year 390 .'

## II.-THE DITCHES.

In the eastern portion of the field two parallel ditches were discovered in the positions indicated on the plan. The eastern ditch had an average breadth and depth of eighteen feet and six


FIG. 8.-CORSTOPITUM : WOOD FROM DITCH.
feet respectively, and the bottom was twelve feet below the present surface. It had been filled up in Roman times, probably at a comparatively early date, as the lowest stratum of the filling contained fragments of 'Samian' and other pottery of a late Flavian character suggesting a date for this deposit prior to the close of the first century. The western ditch, which was of similar dimensions, had been entirely filled with soil strongly impregnated with sewage, and this had. been covered with stiff clay. This clay and the upper part of the sewage stratum produced some pieces of 'Samian' of a similar character to those found in the eastern ditch, and more were discovered in a rubbish pit between the two ditches. In the sewage matter were found some pieces of thin leather in a good state of preservation, and some pieces of worked oak, of which one at least has been a tent-peg (see fig. 8).

These ditches were traced from north to south across the entire length of the reserved area, at each end of which there were some indications of a return eastwards in the case of the eastern ditch, but the evidence was not sufficiently definite, and further excavation in the adjoining portions of the site will be necessary before it can be determined whether we have here a portion of the defences of the town, or the remains of an early fort, constructed on what appears to have been the highest part of the site during the earliest period of the Roman occupation. The character of the pottery found in these ditches seems to favour the latter theory, as no such fragments occurred in the ditch found on the south side of the town in 1906, or in the north ditch discovered in 1909. It must also be noted that the easternmost point at which the south ditch has been traced is well to the east of the line of the eastern ditch examined last year.

The pottery referred to bears some resemblance to frag$\dot{m}$ ments found at Chesters and at Nether Denton, and it is possible
that we have here traces of a line of forts of a date earlier than the time of Hadrian, possibly with the Stanegate as their means of communication. For the present, however, we have not advanced beyond the stage of conjecture, though the excavation of the field to the east of last year's reserved area may throw some light on the subject.

## III.-THE NORTH ROAD.

Close to the eastern limit of the reserved area a metalled street or road, twenty-two feet in breadth, was found: its direction was approximately north and south, and only a slight deflection would be necessary to bring it into connexion with the lane on the further side of the Beaufront road which Maclauchlan notes as marking the probable line of Watling street to the north of corstopitum. The road in question does not appear to belong to the earlier period of the occupation; a few feet of its western side overlap the site of the eastern ditch already described, and the road has evidently been constructed after that ditch was filled up; the stone channels, where they remained, showed a considerable subsidence and in many cases were turned nearly on edge. At a later period there had been a raising and remetalling of the surface, and new kerbs seem to have been added at a higher level. Unfortunately the point of junction with the main street running along the south side of the granaries and 'forum' lies in the field to the south of the 1910 area, and the correspondence of the various levels could not be checked, but it seems probable that the two levels of this north road are of the same respective dates as the second and third period levels of the main street, and may possibly be ascribed, one to the first half of the third century and the other to about the middle of the fourth. A priori it seems unlikely that the original Dere or Watling street passed through the
town with two rectangular turns, as has sometimes been conjectured. Probably the original line lay farther to the west, in continuation of the direction determined by the excavations of 1907; but this is a point on which the work of the coming season may be expected to throw some light.

## IV.-THE AREA EAST OF SITE XI.

Much had been expected from the site adjoining the 'forum' on the east, but unfortunately our hopes were disappointed: the work was heavy, as there was a deep accumulation of mixed soil, especially on the southern side of the field; and all our efforts failed to find any trace of a building of the same importance as the 'forum' and the granaries, and such remains as were discovered appeared to be of distinctly later date. The conclusion seems to be that during the earlier Roman occupation of the site this area was an open space; used, perhaps, for various purposes, but not occupied by permanent buildings, and this is quite in accord with the suggestion that the ditches belong to an early fort. If such a fort did in fact exist, a fairly wide belt of open ground would be maintained round it, so long as the fort remained in being, in order to prevent a possible enemy from obtaining cover.

However, as we have seen, the ditches were filled up, the new north road constructed, and much of the land which had previously lain vacant became covered with buildings, practically all of which abutted on the main east and west street or on what we have called the north road, and all seem to belong to the later periods of the occupation. They have been numbered on the plan in order of the dates of their discovery, but it will be convenient to describe them in order of position, following the street eastwards from the south-east corner of the 'forum,' and then turning northwards along the north road.

## SITE XX.

This was a small, rectangular building, measuring twentyfour by fourteen feet, apparently of late date, but standing on a site which had been used for some purpose from fairly early times. The walling was of thin courses, resembling the west wall of the 'pottery shop' and the building on site Ix , which may perhaps be ascribed to the latter half of the third or the early part of the fourth century, and in the present case the suggestion is supported by the fact that the last remetalling of the adjacent street abutted against the south wall of the building. The made soil extended to a depth of about six feet below the floor, which was fifteen to twenty inches below the present surface, and the lower stratum produced coins ranging from Vespasian to Marcus Aurelius: the coins found in the upper soil end with Gratian.

The-south wall of the building just described was continued westwards, and formed the south wall of another building of similar character, separated from the first by a clay-floored passage eight feet wide; the same wall then extended four feet beyond the south-east corner of the second building and made a return to the north, forming a narrow passage with a drain at the south end, in which were found coins of Tetricus 1 , Tetricus II, and Constantius II.

These buildings project obliquely beyond the line of the south front of the 'forum,' and appear to be earlier in date than the latest street level. To the north of them were traces of an earlier building, which appeared to have been paved with heavy flags, but the foundations were too fragmentary to justify any conclusion as to its date or character.

## SITE XXIV.

Here again a considerable depth of mixed soil was found at the south end of the site, but such foundations as were dis-
covered lay at a high level. To the north were the remains of an oblong building, eighteen feet wide, and, owing to the disappearance of the south wall, of uncertain length : it may possibly have been fitted with a rough hypocaust of late date, but only the bases of the pilae (if such they were) were found, and they were so irregularly placed that the theory must be regarded as doubtful. It is just possible that the building may have been the drying room of a pottery, and the supposed pilae the stands on which the vessels were placed.

The floor of this building produced coins ranging from Severus Alexander to Carausius, with a single coin of Theodosius which may have worked its way down; from the surface soil came single coins of Constantius II, Constans, Valens, and Gratian. A number of coins of Vespasian, Domitian, Nerva, and Trajan were found in trial trenches on the southern part of the site at depths of from five to seven and a half feet.

## SITE XXV.

This site was bounded on the west by a foundation of large, rough stones, which appeared to have formed part of a boundary wall rather than of a building. Near the centre it had been carried over the site of a rubbish pit and had sunk considerably : except at this point it was only a foot below the surface, and we may probably assign it to the last period of the occupation.

Close to the rubbish pit was a small double furnace at D on plan, constructed of clay on flags; the floor in front of it was four feet three inches below the surface, and this may point to a comparatively early date. Another clay furnace was found near the middle of the site, E on plan, and close to it was a hearth formed of four square tiles; both showed traces of heavy burning, and the hearth was on the brink of the eastern ditch, about six feet below the surface. The indications generally
pointed to this area having been used for industrial purposes at a fairly early date. The coins found at low levels ranged from Vespasian to Hadrian.

SITE XXIII.
This number was given to the triangular piece of land bounded by the north road and the east and south hedges of the field: it is thus only a portion of a site, and the remains found in it cannot be fully understood until excavations are carried out in the adjoining enclosures. Traces of a masonry foundation were found close to the east side of the road, and twenty-four feet farther to the east were the remains of a fairly substantial wall, two and a half feet thick, with four and a half inch footings. This was followed southwards till it ended in a single large, flat stone, at a point near the south hedge, and northwards as far as it was possible to do so without cutting down the east hedge-a distance of fifty feet in all. Near the centre of this length the wall had been carried over the edge of a rubbish pit which produced pottery of a fairly early type.

The coins found on this part of the site are somewhat confusing, both early and late coins occurring at comparatively low levels. It is known, however, that this part of the field was formerly called 'Standing Wall Sheath,' and it has been suggested that the wall found near the east hedge is all that remains of the 'Standing Wall' in question: if so, most of it must have been removed in comparatively recent times, and the soil at this point had a particularly disturbed appearance; indeed, some of it seemed to be modern filling. This would account for the confused levels at which so many of the coins were found.

## SITE XXI SOUTH.

This site lay immediately to the north of site xxv, and had been occupied by a building measuring about fifty-six feet by
twenty-three feet. The east end abutted on the west side of the north road, and had been built over the site of the eastern ditch, with the result that there had been considerable subsidence of the north and south walls, and of the channel-stones forming the


FIG. 9.-CORSTOPITUM: SITE XXI SOUTH.
gutters on each side of the building. The masonry of the eastern half of the structure was of a fair character, and there was some trace that there had originally been a doorway about the middle of the south side; towards the west end little more than the foundations remained, and these were of the poorest
quality. On the whole the evidence suggests that the building dates from the middle or latter part of the third century, and that it was repaired or partly rebuilt in the last period of the occupation.

## SITE XXI.

This site lay immediately to the north of the last, and had been occupied by a building of about the same size and much the same character, with traces of a cobble-paved yard between them. It produced no finds of any particular interest.

## SITE XXI NORTH.

This site was in a state of great confusion, and it was practically impossible to determine whether the remains were those of a building or of an enclosed court or yard. At the east end, adjoining the north road, was a pavement of heavy stonesapparently re-used material-with two pivot-holes, a sill of a door grooved for jamb stones, two feet eight inches wide, and indications of other doors or gates. Here again there had been a serious subsidence, due to the filled up ditch below.

The coins found on these three sites bear out the suggestion already made as to the date of their occupation. With the exception of a single coin of Trajan found at a lower level than the rest, they range from Gordian in to Gratian, and this seems an additional reason for ascribing the construction of the north road provisionally to the third century.

## EAST AREA NORTH.

This included all the ground lying between the northern half of the 'forum' and the east hedge of the field. A considerable amount of trenching was done in this quarter, but little of interest was discovered. A short distance to the north of site xxi north was an oven or furnace, measuring about five feet nine


inches by two feet nine inches; it had a flagged floor, with walls of rough stones put together with clay including the jamb stone of the opening, and showed signs of heavy burning. Farther north still were the remains of a heavy flag pavement, which had been carried across the filled up eastern ditch, and close to the north fence were the foundations of another oblong building of poor quality.

The space lying between the 'forum' and site xxi was also trenched, but apparently this part of the ground had always remained open, though probably used for industrial purposes. A covered stone drain was found in the position shown on the plan, and a short distance to the east of it was a rubbish pit, which produced some pottery and a number of square bricks.

fig. $9 a$.-CORbridge, $1909\left(\frac{1}{1}\right)$ 'omNiA vos.'

## SMALLER OBJECTS.

by f. Haverfield, M.a., Ll.d.

## I.--INSCRIPTIONS.

(A) Among inscribed objects the first place is due to an altar (fig. 1) found in September lying face downwards and forming part of the kerb to the uppermost, that is, the latest, road-level of the main highway, just in front of site xi. It is a well-preserved piece, thirty-six inches high, decorated on one side with a winged cupid holding a bunch of grapes and a pruning-knife, and on the other side with a crowned genius-not Fortuneholding his right hand over an altar and supporting in his left a large cornucopiae: this type of genius is well-known from stones found at Netherby (Tullie House Museum, no. 88, Lapid. Sept., 755), at Lanchester (ibid., 708, 710), and elsewhere. The inscription, as I copied it, is as follows :-iovi aeterno dolicheno et caflesti brigantiae et salvti, c. ivlivs apolinaris > (= centurio) leg vi ivs(sus) de(dicat). 'To the eternal Jupiter Dolichenus and to the celestial Brigantia and to Health (or Safety), C. Julius Apolinaris, centurion of the sixth legion, dedicates (this altar) as bidden (by the gods).'

Dolichenus is a well-known god and Brigantia is familiar to us on several altars found in various parts of the wide landincluding all northern Englaind and some of Dumfriesshire-inhabited by the Brigantes. The epithets aeternus and caelestis are probably simple epithets. But the latter adjective provokes a conjecture. Caelestis was the Latin name of the old Carthaginian deity Tanit; under that name she was worshipped both in Roman Africa and to some extent in Italy. Her cult does not seem to occur north of the Alps. But in corstopitum, where the Tyrian Heracles and Astarte had a worshipper (Lap. Sept. 637, = C.I.L., vir, p. 97), it is conceivable, though it cannot be called very likely, that Tanit had also some dim remembrance.

The last three lines of the inscription are in rasura, that is, three original lines have been erased and the lines now visible have been cut on the sunk surface thus produced. A few marks between the $\mathbf{v}$ and l of iulius and after the r of apolinaris may be traces of this older lettering. The final letters ivsde are easiest explained as above, though other interpretations are perhaps possible.

The road to which this altar furnished a kerb is probably to be assigned to the middle of the fourth century. The altar itself might well be a great many years earlier.
(в) A fragment of sculptured stone, showing a bearded head in a. rounded niche, eighteen inches high, twenty-four inches broad, was found lying loose in the soil to the south of site xI; the letter $s$ is visible on its right side. It is apparently part of a sepulchral monument; the s may be a relic of the formula d m s , dis manibus sacrum.
(c) A rudely dressed slab, twelve by fourteen inches square by five and a half inches high, was found in July in a deep trench a little east of site xi. It is inscribed on two faces, which enclose a corner, in rudely 'picked-out' letters:

$$
\begin{array}{|l|l|}
\hline \text { hING } & \text { IhIOM } \\
\hline
\end{array}
$$

The stone may have occupied a corner with these two faces outwards. Its inscription must, however, have been continued on other adjacent stones, for it is obviously not complete. unga seems to be part of a mention of the First Cohort of Lingones, which was stationed at different times at two posts not far from Corbridge, High Rochester and Lanchester ; it is possible but less probable, that it refers to the Fourth Cohort of Lingones, stationed at Wallsend. iliom, in which some of our visitors detected an allusion to Troy, is most likely the beginning of a soldier's name, such as Iliomārus (Holder, Sprachschatz II, 32), a Celtic name which occurs in Gaul. If this view be right, the
stone was wrought, or put in its place, by or under the care of a soldier of this name, belonging to a Cohort of Lingones.
(D) A fragment of a bronze roundel (plate iv, fig. 8), found loose in the earth at the point where the east side of the building numbered xi has been overthrown (p. 158), bears the letters H(or s).pti. It belongs to a type known by discoveries in England at High Rochester (Lapid. Sept., 578; C.I.L., 1290), at York

fig. 10a.-aldborovgh ( ${ }^{(2)}$ ). omnivm, militantivm and fragm. (See p. 179.)
(Arch. Journ., xlviI, 260, Ephemeris Epigr., viI, 1160, and Proceedings of this Society, ser. 3, iv, 225), at Silchester (Arch. Journ., xlix, 182), and abroad, at Zugmantel on the German Limes. The perfect specimens bear the figure of an eagle and round it an inscription $\mathbf{C O H}$ (or con) optim. maxim. or something similar, of which the interpretation has not yet been determined. Apparently they were intended to be sewn on leather and it has been suggested by Prof. A. von Domaszewski (Röm. germanisches Korrespondenzblatt, III, p. 9) and Herr Bauinspektor Jacobi that they are to be connected with similar but rather differently


BRONZE PIECES ( $\frac{1}{1}$ ).
Nos. 1, 2, terret; 3 , button ; 4, 6, studs; 5 , fibula; 7 , handle; 8 , inscribed roundel, p. $178 ; 9$, millefiori enamel; 10, scabbard attachment, p. 190 .
shaped pieces of pierced bronze which bear the inscription nvmervm omnivm militantivm. An unpublished instance of this latter has been found at Aldborough in Yorkshire and may be illustrated here (fig. 10a). ${ }^{1}$ It has been suggested that these inscriptions should be read together $\operatorname{con}(\operatorname{serva})$, optim(e) maxim(e), nvmervm omnivm militantivm, ' Iuppiter, preserve the number of all the soldiers.' A fragment found last year at Corbridge (fig. 10, p. 175) bears a different legend, omnia vos.
(E) Two lead 'seals' were found, of the type well-known from Brough, South Shields and already represented here among the finds of 1908 (Arch. Ael. 3 ser. v, 399, 409). One, discovered on site xx at a depth of nearly six feet, bears on one side the letters rvd with an obscure symbol before them and a conventional thunderbolt (?) underneath, and on the other side the letters mas with an initial letter defaced and a palm branch underneath. The legend rvd occurs on several previously known specimens, but (so far as I am aware) always with the reverse cvirt ; ${ }^{2}$ here $\overline{I I}_{A S}$ might denote the Second Cohort of Astures, which is otherwise known to have served in Northern Britain. The other 'seal' is much damaged: it appears to read on one side Lxx, presumably legio $x x$, with a second line underneath which might be $\mathrm{v}^{*}$; the other side is to me illegible. Such piombi were probably used, like the leaden 'seals' now used on Italian railways to fasten unlocked luggage, to seal up goods or baggage belonging to various regiments. ${ }^{3}$ They have now been found in

[^1]Britain at not a few places. Brough, in Westmorland, and South Shields have been prolific: specimens have also occurred at Cirencester, High Rochester, Chesters, Newstead and-though not quite of the same character-at Silchester, Felixstowe, Richborough, and Combe Down near Bath. What meaning attached to the other letters of the legends, besides those indicating regiments, is not clear, even after the enquiries of prof. Rostowzew (Plombs de l'antiquité, Paris 1900, pp. 21-28).
II.-UNINSCRIBED SCULPTURED STONES.
(A) Bas relief of the Deae Matres, much broken, fifteen inches long by ten inches high. The goddesses sit holding in their laps with both hands some sort of basket or parcel. Very coarse work. Found on site XI (east range).
(в) Small rude representation of a temple front, forming a frame to an equally rude relief of an animal, ten and a half inches long by eight inches high. Found on site xxrv.
(c) Fragment of panel with relief of winged Victory springing forwards, thirteen and a half inches high, much damaged. Found to south of site xr.
(D) Fragment eighteen inches long by fourteen inches high, representing the upper portion of a standard, apparently a legionary signum such as appears on the shield dredged up out of the Tyne (Lapid. Sept., p. 58). Found to south of site xi. Rude work.
III.—METAL OBJECTS, PRINCIPALLY BRONZE.
(A) Fibulae.-About forty-six fibulae-for the most part bronze and poorly preserved-were found in 1910, including twenty-six bow-fibulae, five penannular, twelve disk-fibulae, one zoomorphic specimen, and two varieties of an s-brooch. A specimen suggestive of a continental non-Roman type was also found. It will be convenient in describing these to describe also some specimens found in 1909, but perforce omitted from the report of that year.

The disk-fibulae call for little comment. One, found on site xi ce, is almost identical with a specimen with Late Celtic pattern obtained in 1908 (report of 1908, fig. 22). Another, a gilit oval piece, mounted with a conical amethyst or similar stone, precisely resembles a specimen found at Swaffham in Norfolk which I have figured in the Victoria History, I, 321. Another specimen was found at Whickham Brooke, in Suffolk, in 1788, with Constantinian coins. The other disk-fibulae are (or were) enamelled, but in no case is the enamel well-preserved. They seem mostly to belong to the second and third centuries. One closely resembles a piece figured by Mr. Curle from Newstead (plate lxxxix, 20); another finds parallels in Jacobi's Saalburg collection (plate lxviir, 9, 10) ; for another, of less usual type, see fig. 6 on plate Iv.

fig. 11.-CELTO-ROMAN fibula with ROSETte ( $\frac{1}{1}$ ).
The bow-fibulae include six specimens of the important CeltoRoman type which I noticed in the report for 1908, p. 96, and which has since been further discussed by Mr. Curle (Newstead, p. 321). Two of these specimens seem to have been enamelled at the top, one of them in blue and yellow; a third (fig. 11) has a rosette attached to its trumpet-shaped head; five of them (the
sixth. is broken) have the suspension ring which is common on British brooches. We have, further, five specimens of an allied Romano-British type, also found here in 1908 (report, p. 97, sec. 2), at Newstead (Curle, p. 321, plate Lxxxvi, 17-23), at Camelon near the Wall of Pius, and on the actual Wall near Duntocher (Stuart Caledonia Romana, plate vir). Two of our specimens were enamelled in a lozenge pattern, one in yellow, the other perhaps in blue (see fig. 12); they belong presumably to the middle of the second century. Fig. 13 belongs to the same type and age.

fig. $12\left(\frac{1}{\mathrm{~T}}\right.$ ).


FIG. 13 ( $\frac{1}{1}$ ).

A third group, 'knee-fibulae,' of which we had several specimens in 1910 and one or two in 1909, is not peculiarly RomanoBritish. In most of our examples, the bow swells out into a more or less bulbous form and ends at the top either in a flat semicircular plate or in a cylindrical case for the spring of the brooch, while the catch at the foot is formed by a largish plate (see figs. 14-17); whether fig. 19, a much worn specimen, belongs to the same class, I am not so clear; it perhaps comes later in the development, as will be noted below. This type of brooch occurs


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Figs. 14-19.-SPECiMENS of knee fibulae (P. 182). ( $\frac{1}{1}$ )
at Newstead (Curle, plate Lxxxvir, 28-32) and belongs probably to the second half and end of the second century. With it is connected another variety of 'knee-fibulae' (fig. 18), which shows a more definite knee and a singular bow : something like it occurs at Newstead.

Other interesting specimens claim notice. Two fibulae with knobs along the bows (figs. 20, 21) are unknown to me within British limits, and the only parallel which I can quote is a specimen from Heddernheim in Germany (Mitteilungen über römische Funde in Heddernheim, II, plate III, 59). They appear, from certain details, to be later than the middle of the second century; as Roman Heddernheim ended soon after a.D. 250, they must be earlier than this latter date. One of them has been tinned or silvered over and is therefore comparatively well preserved. Two thin crossbow fibulue (Almgren 187) may belong to the later third century, and two specimens of the stouter type (Almgren 190, 191), from sites viII and xxav, to the fourth century. Two fibulue with divided bows, found in 1909 (figs. 22, 23), date probably from the late second or the third century, though such divisions of the bow were in use from the very beginning of the Roman Empire: they are akin to the fibula figured in the report for 1908, fig. 19. A third specimen, with a ribbed but not divided bow (fig. 24), may be referred to the early third century.

Lastly, we have two small bow-fibulae which take us to the verge of the Roman Empire. One, shown in fig. 25, found on the north of site $x \mathrm{I}$, is a very simple type of brooch which agrees with the 'knee-fibulae' in its head and bow, but has also a curious affinity to such fibulae as Almgren's nos. 182, 184, and seems to point forward to a very important class of later Germanic fibulae. Similar specimens are in Chesters museum and elsewhere. On our specimen the catch of the pin has been lost. Possibly fig. 19 may also belong here.

The other far better preserved specimen shown in fig. 26, is

more remarkable. It was found in a trial-pit sunk near the middle of the central yard in site xi, lying in a deposit of silt above hard gravel, which suggested to Mr. Forster that there had been a shallow pool here in late Roman or early post-Roman days. It appears to be of silver : the head is formed by a small circular disk ornamented with minute knobs and holding beneath it the long spring (when perfect, apparently of twelve coils), on which the pin worked: across the bow is a similar disk, placed at right angles to the other: the ornament is carried down to the foot. - The decoration by tiny knobs is familiar on certain continental non-Roman fibulae; Lindenschmit and Almgren (no. 184) figure an example from the Sackrau find, which occurred with a gold coin of Claudius Gothicus, and others occur in Scandinavia. Apart from this ornament, the fibula itself belongs to a not uncommon class of brooches, which are mostly small in size and worked in silver. One variety of this class (Almgren 77) occurs principally in north Germany and Scandinavia; the other (Almgren 101), to which our fibula clearly belongs, is distinguished by a flatter foot, and has been found chiefly in the lands of the Rhine and Elbe, frequently within the Roman borders, as at Heddernheim, and even in forts on the Limes, such as Rückingen and Neckarburken (Schumacher Osterburken, p. 32). No specimen of this brooch has yet been noted from Britain, and very few, so far as I know, with the peculiar knob-decoration from any site in Europe. Nor do I feel sure whether our specimen should be referred to the Elbe, the Rhine, or Scandinavia. Indeed, Dr. Read has pointed out to me that the British museum possesses a gold fibula of similar style and knob-ornament, which was found at Felegyhaza in Hungary.

Of fibulae other than bow-fibulae, I have to mention, first, a small zoomorphic brooch, fashioned like a horse in red and green enamel. Another was found last year on site xvr, similarly enamelled and fashioned to represent a horse and rider, and is now



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figs. 26-29-fibulae. figs. 30, 31—bronze enamelled ornaments.
figured (fig. 2i). Similar pieces have been noted at Coventina's Well (Chesters museum) and in Roman Germany (Schumacher, Osterburken, p. 33) ; Mr. A. J. Evans has one from Brettenham in Norfolk. Secondly, a specimen of a plain s-shaped brooch, similar to that from Settle figured by me in the Victoria History of Derbyshire ( $\mathbf{r}, 239$ ). Thirdly, an enamelled s-brooch, found on site xvi in 1909 (fig. 28). Fourthly, five small penannular brooches which call for no comment.
(в) Enamelled bronze work (other than brooches).--Besides the brooches, four enamelled studs, two perfume boxes, and one or two less noteworthy trifles were discovered in 1910, all in very bad condition. I take this chance of figuring two good pieces found in 1908 but omitted from the report for want of space (figs. 30 and 31). Fig. 30 has plain Late Celtic affinities; fig. 31 is more Italian.
(c) Other bronze work.--Besides the preceding, many miscellaneous pieces were obtained, such as two terret-rings for harness (plate iv, figs. 1 and 2); six or seven portions of bronze buckles; two bucket-handles of small vessels; the handle of a bronze jug; a large key; ten rings, one with a serpent's head (a usual Roman device), three with intaglios still remaining; a small head of an animal (?ox); a tiny helmeted head of Mars; a tiny lamp with a leaf concealing the handle (fig. 32); some pieces of 'horse-trapping' for which see figs. 33,35 ; an ornamented bar, just over an inch long, used (Mr Curle suggests) for a button (plate iv, fig. 3); a cross-piece from the top of a helmet, such as is figured by Jacobi (Saalburg, Lx, 2, 3); a scabbard attachment; two scabbard-tips (plate rv, 10) similar to one figured by Mr. Curle (Newstead, pl. xxxv, 13) a great quantity of scale armour-one of the largest finds ever made of such objects-with some of the wire fastening of the scales still perfect (fig. 41), found on site xxiri and in court 6 of site xi; several pins, styli and the like, including two of Celtic ${ }^{1}$ character (fig. 34); and part of the handle of a patera or

[^2]
figs. 32-37.-bronze ornaments.
similar vessel (plate iv, fig 7). With respect to the scabbard attachment, it is necessary to add that a similar specimen found last year and now figured here (plate iv, fig. 10), which was described by us, on the authority of prof. Montelius, as early Danish work, appears to be Roman. Parallels to it have occurred both in the Limes forts in Germany, and in England at Chesters (museum, case b, 1258), and at Newstead. Although therefore a great number have come to light in the Danish peat-mosses, we cannot take this specimen as final proof of a Scandinavian visitor about a.d. 300. But we may be allowed to express our disagreement from the German scholar who, having to describe a specimen found at Heddernheim, classed it among fibulae of about 250 A.D.
(D) Iron.-A lengthy list made by Mr J. P. Bushe-Fox of the iron objects recently found in our excavations showed, at the end of last season, fifty-two spear or arrowheads, including ten three-barbed arrowheads of the type illustrated in report for 1908 (fig. 32) ; eighty-one knives, some with traces of wooden handles; thirty-five pieces of chain, mostly only a link or two ; eighty-one rings, some of them perhaps sockets for doors-pivots or the like; forty-five styli; thirty-two hooks; three hundred and seventy-four nails of various sizes; twenty keys (besides some in bronze); twenty-seven caltrops of the type illustrated in the report for 1908 (fig. 30); twenty-six cramps; over eighty tools of various sorts, many of them seemingly intended for dressing stone; twenty-one nails or pins with looped heads; many miscellaneous pieces, hinges, staples, buckles, padlocks, shoenails in a sole, a possible handcuff, some possible wheel-tyres, and, of course, many objects of uncertain use. This list comprises only the finds of the last two years. It is enough to show that any attempt to deal fully with these iron finds would swell this report to unbearable size. We must be content at some future date to give a collective account of the iron found in several years' work, and in the meantime to take measures to preserve the pieces. Like all very old iron, they come to us in bad condition.
(玉). Lead is represented by two lead 'seals' (above, p. 179), a lead ring and one or two other small items. Special notice is also due to nine leaden sling-bullets or glandes, found partly in 1909 and partly in 1910 lying loose on site xis, xrv and xvi N. One of them is acorn-shaped and weighs a little over four ounces; the rest are roundish and vary in weight from two-and-a-half to a trifle over five ounces. Such Roman glandes are rare in this country. In 1897 I found a specimen at Birdoswald (Cumb. and Westmor. Arch. Trans., xv, 200) ; in 1898 sixty-seven were dug up at Birrenswark (Proc. Soc. Antiq. Scot., xxxiri, 214, 246); in 1900 another was found close to the Roman fort at A mbleside (Cumb. and Westmor. Trans. xvi, 84), if it be not a fishingweight. Abroad, they are commoner, but seem to be confined to a period which ended somewhere about the middle of the first century. Whether the Corbridge and Birrenswark specimens should be connected with Agricola, may be left for the present undecided. But it would seem that they cannot be earlier than A.D. 80 .

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IV.-MISCELLANEOUS OBJECTS.
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FIG. 38.
A small wooden handle, two and three-quarter inches long, probably a knife-handle, picked up in 1909 in the surface soil of site xr , seems to be ancient and to deserve illustration. If ancient, it illustrates that type of early medieval or late Roman art which different writers explain differently at the present day, some taking it to be Roman and some to be Germanic or Scandinavian. Our readers may judge from fig. 38.

It may be convenient here also to illustrate in fig. 39 the 'hand-bricks' (each about four inches high) found last year in some numbers in the interior of the bath-house on site xvir (report, 1909, p. 36). Their presence in the bath-house appears not to be fortuitous, as they have also been noted in a bath-house at Binchester (Hooppell Vinovia, pp. 21, 63); we must not, there-

fig. 39.

fig. 40.
fore, suggest that the Corbridge bath-house was by chance temporarily converted into a drying-room for pots and pans. The holes which run longitudinally through them are (as I am assured by expert potters) pierced to aid in equable drying and perhaps also to lighten the weight, and need have no relation to the use of the objects. But similar objects found in Germany, at Niederberg, Vielbrunn and Möhn, seem to have been em-
ployed with long nails to provide a kind of alternative for boxtiles and form passages for hot air between the walls and an outer surface of tile.

A third find which may be noted here consists of two foreheads of bos longifrons pierced with small square holes, too small to have yielded buttons or the like. Possibly these skulls were used as targets for throwing square-headed javelins (fig. 40).

A small piece of millefiori 'enamel' is figured on plate iv, fig. 9.

fig. 41. - three rarieties of scale armodr ( $\frac{1}{2}$ ) (p. 188).

## V.—POTTERY.

(A) Stamps on Samian ware.-About three hundred pieces were found with marks or parts of marks of Samian potters' stamps. Many were mere fragments; about one hundred and thirty were fairly legible and perfect. I leave the stamps on plain Samian, as in previous years, for later collective treatment. and give here only those on decorated bowls. These are all of shape xxxvir and stamped externally, except one or two pieces specially noted. I may add that I use $\mathbf{D}$ in the following paragraphs to denote the numbered catalogue of ornaments on Gaulish Samian published in the second volume of M. Déchelette's Vases Céramiques.
(1) Albucius, two pieces. One fairly perfect piece, from xi e, was ornamented in medallions and half medallions with a Cupid (d 264), a soldier (like d 103), and a reclining woman (not in D). The other, from xi s, had a Victory (d 484).
(2) Att. (Déchelette 1, 252). A fragment showing a free design of animals with the letters . . ITA. ЭO may be ascribed to this Lezoux potter.
(3) Bannuus. One fragment with the letters … $\wedge$ Ag (Déchelette $\mathrm{I}, 253$ ), from site xxv .
(4) Cinnamus. Seven or possibly eight examples, all in the familiar style. One piece showed animals (п $766,808,867 a$, $950 a$ and a small lion); another, in medallions and demi-medallions, had a bird ( D 1018), a seated figure like $\mathbf{~} 39$, a man ( $\mathbf{D} 331$ ) on a stand (d 1069a), Venus (D 185) and standing philosopher ( D 523 ). The combination of Venus and a philosopher is quite in the cynical spirit of Roman art, but it is on such a bowl mere accident. A third piece was of shape xxx, and showed Perseus with the head of Medusa (d 146).
(5) Cintusmus. A bowl from site xy, probably of shape xxxvil, bears the stamp cintvsm... sunk into its rim. Compare Knorr's Rottweil, pl. xvx, 15, and xx, 17.
(6) Cobnertus. A broken bowl found on site xx , in German style, with the broken stamp cor.. just under the ovolo border, may be assigned to this potter.
(7) Divixtus, two pieces. One fragment, of shape xxx, from site XIE, shows the letters div... in metope ornament, above a small cruciform device found elsewhere in the work of Divixtus and beside a figure of a man (resembling D 114 ). The other, from the same site, showed similar ornament with the letters ...IX•F. On the date of this potter, see Curle, Newstead, p. 235, and my Military Aspects of Roman Wales, p. 129; he seems to belong to the middle rather than to the opening of the second century.
(8) Doeccus. Three pieces bear the monogram of this potter, aD, all from site xi.
(9) Paternus. Six pieces bear the monogram of this potter. One shows a Cupid (D 265) and a man (b 524).
(10) Putriu. A decorated fragment of uncertain shape, from the east area, bears the letters pvtri . .
(11) Reginus. Two pieces, one from the east area, the other from xie, bear the circular stamp of Reginus. The former is a fragment; the latter has devices like D 1129 and 871 and a wheelrosette; in both the ovolo has no tongue (or dart); we have obviously to do with the German Reginus.
(12) A piece stamped $2 \mathrm{~V}_{\ldots}, \mathrm{VI}$ (possibly Iulius, retrograde) diagonally across a medallion enclosing the hare of Lezoux (. 950 ), was found on the eastern area.
(13) A piece, of uncertain form, with Lvi... stamped inside on the base, was found four feet deep on the north side of site xi.
(14) A small stamp o-vaitt... inside a tiny label amid a free design of animals (D $766,799,808,867-8,950 a$, and a small lion like D 769 , but facing to right), is probably a retrograde stanp of Attianus (c.i.l., xiII, 10,011, 152).
(15) A fragment in large letters ... ons, on a bowl of German fabric, may be part of the Rheinzabern stamp b. f. attoni, cited by Ludowici and by Knorr (Rottenburg, pp. 12, 24).
(в) Samian ware (except potters' stamps).-Among the decorated Samian; shape xxxyri was, as before, much the commonest variety; xxx was somewhat scantily represented; xxix we found only in special associations. The bulk of the pieces came from Lezoux, as far as could be discovered by a comparison of their types with the lists of Déchelette. ${ }^{4}$ But certain ditches and other finds yielded xxxyir bowls of Graufesenque workmanship, and, as in former years, a sprinkling of German or East-Gaulish products was noticeable, mostly on site xi. Thus, one piece with an arcade design, a leaf-border instead of the usual ovolo, and a Cupid, shows affinities with the work of Reginus, Cerialis and Janus (see Knorr, Cannstatt, plates xxviri, 10, and xxxiri, 5, and Rottweil, xxvir).

In point of date the Samian decorated ware suggests, both on site xi and elsewhere, an intensive occupation in the second century, from 120 or 140 A.D. onwards, while it gives definite, though naturally scantier, evidence of a previous occupation dating from the Flavian age.

Amongst plain Samian, shapes xxxi and xxximi naturally predominated. The small cup of shape xxvir was, as before, very common (seventy-seven pieces inventoried); the flanged bowl xxxviir was almost as abundant (sixty-three pieces); the flat saucer lxxix (thirty-one), the mortaria with lions' heads (thirtythree), the shallow bowls and saucers with ivy-leaf ornament on the rim, xxxy and xxxvi (thirty-five), and the small cup, xavi (eleven), were also well represented ; of xurv and of li one each, and of lxxx two specimens were noted; of xviir few except in special deposits. There were also a few specimens of the 'Viertel-rundstab' and three of xxxvir undecorated. In respect

[^3]of date, the plain Samian gives much the same testimony as the decorated.

As usual, some pieces bore graffiti, but only one, M介으..., perhaps $M a r t i$, on a cup of shape xxvir from site xxi, is decipherable into distinct meaning.
(c) Special finds of Samian and other ware.-In the course both of 1910 and of the preceding year some few deposits of pottery, etc., were found in pits or ditches, which plainly formed independent groups of contemporary objects. It may be convenient here to summarise the most important.
(1) Rubbish-pit of first-century objects found in August, 1909, under the south-east corner of site xiv (report, 1909, p. 24). The finds here, catalogued by Mr. Newbold and Mr. Cheesman, included twelve pieces of decorated Samian, six of plain Samian, a potter's stamp Logirsi, four bits of rougher pottery, two fragments of glass, two corroded bits of bronze and an amphora rim. The decorated Samian consisted of (1) three specimens of xxixone showing a frieze of deer alternating with arrowhead panels, and other winged animals (D 503) similarly alternating, the third a Great Ovolo pattern like that of Déchelette 1 , plate viI, 24; (2) three specimens of axx, the best of which shows the devices o 502 and 732 and arrowheads and trellis pattern; (3) one bit of xxxvir, showing an archer in a medallion (d 168) placed in a rinceau pattern with arrowhead panels; and (4) some indeterminate fragments. The plain Samian, apart from uncertain pieces, represented shapes xvirf and xxvir; one rim had the well-known ivy-leaf ornament. The coarser wares included the rim of a buffcoloured cooking-pot, a bit of a grey jar with 'rustic' ornament and a bit of another grey jar with a hatched or incised pattern.

This pit is probably of the Flavian age. In dealing with a pit we need, of course, always to remember that objects earlier than the date when the pit was in use may easily have got shovelled into it along with the properly contemporary rubbish.

When, for instance, the excavators of Caerwent found a coin of Licinianus (A.D. 307-323) at the bottom of a deep pit and a coin of Domitian near the top, it is fairly clear that the latter coin lay in the rubbish of Caerwent long after it had passed out of currency and was thrown into the pit in the fourth century with other surface débris; it is, therefore, no proof of the age of the pit or of its contents. But in the pit on site xiv all the finds seem Flavian. The stamp of Logirnus has occurred at Pompeii (destroyed a.d. 79) ; the pieces of xxix and xxx belong to the same period; the 'rustic' ware was then in use; the design on the piece of xxxvir is also early. The other objects may therefore be dated to the period of these early bits and the whole referred to the age of Agricola or a little later.
(2) Excavation south of the granary on site viin (report 1909, p. 12). Here we found at a low level on or near the undisturbed subsoil, some post holes of the earliest buildings of corstopitum and some pottery-a piece of xxix with scroll pattern, a piece of xxx with arrowheads, bits of xviII, of xxvir, of a globular vase, of a dish with 'viertel-rundstab,' all thin and fine ware. This stratum probably belongs, therefore, to the Flavian age, like the preceding deposit.
(3) Eastern ditch, 1910 (above, p. 165). Some distance to the east of the building on site xi, a filled-up Roman ditch was discovered running from north to south across the area of our excavations. This ditch was certainly filled up in Roman times, since Roman foundations were traced across it at several points. From its lowest levels came many fragments of pottery, which have been catalogued by Mr. Cheesman. Decorated Samian was represented by thirty-two pieces, all of shape xxxvir except one piece of xxix, one perhaps of cxxviil ( $\mathrm{pl} . \mathrm{v}, 6$ ), and one gobular piece, possibly lxvir. The ornamentation of many xxxvir specimens was the double frieze (pl. iv, 3), inherited by the early xxxvir bowls from the style of xxix, and all the details were suggestive of the Graufesenque and allied potters towards the

end of the first century a.d. Thus, one bowl showed a lower frieze of running animals ( D 858 , etc.), and an upper frieze of metope and medallion style with a stag ( D 862 or 845 , cf. Knorr Rothenburg, v, 8). Another resembled in its foliated scrolls a piece figured by Knorr (Cannstatt, xI, 6) and assigned by him to the first century. Other pieces bore the early devices o 63,481 , $941-2,1009,1036,1151$; for illustrations see plate v. Of plain Samian, in all some fifty pieces, twenty-four exhibited shape xxvir, three shape xxxim, the second century successor of xxvir, four shape xviII, and three or four the later variety of xviII, which is sometimes called ' xviri-xxxi,' while three shallow dishes showed the 'Viertelrundstab,' and there was one specimen each of a flanged bowl (xxxvi) and of a large flanged and ribbed mortarium. Three fragments of xxvii bore the stamps of rvf . ., of apr . . . and bvccis $f$ and one fragment of xviir the stamp of . cre . . . The general character of the whole group of objects extracted from this ditch is late Flavian. Shape xxix is almost wholly absent, but all the designs on shape xxxvir are such as are recognised as early.

Unfortunately, we know very little of the development by which, in Britain, the early fashions of xxxvir gradually gave way to the common second century patterns. One or two pieces at Chesters (Museum, 2843, 3445) and at South Shields are akin to the early xxxvir, and it is not clear whether they ought to be dated before or after a.D. 120. In general, the pottery from the Corbridge eastern ditch may be said to resemble that of Gellygaer, where also early xxxvir is the rule and a solitary bit of xxix the exception. Gellygaer, as I have elsewhere conjectured, may have been founded about a.d. 105, or possibly earlier, ${ }^{5}$ and some such date may suit the deposits of the Samian
${ }^{5}$ Military Aspects of Roman Wales, p. 88. The one piece of xxix was found (in the cellars of Cardiff museum) after my paper was published. From other recent experiences, I incline to think that the basements of our museums need excavation almost as much as our ancient sites.
potsherds at Corbridge. The coins found in the ditch (Vespasian, Titus, Domitian) indicate an early date. of cre must denote the Flavian potter Crestio or Crestus. Buccus is a Gallic potter often assigned to the reign of Vespasian ; of rvf. ., if originally of rvirini, may be of similar date (Knorr Rottweil, pp. 57, 65) and of apri may be referred to Graufesenque. Indeed, these coins and stamps tend to suggest that the date A.D. 105 is rather too late, and that (as is, of course, possible) we should have found more xxix if we had been able to clear out more of the ditch. Further excavation may therefore be desirable at this point.
(4) Rubbish pits under site xI (p. 162). These yielded a tiny piece of xxix, a piece of xxxvir with double frieze-above, arrowheads and 'trellis'; below, the great ovolo-and also a piece of xxyir and one of xviri verging towards xxxi. A moderately worn coin of A.D. 86 was found in one of the pits.
(5) Pottery found in the refuse ditch (p. 167 above). This ditch was filled almost entirely with sewage which contained no pottery at all. But along the top of this deposit was Samian of an early type. Of eighteen pieces inventoried, three were of shape xxix and six or seven were early examples of xxxvir (6ladiators, D 588-9, from Graufesenque (plate vi, 1); double frieze; early cruciform pattern, Great Ovolo (plate vi, 2), and so forth), while three showed the 'Viertelrundstab'; one was a piece of laxix, and, besides some indeterminate pieces, a bit of rude 'rustic' ware was recorded. The evidence of this pottery suggests that this sewage pit was filled in the Flavian age and perhaps in the time of Agricola. Shape xxix was then still relatively common, and large armies and their trains were then moving along Dere street to or from Caledonia.
(6) Pit on site xxi. A pit to the north of site xxi also yielded early Samian--fragments of five or six early xxxvir bowls with double friezes, Great Ovolo, cruciform devices, and


SAMIAN WARE FROM THE REFUSE DITCH (see opposite page).

Graufesenque patterns such as d 416, 916, 916b, 941 ; further, two bits of xxvil, a piece of xyiil (or xxxi?), two early flanged bowls with singularly good glaze, etc. This seems to fit closest to the finds recorded above in no. (3). See fig. 42.

fig. 42. - SAMIAN from pit on site xit.
(7) By way of contrast I note a 'pocket' of pottery found close to the surface near a late wall on the south part of site xxi. The exact origin of the pocket is not certain. But the Samian
in it is significant. Five pieces of xxxvir in late styles-medallions, late foliated scrolls, and the like; many pieces of xxxi, two stamped titi.m and aet . . . ; several of xxxiti, with the stamps rebvrri of and osbetmai . . .. ; a piece of li añd a German piece (Ludowici $\mathrm{RS} a$ ), testify to the middle or second half of the second century.
(D) Other pottery.-The stamps on amphora handles and mortaria rims are, as before, reserved for collective treatment. One handleless lamp bore the stamp vrsvir. Other wares were represented much as in former years. But notice is due to one fragment of rough grey ware with barbotine ornament. It exhibits the feet of a man (or god) standing on a ledge or pedestal with the bottom of a spear or staff to the right. On the left is a raised cartouche with the inscription, scratched on it before baking, allititio and the same (or more exactly abliitio) scratched under the feet of the figure (plate vir, 3). Here we have a piece made from a mould similar in style to that which we found in 1909 and our workmen christened Harry Lauder. Two fragments of a similar piece (figs. 1, 2) representing a god with a battle-axe were found in 1908 (report, 1908, p. 116, 1909, p. 24).* The method in which this class of pottery was made is simple: the reliefs were cast in moulds and then 'applied' to the surface of ordinary large grey urns. It seems worth while to figure the specimens of finished products which we have now found, for comparison with the mould of 'Harry Lauder.'

Asletio, or however the letters on our urn may best be read, would seem to be the name of the god or hero depicted in the relief which originally stood out from the surface of the urn just above them. No Celtic scholar seems willing to venture any interpretation of them.

[^4]

GREY BARBOTINE WARE, PROBABLY A LOCAL PRODUCT $\frac{1}{1}$
(see opposite page).

THE COINS.

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BY H. H. E. CRASTER, M.A., F.S.A
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The total number of coins found in the excavations at corstopitum in 1910 amounted to 683 . There was the usual quantity of barbarous coins, mainly imitations of the Tetricus coinage, which are left for future consideration; and a certain number of specimens were otherwise undecipherable. As in the last report, a full list is appended of all coins prior to Gallienus; while the second table is limited to recording types later than A.D. 260 which have not been met with in previous years.

The recent publication, by Mr. George Macdonald, of a full and detailed list of all coins found at Newstead, ${ }^{1}$ makes a comparison possible between the numismatic finds of corstopritum, where evidence for Agricolan occupation is as yet scanty, with those of Newstead, a camp admittedly established by Agricola and of which the occupation terminated early in the reign of Commodus. The similarity between the lists of denarii found on the two sites is striking:

|  | Corstopi | Newstead. |  | Corstopitum | Newstead. |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Republican Period | ... 2 | 9 | Nerva | ... 4 | 3 |
| Mark Antony ... | 13 | 8 | Trajan | 16 | 15 |
| Augustus | 1 | 1 | Hadrian | 16 | 22 |
| Tiberius | ... - | 1 | Antoninus Pius | 15 | 6 |
| Nero | .. - | 1 | Faustina, Senior | .. 6 | 4 |
| Galba | 2 | 2 | Marcus Aurelius | 11 | 1 |
| Otho | ... - | 1 | Faustina, Junior | 2 | 1 |
| Vitellius | 1 | 1 | Lucius Verus | ... 1 | - |
| Vespasian | 15 | 22 | Crispina $\quad \therefore$ | .. - | 1 |
| Titus | 4 | 2 |  |  |  |
| Domitian ... | 8 | 12 | Total | ... 117 | 113 |

The parallel between the series of copper coins for the same period, though less close than that afforded by the denarii, is also worthy of note:

[^5]| Augustus (?) |  |  | Corstopitum <br> First brass. Secoud bras |  |  | Newstead. <br> First hrass. Second brass. |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | ... | $\ldots$ | ... | - | 1 | - | 1 |
| Nero | ... | $\ldots$ | $\ldots$ | - | 2 | 1 | 1 |
| Vespasian ... | ... | $\ldots$ | .. | 1 | 25 | 1 | 27 |
| Titus | $\ldots$ | $\ldots$ | $\ldots$ | 1 | 8 | 5 | 5 |
| Domitian | $\ldots$ | $\ldots$ | $\ldots$ | 7 | 14 | 4 | 21 |
| Nerva | ... | $\ldots$ | $\ldots$ | 6 | 1 | 1 | - |
| Trajan | ... | $\ldots$ | $\ldots$ | 23 | 36 | 20 | 6 |
| Hadrian | $\ldots$ | $\ldots$ | $\ldots$ | 23 | 11 | 12 | 15 |
| Sabina | $\ldots$ | . | . | 1 | 1 | 1 | 1 |
| Antoninus Pius | $\ldots$ | $\ldots$ | $\ldots$ | 13 | 18 | 3 | 4 |
| Faustina, Senior | $\ldots$ | $\ldots$ | $\ldots$ | 2 | 8 | 1 | , |
| Marcus Aurelius | ... | $\ldots$ | .. | 6 | 6 | 1 | 1 |
| Faustina, Junior | . | $\ldots$ | . | 5 | 4 | - | 3 |
| Total | .. |  | ... | 88 | 135 | 50 | 92 |

Three conclusions may be drawn from this comparison: (1) The number of coins of the Flavian and pre-Flavian emperors found at Newstead exceeds that from corstopitum ; with the later emperors the reverse is the case. Of republican denarii, a type of currency which probably went out of use about the time of Trajan, Newstead has yielded nine examples against only two from corstopitum. Adopting Mr. Macdonald's parallel of the Newstead results with the silver hoard from Castle Bromwich and the copper hoard from Croydon, both of which date about a.d. 180, we find that the proportion of pre-Trajanic silver to the whole is 56 per cent. for Newstead, 44 per cent. for corstopitum, and 19 per cent. for Castle Bromwich; while copper gives 49 per cent. for Newstead, 30 per cent. for corstopitum, and $16 \frac{1}{2}$ per cent. for Croydon. In other words, the numismatic evidence for first century occupation is not nearly so marked at corstopitum as it is at Newstead, and in this accords with the data supplied by the comparison of the pottery found on the two sites. It cannot, however, on that account be said to be wanting, and it must be borne in mind that, while at Newstead the area of Flavian occupa-
tion embraced the whole site occupied in later times, this was almost certainly not the case at corstopitum. Indeed, here the discovery, in the course of the past year, of two ditches of Flavian date on the earlier margin of the excavated area may denote that the Flavian settlement lay eastward of the ground hitherto explored, and has barely been reached in the past season's work; unless indeed it is deep below the granaries and 'forum.'
(2) The results obtained from the Newstead excavations go to show that the outpost was unoccupied from about the beginning of the second century down to the construction of the Antonine Wall in A.D." 140 . There is no reason for supposing any such period of abandonment to have intervened at corstopitum. The difference in the history of the two sites perhaps shows itself in the greater number of copper coins of Nerva, Trajan and Hadrian found in our excavations. Though the coins of these emperors formed the bulk of the currency in circulation during the two succeeding reigns, they had doubtless come into extensive use in northern Britain before the reign of Pius, that is, during the period when there was no occupation at Newstead.
(3) While Newstead was occupied during the reigns of Antoninus Pius and Marcus Aurelius, from a.d. 140 to 180, the coins of these emperors are decidedly scarce. This is not so at corstopitum. If, as is probable, there was no extensive circulation in Britain of coins of Marcus before the reign of Commodus, the preponderance of corstopitum as against Newstead in coins of that emperor, taken together with the occurrence at low levels of five copper coins of Commodus, may represent continued and undisturbed occupation of CORSTOPITUM after the date of the abandonment of Newstead. This supposition accords with the evidence given by single coins found in the 'forum,' indicating that the first period of its occupation may have covered the reign of Commodus, and possibly lasted on into that of Severus (see p. 165). But it has to be borne in mind that, while the area of
the camp at Nerstead was curtailed under the Antonines, and its garrison, in all probability, correspondingly reduced in numbers, corstopitum is marked out by the large public builuings erected in it at this time as a place that, from the year 140, was rapidly growing in size and importance, and in which a larger amount of money would consequently be in circulation.

As has been pointed out in previous reports, the old standards of copper coinage--sesterce, dupondius and as-are not met with at corstopirum after the time of Commodus, though they continued to be minted for sixty years longer. Their absence, contrasting with the common occurrence of debased silver coins of the emperors from Severus to Valerian, becomes every year more striking. Apart from the Greco-Asiatic coin of Septimius Severus, a sesterce of Julia Mamaea found in the course of the past season is the only copper coin of this period yet found. ${ }^{2}$ As against this we have to set fifty-two denarii and eight antoniniani namely :

Denarii: Septimius Severus, 16; Julia Domna, 7; Caracalla, 9 ; Geta, 3; Elagabalus, 3; Aquilia Severa, 1; Julia Soaemias, 2; Julia Maesa, 3; Severus Alexander, 7; Julia Mamaea, 1.

Antoniani: Gordianus Pius, 2; Philip, 3; Volusian, 1; Valerian, 2.

The only individual coin found last year calling for special notice is an apparently new variety of a denarius of Caracalla, unfortunately too corroded for reproduction, but interesting to English readers for the inscription on its reverse: vict brit cos $\mathrm{v} P \mathrm{P}$.

The copper coins of Valentinian 1 and his successors found in the whole course of the excarations will be considered in an appendix to the next report. It is hoped in future reports to summarise, each year, under their respective mints, the total

[^6]number of coins found throughout the time that excavations have been in progress, commencing in the report for 1911 with a consideration of the London mint.

The following two tables give (1) a list of all coins earlier than a.d. 260 found in 1910, (2) a list of all types later than A.D. 260 which have not been met with in preceding years. As in the previous report references are given to Cohen's Médailles Impériales (cited as C)-second edition except where otherwise noted; to Grueber's Roman Republican Coinage (cited as G); and to Mr Webb's monograph on the coinage of Carausius in the Numismatic Chronic.e, 4th series, vol. vir (cited as Webb). The coins in the first table are distinguished as denarius (D), Sestertius (S), dupondius ( Du ), and as (As), the figures within square brackets showing the number of examples found of each type.

## COIN TABLES.

## TABLE $I$.

MARK.antony (b.c. 31). Legionary coins. Eastern Mint.
ANT AVG III VIR R P C ; praetorian galley ; rev. LEG X (?) G 202 ; c. 38 . [1 D.] Same obverse ; rev. LEG XIII; ${ }^{\circ} 205$; c. 42 . [1 D.]
Same obverse ; rev. Leg Xxv (?) ; G 220 ; c. 62 . [1 D.] Illegible. [2 D.]

AUgUSTUS (B.C. 27-A.D. 14).
Bare head 1.; rev. s c ; commemoration coin [1 As.]
galba (A.d. 68-69).
IMP SER GALBA AVG; bare head r. ; rec. S P Q R OB C S within oak wreath; c. 1st edition 81. [l D.]

Vitellius (a.d. 68).
a virellivs germanicvs imp; bare head r. ; rev. concordia p.r; Concord seated l., with patera and double cornucopia; c. 21. [1 D].

VESPASIAN (A.D. 69-79).
imp. CaEsAR VESPASIANVS avg; laureated bust r. ; rev. cos iter tr pot ; Mars marching l. ; with spear and trophy ; c. 88, A.D. 70 [l D.]
Same obverse ; laureated head r. ; rev. IVDAEA ; Judaea seated weeping ; c. 226, $\left[\begin{array}{ll}1 & \mathrm{D} .\end{array}\right]$

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imp cags vesp avg cens ; rev. pontif maxim ; Vespasian seated r., with sceptre and branch; cp. c. 387 ; A.D. $72-75$ [2 D.]
IMP CAES VESP AVG CEN ; rev. S P Q R in oak-leaf crown ; c. 5l6; A.D. 72-75. [ll 1 D.$]$
IMP CAESAR VESPASIAN AVG cos mit ; radiated bust r. ; rev. Pax avg S c; Peace standing l. by altar, with patera in r., caduceus and olive branches in 1.; Lyons mint; c. 301 ; A.D. $72-73$ [2 Du.]
IMP CAES VESPASIAN AVG COS VIII P P; laureated head r. ; rev. S C; eagle standing on globe; Lyons mint; C. 482 ; A.D. 77-78. [l As.]
Same inscription, but rer. Victory standing 1. ; Jyons mint ; c. 466. [1 As.]
Obv. doubtful ; rev. aEqVitas avgist sc; Equity l. with balance and spear. [2 As.]
Illegible [1 D.]
Illegible [l Dü.]
Illegible [ $\left[\begin{array}{ll}2 & \text { As.] }\end{array}\right.$
TITUS (A.D. 69-81).
T CAES IMP avg f TR $P$ COS VI CENSOR ; rev. felicitas pvblica $s$ e Felicity standing l. ; A.D. 77-78; c. 85. [1 As.]
t CAES IMP AVG F PON TR P COS VI CENSOR ; rev. ROMA S C ; Rome standing l.; c. 184 ; same date. [l S.]

T GAES IMP PON TR P COS VI CENSOR ; rev. PROVIDNNT S C ; altar ; Lyons mint; cp. c. 177 ; same date. [l As.]
IMP TITVS CAES VESPASIAN AVG $P \mathrm{M}$; laureated head r. ; rer. TR P IX IMP XV COS VIII P P ; winged thunderbolt on a throne ; c. 316 ; A.D. 80. [1 D.]
Similar obverse ; rev. TR P IX IMP XV COS VIII P P ; curule chair on which is a crown; c. 318. [1 D.]
t CAESAR VESP. ; rev. indecipherable. [l As.].
Illegible. [l D.]
DOMITIAN (A.D. 69-86).

CAESAR AVG $F$ domitianvi cos $V$; laureated head r.; rev. s c; Hope moving 1. ; c. 453 ; A.D. 76. [l As.]

CaESAR avg f domitianvs cos vi ; rev. PRinceps ivventytis; Vesta seated l., wit's palladium and spear ; c. 378 ; A.D. 77-79. [lllll 1 D. $]$
Same inscriptions but rev. Health standing l., feeding serpent and leaning on column ; c. 384 ; same date. [l D.]
IMP CAES DOMIT AVG GERM COS XI CENS POT P P ; radiated bust r. ; rev. VICTORIAE AVGVSTI S C ; Victory 1. ; c. 640 ; A.D. 85. [1 Du.]
IMP CAES DOMIT AVG GERM COS XII CENS PER P P; laureated bust r. ; rev. FORTUNAE AVGVSTI S C; Fortune standing l., with rudder and cornucopia; C. 122 ; A.D. 86 . [1 As.]

IMP CAES dOMIT AVG GERM COS XIII CENS PER P P ; laureated headr. ; rev. IOVI VICTORI S C; Jupiter seated l. ; C. 311 ; A.D. 87 . [1 S.]
'Similar obverse and reverse, with bust in place of head; C.' 312 ; A.D.: 87. [lll S.$]$
imp caes domit avg germ cos xv cens per p p; laureated bust; rev. sc; Domitian standing l., with thunderbolt and spear, in act of being crowned by Victory ; c. 513 ; A.D. $90-91$. [1.S.]
Same obverse; rev. illegible. [l S.]
Same obverse; rev. moneta avgusti s c; Moneta standing 1.; with balance and cornucopia; c. lst edition ; A.D. 90-91: [l As.]
'imp caes domit avg germ pm tr p xv ; rev. imp xxir cos xvil cens p p p Pallas standing to r. on vessel, hurling javelin ; c. 293 ; A.D. 95. [1 D.]
Same type, inscription illegible. [l D.]
Illegible. [1 Du.]
Illegible. [2 As.]
NERVA (96-98).
imp nerva caes avg $P$ m tr pot; rev. cos ili pater patriae; sacrificial instruments; c. 48 ; A.D 97 . [1 D.]
imp nerva caes avg p m tr p il cos ili P p; rev. aeqvitas avgyst ; Equity .. : standing l. with balaṇce and cornucopia; c. 9; A.D. 97. [l D.]
Same obverse ; rev. concordia exercitvvm ; two hands joined ; c. 22 ; A.D. 97. [1 D.]
Illegible. [l S.]
trajan (98-117).
imp caes nerva traian avg germ ; rev. $P$ m tr $P$ cos il P P; female figure seated l. holding sceptre; c. 206 ; A.D. 98-9. [1 D.]
imp caes nerva traian avg germ p m ; rev. tr pot cos "íl i p S c ; same
© $\& 1$ type; c. 618 ; A.D. 98.9 . [1 Du.]
Same obverse ; rev. TR POT COS ... P P S C ; Victory moving l: holding shield lettered S P Q R ; Lyons mint; A.D. 98-102. [2 As.]
Same inscriptions ; rev. Mars standing l. with spear and shield ; A.D. 98-102. [l As.]
'Same obverse; rev. illegible. [l As.]

- imp caes nerva traian avg germ dacicvs $P \mathrm{~m}$; rev. [tr, P vil imp hil cos v P P S C] ; seated figure l. ; c. 602? ; A.D. 104. [1 S.]
 [1 Du.]
imp traiano avg ger dac pm trep rev. cos veps p Q optimo rrinc ; Peace standing 1. with olive branch and leaning on column ; c. 83 ; A.D
i 104-111. [1 D.]
imp caes nervae tratano avg ger dac prm tr. $\mathrm{P} \cos \mathrm{v} \mathbf{P} \mathbf{P}$; bust r. ; rev. SPQR optimo principi sc; Ceres standing l. with ears of corn and flambeau ; c. 368 ; same date. [1 S.]

Same inscriptions; obr.: head r.; rev: Dacia seated l., in front of her a trophy; in exergue dac cap (?) ; apparently unpublished variety ; same date. :[lll S.$]$
:Same inscription, laureated bust ; rev. Fortune standing 1 . with rudder and -cornucopia ; c. 478; same date.: [ [2 As.] .
Same inscription; rev. Hope moving 1. and holding up dress:; c.: 461-; same date. [1 Du.]
Same inscription; rev. illegible. $\cdot[1, \mathrm{Du}$.
Same inscription; rev, illegible. [ll As.].
imp caes nervae tratano avg ger dac p m tr p cos vi p p; radiated bust.; same reverse ; Fortune standing 1. with rudder and cornucopia; c. 480 ; A.D. 112-116. [1 Du.]

IMP CAES NER TRAIANO OPTIMO AVG GER DAC P M TR P COS VI PP P reve SENATVS popvlvsque romanvs s e; Felicity standing l. holding. caduceus and cornucopia; c. 352 ; same date.. [l S.]
imp caes ner traiano optimo avg ger dac parthico $P \mathrm{~m}$ tr P Cos vi P , P ; same reverse-the emperor between two trophies looking l.; c. 356; A.D. 116-117. [1 Du.]

Same obverse; rev. providentia avgusti s pqrsc; Providence standing 1. and leaning on column, holding sceptre in $r$. and pointing to globe; c. 322 ; same date. [1 Du.].

Illegible. [1 Du.]
Illegible. [5 As.]
Hadrian (117-138).
IMP GAES TRAIAN HADRIANO AVG DIVI TRA; rev. PARTH F DIVI NER NEP P M TR P cos ; in exergue pax ; Peace standing 1. with olive branch and cornucopia c. 1011 ; A.D. 117. [1 D.]
imp caesar traian hadrianvs avg ; rev. P m tr f $\cos$ II; design indecipherable; A.D. 118. [1 D.]
Same obverse, laureated bust; rer. P m. TR P cos inf ; Oceanus recumbent l.; c. 1110. [1 D.]
imp carsar traidnvs hadrianvs avg p m tr p cos ili ; bust r.; rev. concordia exercitvvm sc; Concord l. holding in each. hand a military standard; c. 268. [l S.]

Same obverse ; rev. mibertas publica s c; Liberty seated l. holding laurel branch and sceptre; c. 948 . [l S.]
Same obverse.; laureated bust r. ; rev. ; moneta avgivit s c ; Money standing 1. with balance and cornucopia; c. 974. [l S.]

Same type; radiated bust ; c. 976 . [I Du.]
Same obverse; radiated bust; rev. pietas avgusti sc; Piety standing 1. sacrificing at altar; cp. c. 1044. [1 Du.]
HADRIANVS AVGVSTVS; laureated hear ; rev. cos III; star over a crescent, beneath it a globe; c. 461. [l D.]
hadrianvs avgystvs P p; laureated head; rev. cos imf; Equity standing 1. with balance and cornucopia; c. 382. [1 D.]
hadrianvs avg cos iil P P; laureated head l. ; ren. felicitati avgvsti ; vessel with rowers ; c. 713. [1 D.]
Same obverse; bare-headed bust r. ; rey. fides pvblica; Fides standing r. holding ears of corn and cornucopia; c. 716. [1 D.]
Same obverse ; rev. marti ; Mars standing l. with spear and shield ; c. 951. $\left[\begin{array}{ll}1 & \mathrm{D} .\end{array}\right]$
Same obverse ; bare-headed bust r. ; rev. salvs avg ; Health standing r. feeding a serpent; c. 1336. [1 D.]
Same obverse; bare head; rev. victoria avg; Victory standing r. holding laurel branch; c. 1454. [l D.]
Same obverse; laureated and draped bust; rev. pietas avg s c ; Piety.standing 1. with hands raised, at her feet an altar and a stork ; c. 1035. [l S.]

Illegible. [ll D.$]$
Illegible. [ll Du.]
Illegible. [2 As.]
sabina (Augusta 126).
Sabina avgusta hadriani avg p.p; diademed bust r.; rev. female figure seated 1.; inscription illegible. [1 S.]
antonines pits (138-161).
antoninvs avg pivs P PTR ; rev. cos in Sc; the Emperor seated on a platform, behind him the praetorian prefect, in front of him Liberality; at the foot of the platform a man stretching out his hands ; c. 168 ; A.D. 139. [1 S.]
antoninvs avg pivs p p tr p cos iti ; rev. annona avg; modius containing four ears of corn and a poppy ; c. 33 ; A.D. $140-143$. [1 D.]
Same obverse; laureated bust; rev. salvs avg s c ; Health standing i. feeding serpent and holiting sceptre; c. 710 ; same date. [l S.]
antoninvs avg pivs $P$ P; rev. cos imi ; two clasped hands holding caduceus and two ears of corn ; c. 344 ; date after 14.5. [1 D.]
antoninvs avg pivs p p tr p xii ; Bare head r. ; rev. cos mili ; Equity standing 1. with balance and cornucopia; c. 238 ; A.D. 149. [1 D.]

Same obverse; laureated head; rev. cos IIII; Fortune standing l. with rudder and cornucopia; c. 263 ; same date. [1 D.]
imp caes t ael hadr antoninvs avg p p; rev. tr pot ximit cos itil ; in exergue trane ; Tranquillity standing r. with rudder and ears of corn; c. 825; a.d. 152. [1 D. plated.]
antoninvs avg pivs $P$ P TR P xVI; rev. cos iiil ; Vesta standing l. with simpule and palladium ; c. 197 ; A.D. 153. [1 D.]
antoninvs avg pivs P P TR P XVII; rev. female figure standing l. : inscription illegible ; A.D, 154, [1 As.]
antoninvs avg pivs $P$ P TR $P$ XVII; radiated head; rev. felicitas cos ilin S c; Felicity standing 1 . with caduceus and two ears of corn ; cp. c. 371 ; same date. [1 Du.]
ANTONINVS AVG PIVS P P TR P XVIII; rev. BRITANNIA COS IIII $\mathbf{S} \boldsymbol{C}$; Britannia seated l.; c. 117 ; A.d. 1555. [2 As.]
ANTONINVS AVG PIVS P P ; rev. AED. [or TEMPL] DIVI AVG REST; in exergue cos IIII; temple; C. 1; A.D. .158-160. [l D.]
antoninvs avg pivs $\mathbf{P} \mathbf{P}$ tr $\mathbf{P}$ xxilif; rer. pietati avg cos inil ; Piety standing 1. between two children and holding two more in her arms; c. 631 ; A.D. 161. [1 D.]
divvs antoninvs; rev. Consecratio ; eagle looking l.; c. 154; same date. [1 1 D.]
Illegible. [1 D.]
FAUSTINA I (died 141).
diva favstina; rer. avgvsta; Venus standing l. holding apple and resting on shield ; c. 72. [1 D.]
Same inscriptions; rer. Ceres standing l. holding flambeau, left hand resting on hip; c. 104. [1 D.]
Same inscriptions; rer. Vesta standing l. with palladium and sceptre; c. 109. $\left[\begin{array}{ll}1 & \mathrm{D} .\end{array}\right]$
Same obverse; rer. aeternitas s c; Eternity standing l., holding up r. hand and holding globe (?) ; c. 42 [1 Du.]
diva avgvista favstina ; rer. illegible, female figure standing l. [1 As.]

MARCUS AURELIUS (139-180).
avrelivis caesar avg pil f; rev. tr pot ili cos iI; Pallas standing r. with spear and shield; c. 618; A.D. 149. [1 D.]
AVRELIVS CAESAR AVG PII FIL; rev. TR POT VIII COS II sc; female figure standing l., A.D. 155. [1 S.]
Obverse doubtful ; bare head r., rev. TR POT xilif cos in s c; Mars marching r. with spear and trophy; c. 756 or 759 ; A.d. 160. [2 As.]
imp m antoninvs avg; laureated head r., rev. prov deor tr $P$ XVII cos iII; Providence standing l. with globe and cornucopia; c. 525 ; A.D. 163 . [l D.]
m. antoninvs avg parth max ; rev. tr p xx mp ill cos ill; in exergue fax; Peace standing l. with olive branch and cornucopia; c. 434 ; A.D. 166. [1 D.] m antoninvs avg tr p xximif ; rev. felicitas avg cos ini ; Felicity standing 1. with olive branch and sceptre; cp. c. 181; A.D. 170 . [1 D.]
m antoninvs avg TR P xxv; rev. cos III; Jupiter seated l. holding thunderbolt and sceptre; c. 113; A.D. 171. [1 D.]
m antoninvs avg; rev. cos ini P P; Health seatell l., at her feet a serpent; C. 152 ; A.D. 176-180. [1 D.)
m antoninvs avg germ ; laureated bust r. ; rev. illegible; female figure standing 1., extending r. hand ; A.D. 175-177. [1 S.]
m avrfl antoninvs avg tr p XXXiI; laureated head r. ; rev. imp viili cos ili pr s c; Equity standing 1 . with balance and cornucopia; c. 375 ; A.d 178. [l S:]
divvs m antoninvs pivs; rer. consecratio; eagle to l. on altar, looking r.; variety not in Cohen ; cp. c. 87 ; A.D. 180. [1 D.]
Illegible. [1 D.]
Illegible; rer. female figure standing l., holding cornucopia in t. [l S.]
fadstina il (died 175).
favstina avg pil avg fil ; rev. illegible. [l As.].
favstina avgysta; rev. venus genetrix; Venus standing l., with Victory and shield; c. 280. [1 D.]
luctus verus (160-166).
 Mars standing r. with spear and shield ; c. 228 ; A.d. 164. [l D.]
commodus (177-192).
L AVREL COMMODVS AVG TR P IIII; laureated head r; rev. IMP III COS II P PSC; Pallas standing l. sacrificing at altar and with shield and spear in J. hand; c. 234 ; A.d. 179. [1 S.]
 hurling spear and holding shield; c. 879 ; A.D. 183 . [1 D.]
m commodvs antoninvs avg; laureated head r.; rer. vict brit cos vep; Victory seated r. on heap of shields, holding palm and resting shield on 1. knee; new variety, for the type cp. c. 945 ; A.D. 186-190. [1 D.]
 Female figure standing l. with caduceus and cornucopia; in the field a star; c. 578 ; A.D. 192. [1 D.]

Illegible. [1 S.]
CRISPINA (177-183).
crispina avg imp commodi avg; rer. salvs sc ; Health seated l. feeding serpent; c. 32 . [1 S.]
septimites severds (193-211).
imp cae l. sep sev pert avg cos if ; ret. fortvn redvc ; Fortune:seated l., with branch and cornucopia; c. 177 ; A.D. 194. [1 D.]
Same obverse; rev. TR P III IMP V cos FI; captive seated on the ground to r. ; c. 659 ; A.D. 195. [1 D.]
l sept sev pert avg imp...; rer. herculi defens; Hercules standing to r., leaning on his club; cp. c. 210 ; A.d. 197. [1 D.]

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L•Sept sev pert avg imp x ; rev: tr• P vi cos il ; Pallas armed standing l. ; c. 665 ; A.D. 193. [1 D.]
L seft seiv avg imp xi part max; rev. victoriae avge fel; Victory flying to 1.; before her a globe on a cippus; c. 719 ; A.D. 198-201. [1 D.]

Severvs pivs avg; laureated head r. ; ret. p m tr p ill cos il p p; Mars marching to right with spear and trophy; forged coin ; cp. c. 395 ; after A.D. 202 (reverse of A.D. 195). [1 D.]
julia domna (193-217).
ivlia avgusta ; rev. piftas avgg ; Piety standing l., sacrificing at altar; c. 150 ; A.D. 197-212. [1 D.]

Same obverse ; rer. hilaritas; Hilaritas standing l., holding long palm and sceptre ; c. 76. [1 D.]
Same obverse; rer. illegible; seated figure l. [l D.]
geta (Caesar 197-2l1).
l septimivs geta cafs; rer. felicitas tempor; Felicity standing l., with caduceus and cornucopia; c. 44. [1 D.]
caracalla (196-217).
m avr antoninvs caes; rer. Severi avg pif fil; Sacrí̂cial instruments; c. 587 ; A.D. 196. [1 D.]
imp cae m avr ant avg p ír $P$ il ; rer. spes pvblica; Hope advancing to l ., holding flower and lifting up skirt ; c. 600 ; a.d. 199. [1 D.]
antoninvs avgustvi ; ree. vict aetern ; Victory advancing to l. with diadem, in front of her a shield placed on a base; c. 614 ; A.d. 198-201. [2 D.]
antoninvs pivs avg ; rer: concordia felix; Plautilla and Caracalla joining hands ; c. 23 ; A.D. 202. [1 D.]
antoninvs pivs avg germ; ret. liberal avg viil; Liberality standing l., with tessera and cornucopia; c. 139 ; A.D. 2 l 4 . [1 D.]
elagabalus (218-222).
imp antoninvs pivs avg; r:r. invictvs sacerdos avg; Elagabalus standing l., by altar, holding patera and club; in the field a star; c. 60 ; A.d. 22 J. [1 D.]
Same obverse ; rct. P M TR P IIII CoS III P P ; Sun-god running to l., raising r. hand and holding whip ; in field a star ; c. 184; A.D. 221. [1 D.]
Same obverse ; ruv. P M TR P IIII cos III P P ; Sun-god standing facing, raising r. hand and holding whip; c. 182 ; A.D. 221. [1 D.]
julia mamaea ( $222-235$ ).
ivlia mamaea avgusta; ref. fecunditas avgustaf s c; Fecundity standing l., giving her hand to a child and holding cornucopia; c. 10. [1 S.]
imp cabs m ant gordianvs avg ; vev: LaEtitia avg n ; Laetitia standing l., holding crown and anchor ; c. 118 ; A..D. 238-9. [1 Ant.]

PHilip (244-249).
IMP M IVL PHILIPPVS AVG; rer. P M TR P il $\cos$ P P; Philip; seated 1 ., holding $\because$ globë añd sceptre ; in exerguie vi ; c. 119; A.D. 245: (1. Ant.].
Same obverse; rer. providevtia avg; Providènce standing l., pointing at globe and holding sceptre in 1. ; c. 162. [1 Ant.]
Same obverse; rev. indecipherable.. [1-Ant.]

## TABLE II.

List of types subsequent to A.D. 260 not previously found at Corstopitum.
Gallienus ( $260-268$ ).
GAllienvs av̈g ; rev: aeternitas avg; Sun-god standing l., raising right hand and holding globe; mint mark (in field) т; c. 38.
gallienvs avg ; rev. apollini. coñs avg ; griffin walking l.; mint mark (in ? exergue) $\Delta$; c. 76.
gallienvs avg ; rer. dianae consavg ; stag advancing r.; mint mark (in exergue) x; c. 157.
gallenvs avg ; rer. dianae cons avg; wild goat standing r.; mint mark (in $\therefore$ exergue) $\epsilon ;$ : c. 162.
gallienvs avg; rev. dianae cons avg; gazelle moving.l.; mint mark (in exergue) xiI; c. 162.
gallienvs avg ; rev. diana felix ; Diana standing r.; with javelin and bow ; ©... Tarraco mint ; c. 172.
GAllifnís avg ; rev. laetitia avg ; Laetitia standing l., with crown and anchor; mint mark (in field) Iv ; c. 423.
gallienve avg ; rev. marti pacifero ; Mars standing l., with olive branch and at shield $;$ mint mark (in field) A; $\dot{\text { c. }} 617$.
gallienvs avg ; rev. victoria avg; Victory standing l., with crown and palm; mint mark (in field) iv; c. 1071.
gallienvs avg ; rer. virtvs avg; Valour standing l. ; mint mark (in field) s; Tarraco mint; c. 1236 ?

SALONINA.
Corn salonina avg ; rer. vesta aeterna; Vesta standing. l.; holding patera and sloping sceptre; c. 146.

CLAUDIUS GOTHICUS (268-270) ; Rome mint.
timp clâdivi avg; rev. afternitas avg; Sun-god standing l., raising right hand and holding globe; c. 16.
imp c clavdivs avg ; rer. mars vltor ; Mars advancing to r., carrying spear . and trophy; cp. c. 154.
imp Clavdivs avg; rev. pax avgvsti ; Peace standing l., with olive branch and sloping sceptre ; c. 204.
imp clavdivs p f avg; rev. provid avg; Providence standing l., with wand and sceptre; c. 223.
imp clavifivs avg. rev. vberitas avg; Uberitas standing l., with bunch of grapes and cornucopia ; c. 286.
imp clavdivs avg; rev. virtvs avg; Soldier standing l., leaning on shield and holding spear ; mint mark (in field) є ; c.. 318 .
postumus (260-268).
imp postvmys avg; rev. fides aeqvit; Fides seated l., holding patera and military standard ; Tarraco mint; c. 57.
imp c postvmvs $\boldsymbol{P}$ f avg; rev. fortiva avg ; Fortune seated l., holding rudder and cornucopia; c. 81.
IMP $\boldsymbol{f}$ POSTVMVS P F AVG; ret. P M TR P VIIII COS IIII P P ; bow, club and quiver ; c. 281 ; A.D. 267.
tetricus i (270-273).
imp C tetricvi p favg; rev. comes avg n; Victory standing: l. with crown and palm ; c. 20.
imp tetricvs avg; rev. fides militym ; Fides standing l., holding in each hand a military standard; c. 43.
imp c tetricvis p favg; rev. Pax avg; Peace standing.l. with crooked stick and cornucopia; c. 102.
imp tetricvs avg ; rev. pax avg; Salus standing l. feeding serpent and holding sceptre in 1. ; variety not in Cohen.
IMP C TETRICVS PFAVG; rec. PIETAS AVG; sacrificial instruments ; base coin ; c. 117.
jmp. tetricvs pfafg; rev. Salvs avg; Salus standing l., feeding serpent and holding sceptre; variety of c. 148.
tetricus in (270-273).
c piv esv tetricvs caes ; rev. hilarttas avgg ; Hilaritas standing l. with palm and cornucopia; c. 17.
Same obverse? ; rev. Salvs avgg ; Salus standing l. feeding serpent and holding anchor ; cp. c. 77.
piv esv tetricvs P f avg; rev. Spfs pvblica; Hope advancing 1 . holding flower and catching up skirt ; variety not in Cohen.
c piv esv tetricvs caes; rev. . . . . avge ; the emperor helmeted standing l. holding spear and globe; unpublished type.

## SEverina.

severina avg; reo. providen deor; Fides standing r, holding two military standards ; in front of her the Sun-god raising right hand and holding globe; mint mark vxxt ; Taraco mint; c. 12; date 273.275.
diocletian (284:305).
imp cectal diocletíanvs pfavg; rec. iovi conservat avge; Jupiter standing 1. with thunderbolt and sceptre : mint mark (in field) a; Lyons mint; c. 234; date 285-296.

CARAUSIUS (287-293).
imp c caravsivs p favg; radiated and draped bust r.; rev. pax avg; Peace standing 1. with olive branch and vertical sceptre; mint mark $\frac{S \mid P}{\text { MLXXI }}$; London mint ; Webb 139.
imp c caravsivs P favg; radiated and draped bust with cuirass; rev. pax avg; Peace standing 1. with olive branch and sloping sceptre; mint mark $\frac{\dot{s} \mid P}{M L}$; London mint ; Webb 149.
imp Caravsivs P avg; radiated and draped bust r. ; rev. virtvs avg:- Mars standing r . with spear and shield; mint mark m L ; diameter 21 mill.; London mint; Webb 206.
imp caravsivs P favg; radiated and draped bust r.; rev. pax avg ; Peace standing 1. with olive branch and vertical sceptre; mint mark s P C (new variety) ; Colchester mint; Webb 357 or 358.
imp caraviviv P f avg; radiated and draped or cuirassed bust r. ; rev. virtvis avg ; Mars standing r. with spear and shield ; mint mark c ; diameter 22 mill. ; Colchester mint ; Webb 487.
imp caravsivs pfavg; radiated and draped bust r. ; rev. monetalava; Moneta stànding l. with balance and cornucopia ; mint mark (in field). c ; Colchester mint? ; Webb 520.
imp caravsivs av ; radiated and draped bust r ; rev. pax avg; Peac̊e standing 1 with olive branch and sloping sceptre; no mint mark; Webb 993.
imp c caravsivs Pfavg; radiated and draped bust r. ; same reverse; no mint mark; Webb 999.
imp caravsivs p favg; radiated and draped bust r. ; rev. pax avg; Peace standing l. with caduceus and cornucopia ; no mint mark ; diameter 18 mill. ; compare Webb 1022.
imp Caraviviv p favg; radiated and cuirassed bust r. ; rirv. provid avg; Providence standing 1 . with staff and cornucopia ; no mint mark; diameter 21 mill. ; Webb 1061.
imp c diocletianvs pfavg; radiated and cuirassed bust r.; rev. pax avgge ; Peace standing 1. with olive branch and sloping sceptre ; mint mark $\frac{\mathrm{S} \mid \mathrm{P}}{\text { MLXXI }}$; London mint, issued by Carausius; Webb 1238.
constantius chlorus (Caesar 293-305).
constantivs nob caes; laureated head r. ; rev. genio popvli romani ; Genius standing 1. with patera and cornucopia; mint mark $\frac{B \mid F}{T R}$; Trier mint; follis ; c. 61 ; A.D. 295-305.
severds it. (Caesar 305-306).
severvs nobilissimys caes ; laureated and draped bust r. ; rev. genio popvli romani ; Genius standing 1.: with patera and cornucopia; no mint mark ; London mint ; follis; c. 24.
constantine the great and his contemporaries (306-337)
(a) LoNdon mint.
-imp Licinivs P f avg; laureated and cuirassed bust of Licinius r. ; rev. genio POP ROM ; Genius standing 1. with patera and cornucopia; mint mark $\frac{*}{{ }^{*} \mid}$; c. 53 ; A.D. 309-313.
imp constantinvs P f avg ; laureated and cuirassed bust of Constantine Ir. ; rev. SOLI invicto comiti ; Sun-god standing l., raising right hand and holding globe ; mint mark $\frac{*}{\text { PL. }}$; c. 536 ; A.D. 309-313.
constantinvs avg; helmeted and cuirassed bust of Constantine Ír. ; rev. virtvs EXERCIT ; two captives seated at foot of standard inscribed vot xx ; mint mark PLN ; c. 695 ; A.D. 320-324.
(b) trier mint.
constantinvs p favg; laureated and draped bust of Constantine I r.; rev. solr invicto comiti ; radiated and draped bust of Sun-god r. ; no mint mark ; c. 514 ; A.D. 309-313.
imp Licinivs Pfavg; laureated and draped bust of Licinius r. ; rev. genio pop ROM ; Genius standing l. with patera and cornucopia; mint mark $\frac{T \mid F}{\operatorname{BTR}}$; c. 53 ; A.d. 313-317.
constantinvs P favg; laureated and cuirassed bust of Constantine I. r. ; ruv. marti conservatori ; Mars standing r., with spear and shield ; mint mark $\frac{\mathrm{T} \mid \mathrm{F}}{\mathrm{PTR}}$; c. 338 ; A.D. 313.317.
CRISPVS NOB CAES; helmeted and cuirassed bust of Crispus r. ; rev. virtvs EXERCIT ; two captives seated at foot of standard inscribed voT xx ; mint mark $\cup$ PTR ; c. 172; A.D. $320-324$.
constantinvs avg ; laureated head of Constantine r. ; rre. Sarmatia devicia ; Victory advancing to r., with trophy and palm, treading on captive ; mint mark pTRU ; c. 487 ; A.D. $320-324$.
fl helena avgvita; diademed and draped bust of Helena r. ; rer. secyritas reipvblice ; Securitas standing l., with branch and holding up skirt; mint mark STR ; c. 12 ; A.D 324-326.
(c) Lyons mint.
fl ivl crispls nob caes; laureated and draped bust of Crispus l. ; rer. caesarvm NOSTRORVM; .within a wreath vot $x$; mint mark indecipherable; c. 47; A.D. 324.
(d) SISCIA MINT.
constantinvs avg; laureated head r. ; rev. d n constantini max avg; within a wreath vot xx ; mint mark AṢIS ; c. 123; A.D. 320-324.

## (e) HYBRID coins.

constantinopolis; with reverse of vrbs roma (wolf and twins); mint mark $\cup$ PL.G.
fl max theodorae avg; with reverse of Helena (pax pvblica); mint mark illegible.
constans (340-350).
constans p freavg; diademed bust r.; rev. victoriae dd avgg Q nn; two Victories ; mint mark R $\odot$ P; Rome mint ; c. 176 ; A.d. 342-348.
d n constans p favg; diademed bust r., behind the head the letter a; rev. fel temp reparatio; Constans standing in galley, holding Victory and labarum ; $\operatorname{mint} \operatorname{mark} \frac{\mathrm{A}}{\mathrm{TRP}}$; Trier mint ; c. 13 ; A.d. 348-350.
constans or constantive in ; obr. indecipherable; rev. vot xx mvit xxx within a laurel wreath ; mint mark Lvg ; Lyons mint. [Siliqua]
decentios (351-353.)
d n decentivs nob caes; bare headed bust r. ; rer. victoriae dd nn ag (sic) et CaE (retrograde inscription) ; two Victories holding crown inscribed vot $\mathbf{v}$ mvet x ; mint mark illegible; variety of c. 34.
constantios il (353-360).
dn constantivs pfavg; diademed bust r. ; behind the head the letter a; rer. fel temp reparatio ; Emperor spearing horseman; mint marks $\frac{\mathrm{A} \|}{\text { SLG }{ }^{*}}$ (Lyons mint) ; $\frac{\mathrm{A} \mid}{\mathrm{PAR},} \frac{\mathrm{A}}{\mathrm{PARL},}$ (Arles mint) ; c. 46.
julian (Augustus 360-363).
fl cl ivlianvs pp avg; diademed and bearded bust r. ; rer. vot $x$ mvit $x x$ within a laurel wreath ; Lyons mint; c. 146. [Siliqua]
gratian (367-383).
dn gratianvs pfavg ; diademed and draped bustr. ; virtivs romanorvm ; Rome seated, holding globe and spear ; mint mark illegible ; c. 56. [Siliqua]
tHEODOSIUS (379-394).
dn theodosivs ffavg; diademed bust r. ; rex. victoria avgeg ; Victory l., with crown and palm ; mint mark scon ; Arles mint ; c. 41 ; A.p. 388-392. .

ANIMAL REMAINS.

BY PROFESSOR A. MEEK, M.SC., AND R. A. H. GRAY, M.A., M.SC.

## INTRODUCTION. . .

The excavations at corstopitum, begun in 1906, while yielding the interesting antiquarian material reported upon by W. H. Knowles, R. H. Forster, and their colleagues, exposed at the same time a large number of bones of man, and of domesticated and other animals, as well as certain shells. A preliminary note on the remains obtained during the first and second year's excavations was published in the report of $1907 .{ }^{1}$ This was merely a synopsis mentioning the names of the species to which the remains had belonged.

We now propose to give a more detailed account of the remains obtained up to 1910. It is unfortunate, as was pointed out in the preliminary.paper, that the specimens were usually of a fragmentary nature, because this, besides rendering identification difficult, also led to breadth being often preferred to length in measurement. Nevertheless, the specimens were of considerable interest, and, as the following statements will show, they were extremely numerous. Consequently we, are able to bring together and to contrast a wealth of material which enables us to state with greater confidence than has hitherto been attempted, the nature of the domesticated animals of the Roman period in Britain as represented at corstopitum and the relationship of these to the domesticated animals of the present day. : We had, in the first place, to think of a series of measurements which would render comparison easy when fragmentary material had to be dealt with, and, in the next place to make the
${ }^{1}$ Arch. Ael. 3 ser. rv, 802.
attempt to indicate the minimum number of individuals of each species represented. The method adopted was as follows: Measurements of complete or relatively complete skulls were taken and of others more fragmentary with reference to some given region. The areas of the skull bearing teeth were separated into right and left, the extreme length of each area being taken. The long bones were divided into right and left,: and only complete bones, and the lower extremities of incomplete bones, were taken into account, so that, by treating as scrap such other portions of bones as were represented, we eliminated the danger of including the same bone twice in the measurements given in the tables. At the same time, by this method, we have been able as stated to indicate the minimum numbers of individuals for each species:

> I-Mammalia.



Total, 286
All the measurements in the tables are given in centimetres.

THE HORSE.
Only complete bones were counted, and, in the case of the long bones, only the lower extremities of such as were fragmentary. There were altogether 108 complete bones, or fragments representing complete bones. Unfortunately there were very few skulls from which measurements could be obtained, but the long bones were fairly complete, so that an idea could be formed as to the size of the animals represented. In table 1 (Horse) the measurements are given for a recent horse measuring $14 \frac{1}{2}$ hands. The skeleton of this horse is in the museum of the Natural History department of Armstrong college. We have also compared the corstopitum material with the measurements given by Pitt Rivers. ${ }^{2}$

[^7]The Scapula: There were three left scapulae and one right scapula, and as the measurements of the ' neck' in the case of the left ranged from 5.4 cms . to 6 cms.; while the corresponding measurement of the right was 6.7 cms , we assumed that this last measurement belonged to the scapula of a different animal. If this is' so, four animals are represented by the scapulae.

It would seem from the larger measurement that a horse of some 14 to $14 \frac{1}{2}$ hands high existed in Roman times in Britain, besides smaller forms represented by the other measurements given in table 2 (Horse).

Humerus: There were altogether 16 bones or lower ends of bones representing the humerus. Of these 10 belonged to the right limb, and 6 to the left, so; that at least 10 animals were represented. Only two measurements of length could be obtained from the left bones- 28 cms . and 28.5 cms ., the corresponding breãdths of condyle being respectively 7.3 cms . and 7.2 cms . Six measurements obtained for the right limb showed a variation from as small as 21.7 cms . to 28 cms ., while the breadths of the condyles varied from 5.5 cms . to 7.6 cms . Judging from the full-grown condition of the small bone méasuring 21.7 cms . in length; it would seem to represent a distinctly smaller type of horse than the one represented by the humerus with the maximum length of 28.5 cms ., which measurement approaches the length of the corresponding bone in the museum specimen, which is given in table 1 (Horse) as 29.3 cms. Referring to this larger measurement ( 28.5 cms .), we note that it is identical with that given by Pitt Rivers for the length of the humerus of the New Forest pony-an animal 12 hands 3 inches high. The measurements of the humerus evidence the existence in Britain during Roman times of a type of horse smaller even than the Ex̀moor pony used as a test animal by Pitt Rivers in dealing with the remains from Rotherley, and a type as large as a New Forest pony of the present day.

The Radius: The radius was represented by 12 bones, from which one or both measurements could be obtained-5:left and 7 right. The lengths varied from 31 cms . to 33.6 cms . in the right, and from 29.2 cms . to 33.9 cms . in the left. The average length obtained from the combined measurements was 31.8 cms ., so that, if this number be taken to represent the mediumsized animal, then the number 29.2 would represent a smaller type of horse, while 33.9 would represent a larger. Again, the length of the left radius of the museum specimen is given in table 1 (Horse) as 34.9 cms .-only 1 cm . more than the length of the largest bone measured from the corstopitum remains.

Referring to the test animals used by Pitt Rivers, we note that here again, in the case of the radius, there seems to have existed in Britain in Roman times a type of horse smaller than the Exmoor pony, another not much larger but less than the New Forest pony, and a third one slightly larger than the New Forest pony.

The Metacarpus: The large metacarpal bones of at least 7 animals were present, there being 7 belonging to the left limb and 6 to the right. The lengths varied from 22 cins . to 23.5 cms . in the left and from 21.7 to 23.2 in the right, while the breadths of the lower articulating surfaces ranged from 4.3 cms. to 5.2 cms . in the left, and from 4.5 cms . to 5 cms . in the right. The specimen measuring 21.7 cms . long (table 5, Horse) is almost identical with the measurement for the length of the corresponding bone of the New Forest pony, which is given by Pitt Rivers as 21.5 cms . for the right limb and 21.6 for the left. . The other measurements appear to represent animals still larger than the New Forest pony, whilst the largest length obtained, namely, 23.5 cms ., approaches very closely to that of the museum specimen given in table 1 (Horse) as 23.7 cms . for both right and left metacarpal bones. The ratios of length to breadth of the lower articulating surface varied from $4: 3: 1$ to $5 \cdot 1: 1$, so that none of the animals could have approached in fineness of limb some of the present day horses possessing this feature. Four of them had evidently suffered from 'splints,' the ratios of these being $4 \cdot 3,4 \cdot 8,5,5 \cdot 1: 1$.

With regard to the metacarpals alone, we would point out that the majority of the animals represented seem to have belonged to a type of horse a little larger than the New .Forest pony of the present day, and slightly less than the horse represented by the museum specimen; that is to say, from an animal slightly larger than 12 hands 3 inches, to one slightly less than $14 \frac{1}{2}$ hands.

The Innominate: Four individual horses were represented by this bone, there being only 4 left and 4 right complete or (generally) incomplete innominate bones found amongst the remains submitted to us. Only one of these appears to be similar to the innominate of the museum specimen, its measurement relating to the acetabulum being 6.5 cms . The average measurement for the acetabulum is 5.5 cms ., and then there is a gap in the measurements till we come to a pair of innominates, belonging to the same animal, having a measurement of $5 \cdot 1 \mathrm{cms}$. The number $5 \cdot 2$ in the right may belong to this latter type of innominate, seeing that the difference is so small.

Though the specimens are few and somewhat fragmentary, they appear to show what we have referred to, namely, that there was in Britain during Roman times a large type of animal, a medium sized, and a small.

The Femur: Five animals are represented from the nine specimens examined. A small sized bone again appears, if we judge from the breadth of cöndyles alone, which is given in table 1 (Horse), for a right femur, as 7.3 cms. A medium sized animal is probably represented by the following measurements given in the same table for the left breadths of condyles$8,8,8.5 \mathrm{cms}$. The two largest bones have measurements of condyles given as $8.5,8.8 \mathrm{cms}$., and the last of these furnished a length of 36.4 cms ., which is very near to that of the museum specimen, where the length of the femur
is given as 36.3 cms . for both right and left limbs, the breadth of condyles being 8 cms . The only other length obtained, namely, 33.9 cms ., is less than the corresponding length for the Exmoor pony, given by Pitt Rivers as 34.9 cms . for the right, and 35.1 cms . for the left limb.

The Tibia: Out of 14 tibia bones found in the remains, 7 animals were represented. Only 4 of these gave a longitudinal measurement. Two of the bones are small, being only 29.3 cms . and 30.9 cms . respectively, as given in table 8 (Horse), and they seem to represent an animal slightly larger than the Exmoor pony, the length of tibia of which is given by Pitt Rivers as $29 \cdot 1$ cms . for the right limb, and $29 \cdot 2$ for the left. The measurement of 33.6 cms . given for a right tibia bone may be that of a medium sized horse, and it is slightly larger than the corresponding measurement given by Pitt Rivers for the New Forest pony. The remaining measurement of length obtained, namely, 37.9 cms ., suggests a large type of animal-even larger than the horse of $14 \frac{1}{2}$ hands represented by the museum skeleton.

The lower articulating surfaces varied in breadth from 4.3 cms . (belonging to the small bone 29.3 cms . long) to 5.5 cms . (belonging to the large bone 37.9 cms . long).

The Metatarsus: Seven animals were represented by the metatarsal bones sent in, as will be seem from table 9 (Horse). The lengths varied from 22.6 cms . to 29 cms ., and again there is a gap between the measurements of two small ones ( 22.6 cms . and 23.3 cms .) and the next measurement of 26.5 cms. The large one, measuring 29 cms ., is larger than the corresponding bone of the museum specimen which is given in table 1 (Horse) as 27.4 cms .

Comparing these with the test animals used by Pitt Rivers, we note that the small measurements, 22.6 cms . and 23.3 cms ., approach very closely to the length of metatarsus in the case of the Exmoor pony ( $23 \cdot 1 \mathrm{cms}$ ). The next length, 26.5 cms ., is slightly larger than that given for the metatarsal of the New Forest pony ( 25.4 cms .).

Skull: As will be seen from table 10 (Horse) very few measurements could be obtained. A reference to the table, however, shows that portions of two skulls giving three measurements belonged to two differently sized animals, one of which has the very small measurement of 9 cms . between crest and basion. The length occupied by molars and premolars was obtained for one upper portion of a skull. and this came to 11.5 cms . According to Pitt Rivers the same measurement for the Exmoor pony is 13.7 cms ., so that the animal represented by the number 11.5 was smaller than the Exmoor pony.

The lower jaws were also in a very fragmentary condition. One gave two measurements. In this single instance the length from condyle to the tip of the lower jaw is given in table 10 (Horse) as 38.5 cms ., and the teeth area as 15 cms . From the condition of the teeth, however, this animal was only about 2 years 3 months old, so that it does not admit of a comparison being made with recent types. A lower jaw, however, of an animal at
least 6 years old had a teeth area of 15.4 cms .-suggesting a horse larger than the Exmoor pony which, according to Pitt Rivers, has a teeth area of $14 \cdot 1$ cms. There are, besides, two sets of incisors-one belonging to an animal about 7 years old, and the other to an 'aged' horse.

## Conclusions.

From the foregoing analysis of the bones of the horse it will be seen that the bones of the limbs had to be depended upon for giving measurements from which we could form our conclusions with regard to the types of animals represented. A comparison of these measurements with those of recent types of horses appears to indicate that there must have existed in Britain during the Roman period at least three types of horses: (1) a type of about $14 \frac{1}{2}$ hands high at the withers, though two bones-one a tibia, and the other a metatarsal-seem to indicate a still larger type ranging from $14 \frac{1}{2}$ hands to about 15 hands; (2) a type approaching very closely to the New Forest pony, that is, a horse about $12 \frac{1}{2}$ hands high; and (3) a small-sized animal about as large as the Exmoor pony (in some cases slightly less, and in others slightly greater), that is to say, an animal about $11 \frac{1}{2}$ hands high at the withers.

We would point out that there were, besides the bones given in the tables, 4 pastern bones, 3 coronet bones, and a single sacrum, but we did not think that it would serve any useful purpose to put these with their measurements in separate tables. One interesting feature, however, must be noted with regard to a small pastern (measuring 6.2 cms . long, and having a breadth of the lower articulating surface, 3 cms .), namely, the occurrence on its anterior surface of an indentation similar to those found on the skull of the ox (p. 247).

Table 1.-Horse (in College Museum). Height, $14 \frac{1}{2}$ Hands.

| Scapula- | L. | R. | Innominate - | L. | R. |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Length ... | 33.5 | 35.5 | Ilium | $24 \cdot 2$ | 24.2 |
| Neck | $6 \cdot 7$ | 6.7 | Acet | $6 \cdot 5$ | $6 \cdot 5$ |
| Glenoid ... | 6 | 6 | Ischium ... | $13 \cdot 1$ | $13 \cdot 1$ |
| Humerus - |  |  | Femur- |  |  |
| Length | 29.2 | $29 \cdot 3$ | Length .. | $36 \cdot 3$ | $36 \cdot 3$ |
| Condyles | $7 \cdot 8$ | $7 \cdot 8$ | Condyles | 8 | 8 |
| Radius - |  |  | Tibia - |  |  |
| Length | $34 \cdot 9$ | $35 \cdot 2$ | Length | $35 \cdot 5$ | $35 \cdot 5$ |
| Lower art'n | $6 \cdot 5$ | 6.5 | Lower art'n | 5.9 | $5 \cdot 9$ |
| Metacarpus- |  |  | Metatarsus - |  |  |
| Length ... | $23 \cdot 7$ | $23 \cdot 7$ | Length ... | 27.4 | 27.4 |
| Lower art'n | 5 | 5 : | Lower art'n | $4 \cdot 8$ | $4 \cdot 8$ |

Table 2.-Scapula (Horse).

|  | Left. |  |  | Riaht. |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| No | Length. | Neck. | Glenoid | No. | Length. | Neck. | Glenoid. |
|  | - |  |  |  |  |  |  |
| 1 | - | $5 \cdot 4$ | 4.9 | 1 | - | 6.7 | 6 |
| $\mathbf{2}$ | - | 6 | - |  |  |  |  |
| 3 | - | 6 (ca.) | - |  |  |  |  |

Table 3.-Humerds (Horse).

| Rrgent |  |  | Left. |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| No. | Length. | Condyles. | No. | Length. | Condyles. |
| 1 | - | $6 \cdot 6$ | 1 | $21 \cdot 7$ | $5 \cdot 5$ |
| 2 | - | 7 | 2 | $24 \cdot 5$ | $6 \cdot 3$ |
| 3 | 28.5 | $7 \cdot 2$ | 3 | - | $6 \cdot 5$ (ca.) |
| 4 | 28 (ca.) | $7 \cdot 3$ (ca.) | 4 | $27 \cdot 1$ | 6.6 |
| 5 | - | $7 \cdot 8$ | 5 | $27 \cdot 3$ | 6.9 |
| 6 | - | - | 6 | - | $6 \cdot 9$ (ca.) |
|  |  |  | 7 | $25 \cdot 7$ | 7 ( |
|  |  |  | 8 | 28 (ca.) | 7 (ca.) |
|  |  |  | 9 | - | 7.5 |
|  |  |  | 10 | - | $7 \cdot 6$ |

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Table 4.-Radius (Horse).

| Left. |  |  | Right. |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| No. | Length. | Lower Art. Surf. | No. | Length. | Lower Art. Surf. |
| 1 | - | $5 \cdot 2$ | 1 | $29 \cdot 2$ | $5 \cdot 3$ |
| 2 | 31 (ca.) | $5 \cdot 5$ | 2 | $30 \cdot 1$ | $5 \cdot 5$ |
| 3 | 33 | $6 \cdot 4$ | 3 | - | $5 \cdot 5$ |
| 4 | - | 6.4 | 4 | 32 | $5 \cdot 9$ |
| 5 | $33 \cdot 6$ | - | 5 | $33 \cdot 9$ | 6 |
|  |  | . | 6 | . - | 6 |
|  |  |  | 7 | - | $6 \cdot 4$ (ca.) |

Table 5.-Metacarpus (Horse).

| Left. |  |  | Right. |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| No. | Length. | Lower Art Surf | No. | Length. | Lower Art. Surf. |
| 1 | 22 | - | 1 | 21-7 | 4 ${ }^{\text {² }}$ |
| 2 | - | $4 \cdot 3$ | 2 | $22 \cdot 4$ | 4.5* |
| 3 | $22 \cdot 3$ | 47 | 3 | $23 \cdot 2$ | $4 \cdot 5^{*}$ (ca.) |
| 4 | $22 \cdot 4$ | $4 \cdot 7$ | 4 | - | $4 \cdot 7$ |
| 5 | 233 | 5 | 5 | 23 (ca.) | 5 |
| 6 | $23 \cdot 5$ | 5 | 6 | , | 5 |
| 7 | $22 \cdot 6$ | $5 \cdot 2^{*}$ |  |  |  |

* Diseased.

Table 6. - Innominate (Horse).

| Left. |  |  |  | Right. |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| No. | "1." | "2." | "3." | No. | "1." | "2." | "3." |
| 1 | $18 \cdot 5$ (ca.) | $5 \cdot 1$ | 11 (ca.) | 1 | $18 \cdot 5$ (ca.) | $5 \cdot 1$ (ca.) | 11 (ca.) |
| 2 | 20.2 (ca.) | $5 \cdot 5$ | - | 2 | (8. ${ }^{\text {(ca.) }}$ | $5 \cdot 2$ | ) |
| 3 | - | $5 \cdot 5$ | - | 3 | - | $5 \cdot 5$ | - |
| 4 | - | $5 \cdot 5$ | - | 4 | - | $6 \cdot 5$ | - |

Table 7.-Femur (Horses).

| Lefir. |  |  | Right. |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| No. | Length. | Lower Art. Surf. | No. | Length. | Lower Art. Surf. |
| 1 | $33 \cdot 9$ | 8 | 1 | - | $7 \cdot 3$ |
| 2 | - | 8 | 2 | -. | 9 |
| 3 | - | $8 \cdot 5$ | 3 | - | - |
| 4 | 36.4 | $8 \cdot 8$ (ca.) | 4 | - | - |
| 5 | - | - |  |  |  |

Table 8.-Tibia (Horse).

| Left. |  |  | Right. |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| No. | Length. | Lower Art. Surf. | No | Length. | Lower Art. Surf. |
| 1 | $29 \cdot 3$ | $4 \cdot 3$ | 1 | $30 \cdot 9$ | $4 \cdot 5$ |
| 2 | - | $4 \cdot 5$ | 2 | - | 5 |
| 3 | - | $4 \cdot 5$ | 3 | -- | 5 |
| 4 | -- | 5 (ca.) | 4 | $33 \cdot 6$ | 5 |
| 5 | - | 5 | 5 | $37 \cdot 9$ | $5 \cdot 5$ |
| 6 | -. | - | 6 | - | $5 \cdot 5$ |
| 7 | - . | $5 \cdot 2$ | 7 | - | $5 \cdot 5$ |

Table 9.-Metatarsus (Horse).


Table 10．－Skull（Horse）．

| No． | $\begin{gathered} \text { Length } \\ \text { of One } \\ \text { Condyle. } \end{gathered}$ | $\begin{gathered} \text { Width } \\ \text { off } \\ \text { Coydyles. } \end{gathered}$ | $\begin{gathered} \text { Crest } \\ \text { tot } \\ \text { Basion. } \end{gathered}$ | Area of Teeth， Upper Jaw， Pre Molars． | A rea of Teeth． Lower Jaw， Pre Molars． | Condyle to Ant．Tip of Lower Jaw． |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1907. |  |  |  |  |  |  |
| 1 | － | － | － | － | － | －－ |
| 2 | $4 \cdot 8$ | $8 \cdot 3$ | 10 | －－ | － | － |
| 3 | $4 \cdot 1$ | 75 | 9 | － | － | － |
| 4 | － |  | － | － | － | － |
| 5 | － | － | － | 11.5 | － | － |
| 6 | － | － | － | － | 15 | 38.5 |
| 7 | － | － | － | － | － | － |
| 8 | － | － | － | － | 二 | － |
| 9 10 | － | 二 | － | － | $\overline{15 \cdot 4}$ | － |
| 11 | － | 二． | － | － | 154 | － |

THE OX．
Bos taurus，var．longifrons（Owen）and Bos sylvestris（sp．nov．）．
As has already been made apparent in the introduction，by far the greater quantity of bones submitted to us belonged to the ox．The measurements of these will gain in importance if we first present for comparison a series of measurements refer－ ring to recent animals．It will be seen from table $1(\mathrm{Ox})$ ，that we have a complete set of measurements for a Chillingham bull and a Chillingham cow－the skeleton of the bull being in the Natural History department of Armstrong college，and that of the cow in the Hancock museum．A complete set of measure－ ments was also available from a Shorthorn cow in the College museum，as well as from the skulls of a Welsh bull，a Highland bull，and a Kerry cow，also in the College museum．With regard to bones other than those of the skull of the Kerry cow， we have added the measurements given by Pitt Rivers for a recent Kerry cow．We shall now indicate briefly the nature of the measurements which have been made in the case of both the recent and the corstopitum bones．

The Scapula: The greatest diameter of the glenoid cavity, the least diameter of the neck, and, when possible, the length from the glenoid cavity along the spine to the dorsal border.

The Humerus: The width of the condyles, and, when possible, the greatest length between the articular surfaces.

The Radius: The width of the lower articular surface, and, when possible, the length.

The Metacarpus: The width of the combined lower articular surfaces, and, when possible, the length between the proximal and distal articular surfaces.

The Innominate: In so far as the corstopitum material was concerned it was possible to measure only the acetabulum, but the recent material was measured in the following manner:
(1) From the crest of the ilium to the anterior border of the acetabulum-'Ilium.'
(2) The diameter of the acetabulum from the anterior border to the lower lip of the notch-'Acet.'
(3) From the latter to the most posterior point of the ischium-'Ischium.'
The Femur : The width of condyles, and, when possible, the length between the two articular surfaces.

The Tibia: The width of the lower articular surface, and, when possible, the extreme length.

The Metatarsus: The width of the combined lower articular surfaces, and, when possible, the extreme length.

## The Skull:

Top: (1) Distance between horn cores measured along the poll.
(2) Length of horn cores measured without reference to curve.
(3) The diameter of the horn cores at their base; that is to say, at the base of the rough portion of the
core. This gives the greatest width of the horn core measured sub-parallei to the plane of the frontal bone.
(4) The least width of the frontals. This measurement is made between the horns and orbits on either side, and is distinguished in the following tables under the word 'frontals.'
(5) The width of frontals between the posterior borders of the orbits. (With regard to (1), (4), and (5) it was sometimes necessary in the case of the Roman material to measure to the middle of the frontal bone and then to double it. This was also the case with regard to the measurement about to be specified-no. (7).
(6) The longitudinal distance between the poll and a line drawn between the posterior borders of the orbits. When it was possible $\frac{(6) \times 100}{(4)+(5)}$ was found to furnish a number which was characteristic not only of sex, but also of variety and species.
(7) The distance between the horn cores, posteriorly.

Back: (1) Width between the lower edges of the horn cores.
(2) Extreme width between the condyles.
(3) Width of foramen magnum.

Base: (1) Length from lower lip of foramen (basion) to the suture between the maxillae and palatines.
(2) From the latter to the anterior end of the premaxillae.
Teeth: Upper jaw-The whole length of the molar teeth or of the molar alveolar area.
Lower jaw--The whole length of the molar teeth or of the molar alveolar area. Also, when possible, the length from the condyle to the tip.

In table 2 (Ox), the whole of the bones referable to the ox as thus analysed, are presented. It shows that the number of cattle represented by the bones sent in from corstoritum reached at least to $188 .{ }^{3}$ This number was arrived at by carefully separating out the remains of the skulls into right and left regions, and it is doubtless not very far from being correct, seeing that the greater number in the two columns must represent separate animals. Next to the bones of the skull, the scapulae were most numerous, portions or almost complete bones belonging to 152 animals being found. The metatarsal represented 108, the metacarpal 95 , the humerus 67 , the tibia 51 , the radius 48 , the innominate 25 , and the femur 15 cattle. For some reason, therefore, the skull is the most numerously repre-sented-the horn cores appear to be very resistant-and the femur and innominate the least.

In the following tables referring to the bones in detail the bones are arranged for each year, as far as possible, according to size ${ }^{4}$

| Year. |  | Left. | Right. |
| :---: | :---: | :---: | :---: |
| 1906 | .. | 0 | 0 |
| 1907 | $\cdots$ | 0 | 2 |
| 1908 | . | 7 | 8 |
| 1909 | . | 0 | 0 |
| 1910 | .. | 6 | 10 |
| $\ldots \ldots$ | 13 | 20 |  |
|  |  |  |  |

The Scapula: In the case of the scapula two well marked varieties were at once apparent: (i) a light, graceful bone, evidently belonging to an animal capable of considerable speed, and characterised by a 'neck' which was narrow when compared with the diameter of the glenoid, and (ii) a
${ }^{3}$ Of these (based on the skulls) 13 belonged to Bos sylvestris. But 20 of the latter are accounted for by scapulae. Hence the numbers in the first table.
${ }^{4}$ We have given the analyses according to the years of excavation in the subsequent tables also, so that reference to the different areas explored may be made.

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heavier and larger bone not differing in form from that of the present day domesticated varieties. In the table the former are shown first under each year and a line is drawn between them and the second variety in each case. To sum up, the above figures with reference to the first variety are abstracted from the table (p. 233).

There were at least, therefore, some 20 animals with this variety of scapula represented. The glenoid measured from 4.2 cms . to 5.5 cms , and was therefore smaller than that of the Chillingham of the present day, and


FIG. 1.--PHOTOGRAPH OF SCAPULAE OF OX.
Top row, right: all domesticated.
Bottom row, left: 226 and 229 wild-the first and the third.
of all our domesticated varieties. The ' neck' measured from 3.5 cms . to 4.7 cms ., and was therefore smaller than the corresponding measurement of the Chillingham and the other varieties, but apart from the difference in size, the scapulae agree in all respects with those of the Chillingham, and differ in the characters above mentioned as being also common to the Chillingham, from those of all other cattle.

The diameter of the glenoid cavity in the case of the domesticated types varies from 4.5 cms . to 6 cms ., and thus these measurements include animals
less than, equal to and greater than the Chillingham. The least width of the ' neck' varies from 3.9 cms . to 6.2 cms ., giving the same features with regard to size.

Summing up from the scapula alone, we may gather that there were (1) a small variety identical with the Chillingham of the present day, but slightly smaller, and (2) a domesticated variety varying in size from an animal rather smaller than the Chillingham, to one nearly as large as the Shorthorn.


Fig. 2. - HUMERUS OF ox.
Top row, right. Bottom row, left.
The Humerus: As will be seen from table $4(\mathrm{Ox})$, there were only 4 specimens that admitted of comparing the length with the breadth of condyles, and in these cases the ratios were $3 \cdot 5: 1,3 \cdot 3: 1,3 \cdot 3: 1,3 \cdot 4: 1$-very similar to those of the Chillingham cow and the Shorthorn cow. Again there could be distinguished a narrow fine variety, and a variety more comparable to the domesticated animals of the present day, but we have not felt justified in attempting to rigidly separate the two. The condyles vary from 4.7 cms . to
7.8 cms ., and this is sufficient to show that here again there are included animals as small as the Chillingham, and also animals almost as large as the Shorthorn.

The Radius: There were altogether 34 specimens of the left radius, and 32 of the right, from which it was possible to obtain one or both measurements, and as we measured only those possessing a lower articulating surface, we concluded that there were at least 34 individual animals represented-not counting 'scrap' material, some of which at least belonged to the bones


FIG. 3.-RADIUS OF OX.
Top row, right. Bottom row, left.
which were measured. When the lengths were compared with the breadths of the lower articulating surfaces ic was observed that many of the bones again represented those of a somewhat thick set type of animal suggesting the domesticated Bos of the present day, while some evidently belonged to a more graceful and fine-limbed variety akin to the Chillingham. On working out the ratios of length to breadth of articulating surface, we found that we could not be justified in rigidly separating what seemed from a cursory examination to be the bones of two variebies of animal.

The Metacarpus: The average length of the total number of metacarpals is, for the left limb 18.4 cms ., and for the right 18.2 cms ., while the average width of the lower articulating surface is, for the left 5.4 cms ., and for the right 56 cms . Hence a reference to table $1(\mathrm{Ox})$ seems to show that, if we consider only the average length of metacarpal, an animal resembling the Kerry cow, as given by Pitt Rivers, is generally represented. The width of the lower articulating surface of the metacarpal of the Kerry cow is not given by him, but the averages mentioned above for this measurement


FIG. 4. - METACARPALS OF ox.
Top row, right. Bottom row, left.
were obtained from widths smaller than those of the Chillingham and greater than those of the Shorthorn. Some of those bones giving the smaller averages may have belonged to a male domesticated type, but others had an appearance more comparable to the corresponding bones of the Chillingham bull and cow. Indeed, the widths of some of these latter gave with their lengths ratios which seemed to indicate that they represented the metacarpals of an animal equal to and less than the Chillingham.

The Innominate: As will be seen from table $7(\mathrm{Ox})$ the only measurement possible from the material sent in was that relating to the acetabulum. It is also evident from the table that the number of bones giving this single measurement is very small compared with the number of animals represented otherwise in the excavations, so that a proper comparison with the corresponding bones of recent animals can scarcely be made with confidence. As, however, the measurements varied from 4.3 cms . to 5.3 cms . we may point out that even those innominates with a larger size of acetabulum evidently


FIG. 5. -FEMUR OF ox.

$$
\text { Top row, right. } \quad \text { Bottom row, left. }
$$

belonged to an animal less than the present day Shorthorn (the measurement for which is given in table $1(\mathrm{Ox})$ as 6.5 cms .), and greater than the Chillingham bull, while the smaller innominates approach in size to the innominate of the Chillingham bull, which is given as $4 \cdot 1 \mathrm{cms}$. for the left, and 4.6 cms . for the right.

The Femur: Reference to table $8(\mathrm{Ox})$ will show that, owing to the exceedingly fragmentary nature of the specimens, only one femur allowed of a comparison between length and breadth of condyles. In this single case the
length was 37 cms . while the breadth of the condyles was 9 cms . This length corresponds with that of the Shorthorn cow (table 1, Ox), but the breadth of condyles is less than that of the corresponding bone of the Shorthorn cow by 2.5 cms . It will therefore be seen that nothing of value could be deduced from the specimens of femur submitted to us.

The Tibia: Although there were 37 left tibia bones and 41 right, very few of them, as will be observed from table 9 ( Ox ), were so complete as to furnish the two measurements. The lengths, however, obtainable, ranged

fig. 6. -tibia of ox. Top row, right. Bottom row, left.
from 28.5 cms . to 35.3 cms . in the left limb, and from 28.7 cms . to 36.5 cms . in the right. The breadth of the lower articulating surface varied from 4.5 cms . to 6.8 cms . in the left limb and, in the right, from 4.5 cms . to 6.6 cms . As so few measurements of lengths could be obtained, however, the average breadths of the lower articulating surfaces would seem to give a better indication of size with regard to the general type of animal represented. This measurement was, in the case of the left tibia, 5.4 cms ., and, in the case of the right, 5.3 cms . The width of the lower articulating surface as given for the tibia
of the Chillingham cow, in table $1(\mathrm{Ox})$, is 5 cms . and for that of the Chillingham bull, 4.9 cms . Hence the widths ranging from 4.5 cms . to 5 cms . at least (table 9, Ox) would represent a type less than and equal to the Chillingham cow, and decidedly less than the average type represented. But if we take into account even the few lengths obtainable, it will be seen by a reference to table $9(\mathrm{Ox})$ that the following, viz., $28.5,28.5$ in the left column and 28.7 , $29 \cdot 5,29 \cdot 7,30 \cdot 5$ in the right-all belonging to the small widths of lower articulating surface-are also less than the lengths given in table 1 ( $O x$ ) for


FIG. 7.-METATARSALS OF OX.
Top row, right. Bottom row, left.
the tibia bones of the Chillingham cow and the Chillingham bull. Taking the other lengths in the same way we find that some approach much more closely to those of the Chillingham cow and bull, e.g., $31 \cdot 5,32,32 \cdot 1$ in the left, and $31 \cdot 5,31 \cdot 8,32 \cdot 5$ in the right, while of the two greatest lengths obtainable one is exactly the length of the present day domesticated Bos (Shorthorn, table $1(\mathrm{Ox})$ ), the other being only 1.3 cm . less.

The Metatarsus: There were 76 left and 70 right metatarsals examined, so that we may assume that approximately 76 animals were represented. The
lengths varied from 19.4 cms . to 24.4 cms . in the left, and from 18.1 cms . to 22.8 cms . in the right, while the breadths of the lower articulating surfaces varied from 4.3 cms . to 6.5 cms . in the left, and from 4.2 cms . to 6.5 cms . in the right (table 10, Ox). The length given for the corresponding bone of the Chillingham cow is 20.5 cms ., and the breadth of the lower articulating surface, 5 cms . for both right and left limbs, as will be seen in table 1 .(Ox) where for the Shorthorn cow the measurements are given as: length, $24 \cdot 5^{\circ}$ cms., and breadth of articulating surface, 6.2 cms . for both right and left limbs. Comparing the metatarsal bones in question with these one sees that, in so far as the metatarsal is concerned, many of the bones represent an animal less than the Chillingham, while the others present a great many variations in size from a type of metatarsal comparable with that of the Chillingham to one very closely resembling that of the present day Shorthorn. These numerous variations in size seem to us to indicate what has already been referred to elsewhere in this analyses of the bones from corstopitum, namely, the many different types of domesticated Bos that existed in Britain during the Roman period.

The Skull: The foregoing analysis of the bones of the limbs has shown that the cattle of the Roman period varied greatly, and the variation is not such as can be ascribed generally to age and growth. The smaller bones of the domesticated type approach in general structure to those of the small Chillingham, but certain differences appear as in the case of the scapula; and a more rigorous investigation of the other bones would doubtless disclose still more definitely the finer, more delicately built frame of the wild species.

In the case of the skull there is one feature common to a portion of the Roman remains, which associates them with the Chillingham, but which distinguishes them in so far as we know, from all other members of Bos. This feature is the absence, at all events in adults, of the first lower pre-molar tooth.

This was known to one of us some years ago, and was pointed out in the preliminary note on the Roman remains. It was noted at the same time that a lower jaw from the excavations at the Chesters, now in the Hancock museum, presented this
character. Table $2(\mathrm{Ox})$ shows that in the total of some 188 cattle, lower jaws with five teeth occurred as follows :


There were at least 13 oxen represented, possessing this peculiarity in the lower jaw, or 14, if one with a small alveolus for a rudimentary first pre-molar be counted. We are not dealing with an accidental variation, but with a feature which is characteristic of the present-day representatives of which we have specimens; and Dr. Ridewood informed us some years ago that those in the British museum are in the same condition.

The presence of these lower jaws amongst the corstopitum remains, and the presence also of other bones so closely similar to those of the Chillingham, but.differing from those of all other British cattle indicate as clearly as possible that the wild cattle still living at Chillingham, and in a sadly reduced condition elsewhere in this country, were represented during the Roman period. Moreover, they were so similar in form and size to the present-day Chillingham, that there can be no question as to their having been wild. We shall give presently a fuller description of an animal which, it is clear, is not a variety of Bos taurus, but is worthy of specific rank.

In the measurements here given, the skulls referable with this exception to Bos taurus var. longifrons have been divided into male, female, and doubtful. There was usually little difficulty in distinguishing between the sexes, even if only the horn cores were taken into consideration. In the males the
cores are more massive and spring from a stronger, betterdeveloped base. In the females they may be as long as those of the males, but they are thinner and more weakly built, although in this respect they would be approached by the horn cores of steers.

We desire, also, to draw attention to the formula given in table 2 and in table 1 , which appears to separate satisfactorily the sexes, and at the same time to illustrate to some extent the character of the skull. This formula, when employed with reference to the recent skulls in our possession yields the following results:

|  |  |  |  |  | Male. |
| :--- | :---: | :---: | :---: | :---: | :---: |
| Chillingham | $\ldots$ | $\ldots$ | $\ldots$ | 31.8 | 36.2 |
| Shorthorn | $\ldots$ | $\ldots$ | $\ldots$ | - | 38.6 |
| Welsh $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $44 \cdot 5$ | - |
| Highland | $\ldots$ | $\ldots$ | $\ldots$ | $39 \cdot 7$ | - |
| Kerry $\quad \ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | - | $44 \cdot 2$ |

The Bos taurus var. longifrons varied in the case of males from 39 to $42 \cdot 7$, and in the case of females from 43 to 47.8 .

A glance over the measurements given in table 2 in comparison with those given in table 1 will show that while the majority were smali animals, including both species, some approached the .size of the present-day cattle.

Teeth: The upper molars present, as in modern British breeds, four crescent columns, and an anterior internal column which, from its low condition, comes late into wear, and which is then almost immediately connected with the anterior median column near the junction of the latter with the posterior median column. The anterior internal column becomes smaller with wear, but persists to the old condition. Bos taurus agrees with Bos primigenius in all these characteristics, which are therefore generic rather than specific. Bos sylvestris, however, not only differs with regard to the pre-molars of the lower jaw, but departs from the Bos taurus type in the weak development of the

244 report of the igio excavations at corstopttum:
anterior internal column. All appear to be in agreement with regard to the degree of development of the lower jaw molars and the accessory external column.

Two species were represented: Bos taurus var. longifrons (Bos brachyceros, Rütimeyer), and Bos sylvestris.

Bos taurus var. longifrons (Owen) : This is usually described as a small species, and while in general it was small compared with living domesticated breeds, there was a great variety in size-ranging from animals of about the Chillingham build to that of the Shorthorn. The crest or poll of the skull is usually produced into a median prominence, and this prominence is excavated medianly by the parietal. Again, variations are presented from a well-marked prominence to an almost straight crest. The horns are relatively short, and are directed only at a slight angle with the plane of the frontal-about 10 degrees. They are usually directed outwards and forwards, but some, again, are directed outwards and not at all or only slightly forwards, these latter probably belong to the next species.

The greatest length of frontal as compared with the least breadth is $1 \cdot 4-1 \cdot 5: 1$. The ratio of the length of the temporal fossa to the height is $1 \cdot 3-1 \cdot 4: 1$.

The teeth are as in the present-day domesticated cattle, $\frac{0}{3}, \frac{0}{1}, \frac{3}{3}, \frac{3}{3}$. The upper molars with an anterior internal column coming late into wear. The first pre-molar of the lower jaw present.

Distribution: The common domesticated ox of the Roman period-as evidenced by such excavations as have been carried out at corstopitum-was common in Britain in the pre-historic period, as shown by the remains discovered in peat bogs alluvium, caves, brocks, earth-houses, kitchen middens, and lake dwellings. It co-existed with the Irish elk in Ireland, and was common in Scandinavia and Europe generally.

It is extremely like Nilsson's Bos frontosus, and some of the specimens from Corstopitum might be referred to that variety.

As a matter of fact the existence of the varieties described under different names, and differing in size, shows that already in prehistoric times much variety occurred.

Bos sylvestris (sp. nov.) : The living representatives, as illustrated by the Chillingham herd, are white in colour just after birth, becoming creamy-white later. The ears or the tips of the ears are brown. The end of the tail may be black. The muzzle and hoofs are black and the horns are white, and may have black tips. There is no question that some of the characters have been artificially preserved by whatever tradition or fashion directed by the elimination of those not in agreement with the pattern. But such facts as we have point to a general creamywhite colour with black muzzle and hoofs, and the black colour may also appear in other situations than those mentioned, especially in older animals. Their wild condition is associated with such habits as the power of taking advantage of irregularities in the ground in effacing themselves, and the cows biding their calves, and they have a wild cry very different from the lowing of domesticated breeds. The skin is thinner than in domesticated forms, and is said also to be white in colour. The bulls show evident traces of a mane. The horns are unimportant as defining a species and exhibit a great amount of variety, when different herds are contrasted. They are subject to variation, according to the fashion or tradition of the herd.

Pennant, referring in 1792 to the wild cattle of Scotland, gives the weight of bulls of the Scotch and Chillingham herds as 38 stones and of cows 28 stones ( 532 lbs . and 392 lbs . respectively).

The late Earl of Tankerville, in his pamphlet on the wild cattle, states that the average weights of wild cattle killed from 1862 to 1889 were : bulls 560 lbs., cows 420 lbs., steers 570 lbs. The earlier ones were therefore rather smaller and approximated more closely to those of the Roman period. See also Meek, The Veterinarian, 1900.

The contrast between these (v. Meek, loc. cit.) may be shown by stating that at all periods of life the domesticated breeds are heavier, Shorthorn bulls at 3 years old weighing some 2,200 lbs., and cows 1,850 . lbs. on the average.

They have, therefore, from Roman times preserved their small size and wild deer-like structure.

It is not necessary to give here the historical evidence for the presence of wild cattle in Britain since the Roman period. We have such records as that of Boethius as to the presence of wild cattle in such unenclosed woods as the Caledon wood, and we have accounts of numerous herds in the later enclosed parks in different parts of Scotland and England, now, unfortunately, reduced to about three, namely, Chillingham, Cadzow, and Somerford, in which latter we understand the cattle are polled and tame. From the descriptions of Boethius and successive writers, it is clear that they have preserved the general characters above referred to, and their wild nature.

Thus we have now a continuous record of the presence of wild cattle, from the times of the Romans to the present day, and these have preserved in a remarkably pure manner characters peculiar to them, which they do not appear to share with any other species of Bos.

The question now arises-is there any evidence of the presence of this species antecedent to the Roman period? There is none which, so far as we know, has as yet been described, but two or three skulls and a metatarsal from the alluvium of the Tyne, are nearly akin in structure to those of Bos sylvestris of the Roman period and to the Chillingham cattle. The metatarsal measures exactly the same length as that of the present-day Chillingham cow and is identical with it in shape.

The horns, likewise, were quite short. The skulls are the same in general appearance and agree remarkably in measurement. The length of the temporal fossa to the height, as in the

Chillingham, is as $3 \cdot 6: 1$. The angles measured in contrast in different planes are identical, or approximately so.

The teeth $\left(\frac{0}{3}, \frac{0}{1}, \frac{3}{2}, \frac{3}{3}\right)$ in the species, as already stated, have the remarkable feature of the absence of the first pre-molar in the lower jaw.* The molars of the upper jaw have a smaller anterior internal column than that found in longifrons and the domesticated forms; this column appears to be absent from the third molar.

The conclusion is therefore that the native cattle, prior to, during, and after Roman times were domesticated breeds running into a great variety of size, and a wild species which has remained-thanks originally to the wild condition and later to the owners of the parks in which they were enclosed-practically pure.

Reference may also in this connexion be directed to the difficulties experienced in crossing the Chillingham with the Shorthorn in experiments made from 1875 to 1890 (v. The Chillingham Wild Cattle, by the Earl of Tankerville, 1891, p. 34).

The Urus (Bos primigenius) evidently became extinct in Neolithic times, and the Aurochs (Bison priscus) also in prehistoric times. Neither appears to have left any descendants in Britain. It would appear, therefore, that our modern breeds have all descended from the longifrons type, influenced to some extent perhaps by Bos sylvestris, and later by continental crossing.

There is one feature relating to the skulls to which we must draw attention, and that is, the presence in several of the skulls obtained from corstopitum, and likewise from the Chesters, of small openings about a quarter of an inch square, and usually occurring in great numbers. A few of the animals were

[^8]evidently killed by an instrument resembling a pole-axe, but the condition of the skulls now under consideration conveys the impression that the animals must have been tied up or driven into a fold and killed by javelins thrown at their heads. One of the skulls is reproduced on page 192 (fig. 40). It would be feasible to suggest that the holes had been made after death by the skulls having been used as targets, but against this supposition there has to be advanced the fact that two antlers were found that had been injured in the same way--the only part of the skull of the deer remaining-and also a pastern bone of the horse.

Table 1.-Ox-Measurements of Bones of Limbs of Cattle of the Present Day.

| Scapula - | Chillingham. |  |  |  | $\begin{gathered} \text { Shorthorn. } \\ \text { Cow. } \end{gathered}$ |  | Kerry. <br> Cow. |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Bull. |  | Cow. |  |  |  |  |  |
|  | R. | L. | R. | L. | R. | L. | R. | L. |
| Length | $30 \cdot 6$ | $30 \cdot 1$ | $31 \cdot 4$ | $31 \cdot 7$ | $3{ }_{6}^{6} \cdot 5$ | $37 \cdot 0$ | - | - |
| Neck | 39 | $3 \cdot 9$ | $4 \cdot 3$ | $4 \cdot 3$ | ${ }_{6} 6$ | 62 | -- | - |
| Glenoid... | $6 \cdot 1$ | $6 \cdot 1$ | $4 \cdot 7$ | 4.7 | ${ }^{6} \cdot 7$ | 6.9 | - | - |
| Length ... | $21 \cdot 0$ | $21 \cdot 2$ | 232 | $23 \cdot 2$ | $28 \cdot 6$ | $28 \cdot 6$ | $26 \cdot 2$ | $26 \cdot 2$ |
| Condyle... | $5 \cdot 3$ | $5 \cdot 3$ | 6.4 | 6.4 | $7 \cdot 6$ | 76 | 2 |  |
| Radius - $\qquad$ | $27 \cdot 3$ | 27.2 | $25 \cdot 2$ | $25 \cdot 2$ | $30 \cdot 5$ | $30 \cdot 5$ | $24 \cdot 9$ |  |
| Lower art. | $4 \cdot 4$ | $4 \cdot 2$ | $6 \cdot 0$ | $6 \cdot 0$ | $7 \cdot 5$ | $7 \cdot 5$ | 24.9 | $25 \cdot 1$ |
| Metacarpus- |  |  |  |  |  |  |  |  |
| Length :.. | - | 202 | 17.9 | 17.9 | 2.5 | 22.6 | $18 \cdot 3$ | $18 \cdot 2$ |
| Lower art. <br> Innominate - |  | $4 \cdot 4$ | $5 \cdot 4$ | $5 \cdot 4$ | 6.5 | 6.6 | -- |  |
| Length - Ilium ... | $17 \cdot 6$ | 16.6 | 22.5 | 22.5 | $27 \cdot 5$ | $28 \cdot 5$ |  |  |
| Acet. ... | $4 \cdot 6$ | $4 \cdot 1$ | $5 \cdot 2$ | $5 \cdot 0$ | 6.5 | 6.5 |  |  |
| Ischium ... | 16.0 | $15 \cdot 8$ | 192 | 19.7 | $25 \cdot 0$ | $25 \cdot 5$ | - |  |
| mur - <br> Length | 26.5 | 263 | 31.8 | 31.8 | 37.0 | $37 \cdot 0$ | $33 \cdot 4$ |  |
| Condyle... | $7 \cdot 0$ | $7 \cdot 1$ | 8 8.2 | $8 \cdot 1$ | 11.3 | $11 \cdot 3$ | $33 \cdot 4$ | $33 \cdot 4$ |
| Length | 31.2 | $31 \cdot 2$ | 32.2 | $32 \cdot 2$ | 37.0 | 37.0 |  |  |
| Lower art. ... | $4 \cdot 9$ | 4.9 | 5.0 | $5 \cdot 0$ | 6.5 | 6.7 | 29. | $29 \cdot 9$ |
| Metatarsus - |  |  |  |  |  |  |  |  |
| Length | 22.2 | 22.2 | 20.5 | $20 \cdot 5$ | 25.5 | $25 \cdot 5$ | $21 \cdot 2$ | 21.2 |
| Lower art. ... | $4 \cdot 0$ | $4 \cdot 0$ | $5 \cdot 0$ | $5 \cdot 0$ | 6.2 | 6.2 | 212 | 21 |

Table 11.-Sigull.


Table 1.-Ox-Skulls of Catile of the Present Day.

|  | Chillingham. |  | Shorthorn. |  | Welsh. |  | Highland. |  | Kerry. |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Skull. | M. | F. | M. | F, | M. | F. | M. | F. | M. | F. |
| Dorsal - |  |  |  |  |  |  |  |  |  |  |
| (l) Between horns . ... | 11 | $13 \cdot 7$ |  | $13 \cdot 7$ | 29. |  | $29 \cdot 8$ |  |  | $13 \cdot 5$ |
| (2) Diameter, horn ... ... | $6 \cdot 3$ | $4 \cdot 7$ |  | 5 | $6 \cdot 3$ |  | $7 \cdot 4$ |  |  | 5 |
| (3) Least width, frontal ... | $17 \cdot 1$ | $15 \cdot 6$ |  | 15:8 | $19 \cdot 4$ |  | $21 \cdot 3$ |  |  | $15 \cdot 5$ |
| (4) Width between fore-edge, orbits | $21 \cdot 15$ | $18 \cdot 4$ |  | $20 \cdot 5$ | $21 \cdot 7$ |  | 24 |  |  | $18 \cdot 6$ |
| (5) Poll to ' 4 ' $\ldots$ ' ... .. | $12 \cdot 15$ | $12 \cdot 3$ |  | 14 | $18 \cdot 3$ |  | 18 |  |  | $14 \cdot 4$ |
| $\frac{{ }^{\prime} 5^{\prime} \times 100}{6^{\prime} \times 4^{\prime}}$ | $31 \cdot 8$ | $36 \cdot 2$ |  | $38 \cdot 6$ | $44 \cdot 5$ |  | $39 \cdot 7$ |  |  | $42 \cdot 2$ |
| Posterior- . |  |  |  |  |  |  |  |  |  |  |
| (1) Between horns .. | $18 \cdot 2$ | $18 \cdot 2$ |  | $17 \cdot 6$ | $27 \cdot 3$ |  | $25 \cdot 1$ |  |  | 18 |
| (2) Between condyles ... | $11 \cdot 8$ | $9 \cdot 2$ |  | $10 \cdot 6$ | $12 \cdot 5$ |  | 11 |  |  | $9 \cdot 2$ |
| (3) Width for. mag. ... .. | $3 \cdot 6$ | $3 \cdot 6$ |  | $4 \cdot 7$ | 4 |  | $4 \cdot 1$ |  |  | $3 \cdot 5$ |
| (4) One condyle | $5 \cdot 7$ | $4 \cdot 8$ |  | $4 \cdot 8$ | $5 \cdot 8$ |  | $5 \cdot 4$ |  |  | $4 \cdot 5$ |
| Ventral- |  |  |  |  |  |  |  |  |  |  |
| (1) Basion to pal. suture (2) Pal. sut. to tip of p. ma | $20 \cdot 8$ 18.6 | $21 \cdot 4$ $18 \cdot 6$ |  |  | $26 \cdot 7$ $21 \cdot 2$ |  | $23 \cdot 6$ $19 \cdot 4$ |  |  | 225 $18 \cdot 2$ |
| (2) Pal. sut. to tip of p. ma. | $18 \cdot 6$ | $18 \cdot 6$ |  | $21 \cdot 1$ | 21.2 |  | $19 \cdot 4$ |  |  | $18 \cdot 2$ |
|  | $39 \cdot 4$ | 40 |  | $44 \cdot 6$ | $47 \cdot 9$ |  | 34 |  |  | $40 \cdot 7$ |
| Least basi., width occip.... | - | $3 \cdot 2$ |  | $2 \cdot 5$ | $3 \cdot 9$ |  | $\rightarrow$ |  |  | -- ${ }^{\text {- }}$ |
| (3) Width palatius ... ... | - | $\bigcirc$ |  | $8 \cdot 3$ | - |  | - |  |  | $7 \cdot 3$ |
| Least width, unt. pal. crest | - | 5 |  | $4 \cdot 8$ | $14 \cdot 5$ |  |  |  |  | $4 \cdot 9$ |
| Whole teeth area ... ... | $12 \cdot 2$ | $12 \cdot 5$ |  | 13 | 14:5 |  | $14 \cdot 3$ |  |  | $12 \cdot 3$ |
| Lower jaw - Whole teeth area | $12 \cdot 6$ | $12 \cdot 7$ |  | $14 \cdot 3$ | $15 \cdot 7$ |  | - |  |  | $13 \cdot 5$ |
| Condyle to ant: tip ... | $36 \cdot 4$ | $34 \cdot 1$ |  | $40 \cdot 3$ | 43 |  | - |  |  | $37 \cdot 5$ |

Table 2.-Ox.

|  | $190 \%$. | 1907. | 1908. | 1909. | 1910. | Total. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Scapnla .. $\{$ Right | - | 34 | 76 | 2 | 32 | 144 |
| Scapnla ${ }^{\text {a }}$, Left | 1 | 41 | 67 | 1 | 42 | 152 |
| Humerus ... \{ Right | - | 23 | 32 | 4 | 8 | 67 |
| Humerus $\cdots$ Left | - | 20 | 28 | 3 | 6 | 57 |
| Radius ... $\{$ Right | - | 24 | 14 | 4 | 5 | 47 |
| Radius $\cdots$ Left | 1 | 27 | 15 | 1 | 4 | 48 |
| Metacarpus $\{$ Right | - | 22 | 67 | - | 6 | 95 |
| Metacarpus $\{$ Left | - | 22 | 52 | 3 | 7 | 84 |
| Innominate $\{$ Right | - | 16 | 4 | 2 | 3 | 25 |
| Innominate $\{$ Left | - | 14 | 6 | 1 | 2 | 23 |
| Femur ... $\{$ Right | - | 10 | 2 | - | 2 | 14 |
| Femur $\cdots$, Left | - | 7 | 5 | - | 3 | 15 |
| Tibia ... $\left\{\begin{array}{l}\text { Right }\end{array}\right.$ | $\cdots \cdot$ | 20 | 16 | 4 | 7 | 47 |
| Tibia $\cdots$, Left | $\overline{-}$ | 22 | 19 | 6 | 4 | 51 |
| Metatarsus $\left\{\begin{array}{l}\text { Right }\end{array}\right.$ | 1 | 16 | 66 | $\cdots$ | 16 | 100 |
| Metatarsus - 1 Left | - | 23 | 73 | $\stackrel{1}{8}$ | 10 | 108 |
| Skull-Male .. | 4 | 26 | 43 | 8 | 19 | 100 |
| Female | 2 | 20 | 35 | 4 | 11 | 72 |
| Doubtful | 2 | . ${ }^{\text {. }}$ | - | 4 | 6 | 16 |
|  | 8 | 50 | 78 | 16 | 36 | 188 |

Table 3.-Ox-Scapula.

| Lefr. |  |  |  | Riaht. |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| No. | Length. | Neck. | Glenoid. | No. | Length. | Neck. | Glenoid. |
| 1907 |  |  |  | 1907. |  |  |  |
| 1 | - | - | $4 \cdot 6$ | 1 | - | $3 \cdot 6$ | - |
| 2 | -- | $3 \cdot 9$ | - | 2 | - | $3 \cdot 6$ | - |
| 3 | - | 4 | - | 3 | - | - | $4 \cdot 5$ |
| 4 | -. | $4 \cdot 2$ | - | 4 | - | $4 \cdot 8$ | $4 \cdot 5$ |
| 5 | - | $4 \cdot 2$ | - | 5 | - | $4 \cdot 1$ |  |
| 6 | - | $4 \cdot 3$ | - | 6 | - | $4 \cdot 3$ | - |
| 7 | - | $4 \cdot 4$ | - | 7 | - | $4 \cdot 4$ | $4 \cdot 6$ |
| 8 | - | $4 \cdot 4$ | - | 8 | - | $4 \cdot 8$ | $4 \cdot 6$ |
| 9 | - | $4 \cdot 5$ | - | 9 | - | $4 \cdot 5$ | -- |
| 10 | - | $4 \cdot 5$ | - | 10 | - | $4 \cdot 5$ | - |
| 11 | - | $4 \cdot 6$ | $4 \cdot 8$ | 11 | - | $4 \cdot 5$ | $4 \cdot 7 \mathrm{ca}$. |
| 12 | - | 4.2 | 4.9 | 12 | - | $4 \cdot 6$ | $4 \cdot 7$ |
| 13 | - | $4 \cdot 5$ | 5 | 13 | - | $4 \cdot 6$ | $4 \cdot 7$ |
| 14 | - | - | $5 \cdot 1$ | 14 | - | $4 \cdot 6$ | - |
| 15 | - | $4 \cdot 7$ | 51 | 15 | - | $4 \cdot 4$ | $4 \cdot 8$ ca. |
| 16 | - | $4 \cdot 7$ | - | 16 | - | $4 \cdot 7$ | $4 \cdot 9$ |
| 17 | - | $4 \cdot 7$ | - | 17 | - | $4 \cdot 7$ | - |
| 18 | -- | $4 \cdot 8$ | $\overline{5}$ | 18 | - | $4 \cdot$ | - |
| 19 | - | $4 \cdot 9$ | $5 \cdot 2$ | 19 | - | $4 \cdot 8$ | - |
| 20 | - | 5 | $5 \cdot 2$ | 20 | - | $4 \cdot 8$ | - |
| 21 | - | $4 \cdot 9$ | - | 21 | - | $4 \cdot 7$ | $5 \cdot 1 \mathrm{ca}$. |
| 22 | - | $4 \cdot 9$ | - | 22 | - | 5 | $5 \cdot 1 \mathrm{ca}$. |
| 23 | - | $4 \cdot 9$ | - | 23 | - | 5 | - |
| 24 | - | $5 \cdot 2$ | $5 \cdot 3 \mathrm{ca}$. | 24 | - | $5 \cdot 1$ | - |
| 25 | - | 5 | - | 25 | -- | $5 \cdot 4$ | - |
| 26 | - | $5 \cdot 1$ | - | 26 | - | $5 \cdot 8$ | $5 \cdot 8 \mathrm{ca}$. |
| 27 | -- | $5 \cdot 2$ | $5 \cdot 6$ | 27 | - | $5 \cdot 8$ | - |
| 28 | - | 5.5 | $5 \cdot 8$ | 28 | - | 6 | 6 |
| 29 | - | 5.5 | - | 29.32 | - | - | - |
| 30-39 | - | - | - |  |  |  |  |
| 1908. |  |  |  | 1908. |  |  |  |
| 1 | - | $3 \cdot 5$ | $4 \cdot 2$ | 1 | - | 4 | $4 \cdot 7$ |
| 2 | - | $3 \cdot 8$ | $4 \cdot 2$ | 2 | - | $4 \cdot 3$ | $4 \cdot 7$ |
| 3 | - | 4 | $4 \cdot 7$ | 3 | - | $4 \cdot 2$ | ca. $4 \cdot 9$ |
| 4 | _ | 43 | $4 \cdot 7$ | 4 | - | $4 \cdot 5$ | $5 \cdot 1$ |
| 5 | - | $4 \cdot 3$ | - | 5 | - | $4 \cdot 6$ | $5 \cdot 1$ |
| 6 | - | $4 \cdot 4$ | $4 \cdot 9$ | 6 | - | $4 \cdot 5$ | -- |
| 7 | -- | $4 \cdot 4$ | $5 \cdot 1$ | 7 | - | $4 \cdot 6$ | $5 \cdot 4$ |
| 8 | 31 | $4 \cdot 5$ | $4 \cdot 5$ | 8 | - | $4 \cdot 7$ | $5 \cdot 5$ |
| 9 | ca. 31 | $4 \cdot 4$ | - | 9 | $\checkmark$ | $4 \cdot 6$ | 4.5 |
| 10 |  | $4 \cdot 3$ | $4 \cdot 6$ | 10 | - | $4 \cdot 8$ | 4.5 |
| 11 | - | $4 \cdot 3$ | - | 11 | - | $4 \cdot 5$ | 4.6 |
| 12 | - | $4 \cdot 4$ | $4 \cdot 6$ | 12 | - | $4 \cdot 7$ | $4 \cdot 6$ |
| 13 | - | $4 \cdot 4$ | $4 \cdot 6$ | 13 | - | $4 \cdot 5$ | $4 \cdot 7$ |

Table 3:-Ox-Scapula.-Continued.

| Left. |  |  |  | Riaht. |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| No | Length. | Neck. | Glenoid | No. | Length. | Neck. | Glenoid. |
| 1908 | Continued. | $4 \cdot 5$ | $4 \cdot 6$ | 1908. |  | $4 \cdot 5$ | - |
| 14 |  |  |  | 14 |  |  |  |
| 15 | - | $4 \cdot 5$ | -- | 15 | - | $4 \cdot 5$ | $\overline{4 \cdot 8}$ |
| 16 | - 1 | $4 \cdot 5$ | $4 \cdot 7$ | 16 | - | $4 \cdot 3$ |  |
| 17 | - | $4 \cdot 5$ | $4 \cdot 7$ | 17 |  | $4 \cdot 4$ | $4 \cdot 8$ |
| 18 | - | $4 \cdot 6$ | $4 \cdot 7$ | 18 | - | $4 \cdot 5$ | $4 \cdot 8$ |
| 19 | - | $4 \cdot 6$ | - | 19 | - | $4 \cdot 7$ | 4.8 |
| 20 |  | $4 \cdot 6$ |  | 20 | - | $4 \cdot 8$ | $4 \cdot 8$ |
| 21 | - | $4 \cdot 7$ | - | 21 |  | $4 \cdot 9$ | 4.8 |
| 22 | - | $4 \cdot 7$ | - | 22 | - | $4 \cdot 6$ |  |
| 23 |  | . $4 \cdot 7$ |  | 23 | - | $4 \cdot 7$ | - |
| 24 | - | $4 \cdot 7$ | - | 24 |  | $4 \cdot 8$ | -- |
| 25 | -- | $4 \cdot 7$ | - | 25 | - | $4 \cdot 8$ | - |
| 26 | - | $4 \cdot 8$ | $4 \cdot 8$ | 26 | - | $4 \cdot 8$ | - |
| 27 |  | $4 \cdot 8$ | $4 \cdot 9$ | 27 | - | 4.5 | 55 |
| 28 | ca. $\overline{31} 5$ | $4 \cdot 8$ | -- | 28 | -. | $4 \cdot 8$ |  |
| 29 |  | $4 \cdot 8$ |  | 29 | - | $4 \cdot 8$ | 5 |
| 30 | - | $4 \cdot 8$ | - | 30 |  |  | 5 |
| 31 |  | $4 \cdot 8$ | $\overline{4 \cdot 9}$ | 31 | - | $\overline{4 \cdot 9}$ | 5 |
| 32 | - | $4 \cdot 9$ |  | 32 | - | $5 \cdot 2$ | 5 |
| 33 | - | 5 | $4 \cdot 9$ | 33 |  | $4 \cdot 9$ | - |
| 34 | - | 5 | -- | 34 | - | $4 \cdot 9$ |  |
| 35 | -- | 5 |  | 35 | - | $4 \cdot 9$ | - |
| 36 | - | 5 | - | 36 |  | $4 \cdot 9$ | $\overline{5 \cdot 1}$ |
| 37 | - | $4 \cdot 6$ | 5 | 37 | - | $4 \cdot 8$ |  |
| 38 | - | $4 \cdot 6$ | 5 | 38 | - | $4 \cdot 9$ | $5 \cdot 1$ |
| 39 | - | $4 \cdot 9$ | 5 | 39 | -- | $4 \cdot 8$ | $5 \cdot 2$ |
| 40 | -- | 5 | 5 | 40 | - | 5 | - |
| 41 | - | $5 \cdot 2$ | $5 \cdot 1$ | 41 | - | 5 | - |
| 42 |  | $5 \cdot 2$ | - | 42 |  | $5 \cdot 1$ | - |
| $\stackrel{3}{ }{ }^{4}$ | - - | $4 \cdot 9$ | $5 \cdot 5$ | 43 | - | $5 \cdot 1$ | --- |
| 44 |  | $5 \cdot 3$ | - | 44 | - | $5 \cdot 2$. | - |
| 45 | - | $5 \cdot 4$ |  | 45 |  | $5 \cdot 2$ | $5 \cdot 4$ |
| 46 | - | $5 \cdot 5$ | $5 \cdot 7$ | 46 | - | $5 \cdot 3$ | $5 \cdot 4$ |
| 47 | - | $5 \cdot 6$ | - | 47 | - | $5 \cdot 5$ | $5 \cdot 4$ |
| 48 | - | $5 \cdot 7$ | $5 \cdot 8$ | 48 | - | $5 \cdot 2$ | $5 \cdot 5$ |
| 49 | No meas | $5 \cdot 4$ | $\begin{aligned} & 5.9 \\ & 6.0 \end{aligned}$ | 49 | - | 62 | $5 \cdot 5$$5 \cdot 6$ |
| 50. |  | urements. |  | 50 | - | $5 \cdot 6$ |  |
| 51.67 |  |  | $6 \cdot 0$ | 51 | - | $5 \cdot 5$ | $5 \cdot 7$ |
|  | No meas | urements. |  | 52 |  | $5 \cdot 5$ | $\begin{aligned} & 5 \cdot 7 \\ & 5 \cdot 8 \end{aligned}$ |
|  |  |  |  | 53 | - | $5 \cdot 6$ |  |
|  |  |  |  | 54 |  | $5 \cdot 7$ | - |
|  |  |  |  | 55 | - | $5 \cdot 8$ | - |
|  |  |  |  | 56 | $\cdots$ | $5 \cdot 9$ | - |
|  |  |  |  | 57 | - | $6 \cdot 0$ | - |
|  |  |  |  | 58 | - | $6 \cdot 2$ | - |
|  |  |  |  | 59-76 | No meas urements. |  |  |

252 REPORT OF THE IgIO EXCAVATIONS AT CORSTOPITUM:
Table 3.-Ox-Scapola-Continued.

| Leet. |  |  |  | Right. |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| No. | Lengtb. | Neck. | Glenoid. | Nu. | Length. | Neck. | Glenoid. |
| 1909. |  |  |  | 1909. |  |  |  |
| 1 | 一 | $4 \cdot 1$ | - | 1 2 | - | $\begin{aligned} & 4 \cdot 5 \\ & 5 \end{aligned}$ | $\begin{aligned} & 4 \cdot 7 \\ & 5 \cdot 1 \end{aligned}$ |
| 1910. |  |  |  | 1910. |  |  |  |
| 1 | - | $4 \cdot 3$ | 5 | 1 | - | $4 \cdot 2$ | $4 \cdot 8$ |
| 2 | - | $4 \cdot 5$ | 5 | 2 | - | $4 \%$ | - |
| 3 | - | $4 \cdot 5$ | 5 | 3 | - | $4 \cdot 0$ | $4 \cdot 9$ |
| 4 | - | $4 \cdot 5$ | 5 | 4 | - | $4 \cdot 4$ | $4 \cdot 9$ |
| 5 | - | $4 \cdot 5$ | - | 5 | - | $4 \cdot 2$ | 5 |
| 6 | - | $4 \cdot 6$ | $5 \cdot 2$ | 6 | - | $4 \cdot 3$ | - |
| 7 | - | $4 \cdot 7$ | $4 \cdot 5$ | 7 | - | $4 \cdot 4$ | - |
| 8 | - | $4 \cdot 7$ | $4 \cdot 8$ | 8 | - | $4 \cdot 4$ | 5 |
| 9 | -- | $4 \cdot 5$ | - | 9 | - | $4 \cdot 5$ | 5 |
| 10 | - | $4 \cdot 6$ | $4 \cdot 9$ | 10 | - | $4 \cdot 6$ | $5 \cdot 1$ |
| 11 | - | $4 \cdot 8$ | $4 \cdot 9$ | 11 | - | $4 \cdot 2$ | $4 \cdot 3$ |
| 12 | - | $4 \cdot 6$ | - | 12 | - | $4 \cdot 5$ | - |
| 13 | - | $4 \cdot 6$ | 5 | 13 | -- | $4 \cdot 5$ | - |
| 14 | - | $4 \cdot 7$ | 5 | 14 | - | $4 \cdot 5$ | - |
| 15 | _ | $4 \cdot 8$ | 5 | 15 | - | 4.5 | - |
| 16 | - | $4 \cdot 9$ | 5 | 16 | - | $4 \cdot 5$ | - |
| 17 | - | 5 | 5 | 17 | - | $4 \cdot 5$ | $4 \cdot 7$ |
| 18 | - | - | 5 | 18 | -- | $4 \cdot 7$ | $4 \cdot 9$ |
| 19 | - | $4 \cdot 9$ | $5 \cdot 1$ | 19 | - | $4 \cdot 7$ | 5 |
| 20 | - | 5 | $5 \cdot 2$ | 20 | - | $4 \cdot 8$ | 5 |
| 21 | - | 5 | $5 \cdot 2$ | 21 | - | 5 | 5 |
| 22 | - | 5 | $5 \cdot 2$ | 22 | - | - | $5 \cdot 2 \mathrm{ca}$. |
| 23 | - | 5 | $5 \cdot 3$ | 23 | -. | $4 \cdot 9$ | $5 \cdot 4$ |
| 24 | - | $5 \cdot 1$ | - | 24 | 32 | $4 \cdot 9$ | $5 \cdot 5$ |
| 25 | - | $5 \cdot 2$ | - | 25 | - | $5 \cdot 1$ | $5 \cdot 5$ |
| 26 | - | $5 \cdot 4$ | - | 26 | - | $4 \cdot 9$ | - |
| 27 | - | $5 \cdot 5$ | $5 \cdot 4$ ca. | 27 | - | $5 \cdot 5$ | $5 \cdot 6$ |
| 28 | -- | $5 \cdot 6$ | $5 \cdot 6$ | 28 | - | $5 \cdot 4$ | - |
| 29 | - | $5 \cdot 5$ | $5 \cdot 9$ | 29 | - | $5 \cdot 4$ | - |
| 30 | - | 6 | $5 \cdot 9$ | 30 | - | $5 \cdot 6$ | 6 |
| 31 | $37 \cdot 5$ | $5 \cdot 8$ | - | 31 | - | $5 \cdot 7$ | - |
| 32. | - | $6 \cdot 1$ | 6 | 32 | - | - | - |
| 33 | - | $6 \cdot 2$ | 6 |  |  |  |  |
| 34 | - | $5 \cdot 7$ | $6 \cdot 2$ |  |  |  |  |
| 35 | - | $5 \cdot 8$ | $6 \cdot 2$ |  |  |  |  |
| 36 | - | $6 \cdot 1$ | $6 \cdot 5$ |  |  |  |  |
| 37-42 | - | $\ldots$ | - |  |  |  |  |

Table 4.-Humerus.


Table 5.-Radius.

| Left. |  |  | Right. |  |  | Left. |  |  | Right. |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| No. | Length. | $\begin{gathered} \text { Lower } \\ \text { Art. } \end{gathered}$ | No. | Length. | Lower Art. | No. | Length. | Lower Art. | No. | Length. | Lower Art. |
| 1906. |  |  | 1906. |  |  | 1908. |  |  | 1908. |  |  |
| 1 | ca $25 \cdot 5$ | - | - | - | - | 1 | - | $4 \cdot 8$ | 1 | - | $5 \cdot 1$ |
|  |  |  |  |  |  | 2 | ca $23 \cdot 4$ | $5 \cdot 5$ | 2 | $24 \cdot 2$ | $5 \cdot 1$ |
| 1907. |  |  | 1907. |  |  | 3 | - | ca. $5 \cdot 7$ | 3 | - | $5 \cdot 7$ |
|  |  |  |  |  |  | 4 | ca. 25.5 | $5 \cdot 7$ | 4 | 25 | $5 \cdot 7$ |
| 1 | 25 | 5 | 1 | 25 | $5 \cdot 2$ $5 \cdot 4$ | 5 | $25 \cdot 8$ | $5 \cdot 7$ | 5 | $26 \cdot 6$ | $5 \cdot 9$ |
| 1 3 | - | $5 \cdot 1$ $5 \cdot 2$ | 2 3 | - | 5.4 $5 \cdot 4$ | 6 | $26 \cdot 2$ | $5 \cdot 7$ | 6 | $27 \cdot 3$ | ca. 6 |
| 4 | - | 5.2 5.2 | 4 | $25 \cdot 3$ | $5 \cdot 4$ | 7 | - | $5 \cdot 8$ | 7 | - | 6 |
| 5 | - | $5 \cdot 5$ | 5 | - | $5 \cdot 5$ | 8 | - | ca. 6 | 8 | $\cdots$ | $6 \cdot 6$ |
| 6 | $25 \cdot 6$ | $5 \cdot 5$ | 6 | $25 \cdot 1$ | $5 \cdot 5$ | 9 | - | 6 | 9-14 | No | meas. |
| 7 | $25 \cdot 4$ | $5 \cdot 6$ | 7 | $25 \cdot 5$ | $5 \cdot 5$ | 10 | 32.5 | ca. 7 |  |  |  |
| 8 | $25 \cdot 5$ | $5 \cdot 6$ | 8 | $25 \cdot 6$ | $5 \cdot 6$ | 11 | $32 \cdot 5$ | 7 |  |  |  |
| 9 | - | $5 \cdot 6$ | 9 | $26 \cdot 7$ | $5 \cdot 7$ | 12.15 | No | meas. |  |  | . |
| 10 | $23 \cdot 9$ | $5 \cdot 7$ | 10 | - | $5 \cdot 8$ |  |  |  |  |  |  |
| 11 | 25 | $5 \cdot 7$ | 11 | . $26 \cdot 3$ | $5 \cdot 8$ | 1909. |  |  | 1909. |  |  |
| 12 | $25 \cdot 4$ | $5 \cdot 8$ | 12 | $26 \cdot 3$ | 6 | 1 | $26 \cdot 5$ | $5 \cdot 8$ | 1 | $24 \cdot 5$ | $5 \cdot 5$ |
| 13 | $25 \cdot 5$ | $5 \cdot 8$ | 13 | -- | $6 \cdot 2$ |  |  |  | 2 | $25 \cdot 2$ | - |
| 14 | $26 \cdot 5$ | $5 \cdot 9$ | 14 | - | $6 \cdot 5$ |  |  |  | 3 | - | - |
| 15 | - | 6 | 15 | - | $6 \cdot 5$ |  |  |  | 4 | -- | - |
| 16 | - | 6 | 16 | - | $6 \cdot 5$ |  |  |  |  |  |  |
| 17 | -- | 6 | 17 | 28 | - | 1910. |  |  | 1910. |  |  |
| 18 | $29 \cdot 2$ | $6 \cdot 8$ | 18 | $30 \cdot 3$ | $6 \cdot 8$ | 1.4 | Scraps |  |  |  | $5 \cdot 5$ |
| 19 | - | 7 | 19 | - | 7 | 1.4 | Scraps | Scraps | 2 | - | 5.6 $5 \cdot 6$ |
| 20 | - | $7 \cdot 3$ | 20.24 | - | - |  |  |  | 3 | 32 | $7 \cdot 5$ |
| 21 | - | $7 \cdot 7$ |  |  |  |  |  |  | 4 | - |  |
| 22-27 | - | - |  |  |  |  | . |  | 5 | - | - |

Table 6.-Metacarpus.

| Left. |  |  | Right. |  |  | Left. |  |  | Right. |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| No. | Length. | $\begin{aligned} & \text { Lower } \\ & \text { Art. } \end{aligned}$ | No. | Length. | $\underset{\substack{\text { Lower } \\ \text { Art. }}}{\text { ctict }}$ | No. | Length. |  | No. | Length. | $\underset{\substack{\text { Lower } \\ \text { Art }}}{\text { ater }}$ |
| 1906. |  |  | 1906. |  |  | 1908. | cont'd |  | 1908. |  |  |
| - | - | - | - | - | - | 19 | 17.7 | $5 \cdot 4$ | 19 | $17 \cdot 5$ | $5 \cdot 2$ |
|  |  |  |  |  |  | 20 | $18 \cdot 3$ | $5 \cdot 5$ | 20 | $17 \cdot 8$ | $5 \cdot 2$ |
| 1907. |  |  | 1907. |  |  | 21 | - | 5.6 | 21 | $18 \cdot 3$ | $5 \cdot 2$ |
| 1 | $16 \cdot 4$ | - | 1 |  |  | 22 | -18.5 | $5 \cdot 7$ | 22 | 18 | $5 \cdot 3$ |
| 2 | 18.3 | $\overline{4 \cdot 7}$ | 2 | 18 | $4 \cdot 9$ | $\stackrel{23}{ }$ | 18.5 | 59 | 23 | 18. | $5 \cdot 3$ |
| 3 | - | $4 \cdot 9$ | 3 | 二 | 5 | $\stackrel{24}{ }$ | 18.0 | $5 \cdot 9$ | 24 | 18.7 | $5 \cdot 3$ |
| 4 | - | $4 \cdot 9$ | 4 | 16.9 | 5 | $\stackrel{25}{26}$ | $18 \cdot 9$ $19 \cdot 1$ | 6 | 25 | - | $5 \cdot 4$ |
| 5 | - | 5 | 5 | - | $5 \cdot 1$ | 27 | 20 | $\overline{6.2}$ | 26 | - | $5 \cdot 4$ |
| 6 | $17 \cdot 2$ | 5 | 6 | $15 \cdot 7$ | $5 \cdot 1$ | 28 | 18 | 6.4 | 28 | 18 | $5 \cdot 5$ |
| 7 | $17 \cdot 7$ | 5 | 7 | $17 \cdot 5$ | $5 \cdot 1$ | 29 | 20 | $7 \cdot 2$ | 29 | 19 | 5.5 |
| 8 | 18.5 | 5 | 8 | $18 \cdot 1$ | $5 \cdot 1$ | 30 | 19.8 | $7 \cdot 3$ | 30 | 19.5 | $5 \cdot 5$ |
| 9 | $18 \cdot 2$ | - | 9 | $18 \cdot 3$ | 5.2 | 31-52 | No | meas. | 31 | 18 | $5 \cdot 7$ |
| 10 | $18 \cdot 3$ | $5 \cdot 1$ | 10 | $18 \cdot 4$ | 5.2 |  |  |  | 32 | 18 | $5 \cdot 7$ |
| 11 | $18 \cdot 4$ | $5 \cdot 1$ | 11 | $18 \cdot 8$ | $5 \cdot 2$ |  |  |  | 33 | 193 | $5 \cdot 8$ |
| 12 | 17.5 | $5 \cdot 2$ | 12 | - | $5 \cdot 2$ |  |  |  | 34 | 19 | $5 \cdot 9$ |
| 13 | $18 \cdot 4$ | $5 \cdot 2$ | 13 | - | $5 \cdot 3$ |  |  |  | 35 | 184 | 6 |
| 14 | 19 | $5 \cdot 4$ | 14 | $17 \cdot 5$ | $5 \cdot 4$ |  |  |  | 36 | $18 \cdot 8$ | 6 |
| 15 | - | $5 \cdot 5$ | 15 | $18 \cdot 8$ | $5 \cdot 4$ |  |  |  | 37 | - | $6 \cdot 1$ |
| 16 | $19 \cdot 3$ | $5 \cdot 5$ | 16 | $19 \cdot 1$ | $5 \cdot 4$ |  |  |  | 38 | 20.2 | 6.2 |
| 17 | 18* | 6 | 17 | $15 \cdot 7$ | $5 \cdot 5$ |  |  |  | 39 | - | $6 \cdot 3$ |
| 18 | $19 \cdot 2$ | $6 \cdot 5$ | 18 | $19 \cdot 8$ | - |  |  |  | 40 | - | $6 \cdot 3$ |
| 19 | $19 \%$ | - | 19.22 | - | - |  |  |  | 41 | 19 | $6 \cdot 3$ |
| 20-22 | - | - |  |  |  |  |  |  | 42 | $20 \cdot 3$ | $6 \cdot 3$ |
|  |  |  |  |  |  |  |  |  | 43 |  | $6 \cdot 4$ |
| 1908. |  |  | 1908. |  |  |  |  |  | 44 | $20 \cdot 2$ | 6.7 |
| 1 | 17 | $4 \cdot 6$ | 1 | 16.2 | $4 \cdot 6$ |  |  |  | 45 | $\overline{20.2}$ | 6.8 |
| 2 | - | $4 \cdot 8$ | 2 | - | $4 \cdot 9$ |  |  |  | 47-67 | No | meas. |
| 3 | $17 \cdot 9$ | $4 \cdot 8$ | 3 | - | $4 \cdot 9$ |  |  |  |  |  |  |
| 4 | - | ${ }_{5}^{4 \cdot 9}$ | 4 | - | 5 | 1909. |  |  |  |  |  |
| 5 | $\overline{-}$ | 5 | 5 | - | 5 | 1909. |  |  | 1909. |  |  |
| 6 | $16 \cdot 9$ | 5 | 6 | $17 \cdot 1$ | 5 | 1 | 17 | $4 \cdot 5$ | - | - | - |
| 7 | $17 \cdot 4$ | 5 | 7 | $17 \cdot 1$ | 5 | 2 | 17 | 5 | - | - | - |
| 8 | 18 | 5 | 8 | $17 \cdot 5$ | 5 | 3 | $19 \cdot 6$ | 6.5 | - | - | - |
| 9 10 | $18 \cdot 2$ 19.3 | 5 | 9 | 18.2 | 5 |  |  |  |  |  |  |
| 10 | $19 \cdot 3$ | 5 5 | 10 | 17 | - | 1910. |  |  | 1910. |  |  |
| 12 | $16 \cdot 7$ | $5 \cdot 2$ | 12 | 18.2 | - | 1 | $18 \cdot 3$ | $5 \cdot 2$ | 1 |  | $5^{〔} 6$ |
| 13 | $17 \cdot 7$ | $5 \cdot 2$ | 13 | 18 | 5 | 2 | - | $5 \cdot 4$ | 2 | - | 6 |
| 14 | $17 \cdot 8$ | $5 \cdot 2$ | 14 | - | $5 \cdot 1$ |  | 19 | 57 | 3 | 18.9 | $6 \cdot 1$ |
| 15 | 18.4 | $5 \cdot 2$ | 15 | - | $5 \cdot 1$ | 4 | $17 \cdot 7$ | 6.5 | 4 | $17 \cdot 8$ | $6 \cdot 3$ |
| 16 |  | $5 \cdot 3$ | 16 | - | $5 \cdot 2$ | 5 | 20 | 6.5 | 5 | 18 | - |
| 17 18 | $19 \cdot 3$ | $5 \cdot 3$ | 17 | - | $5 \cdot 2$ | 6 | - | - | 6 | - | - |
| 18 | $-$ | $5 \cdot 4$ | 18 | -. | $5 \%$ | 7 | - | - |  |  |  |

256 Report of the igio excavations at corstopitum:
Table 7.-Innominate.


Table 8.--Femur.

| Left. |  |  | Right. |  |  | Left. |  |  | Right, |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| No. | Length. | Condyles. | No. | Length. | $\begin{gathered} \text { Con- } \\ \text { dyles. } \end{gathered}$ | No. | Length | $\begin{gathered} \text { Con- } \\ \text { dyles. } \end{gathered}$ | No. | Length. | Con- dyles. |
| 1906. | - | -- | 1906. - | -- | - | $\begin{gathered} 1908 . \\ 1 \\ 2-5 \end{gathered}$ | No | $\begin{gathered} 7 \cdot 6 \\ \text { meas. } \end{gathered}$ | $\begin{gathered} 1908 . \\ 1-2 \end{gathered}$ | No | meas. |
| 1907. |  |  | 1907. |  |  |  |  |  |  |  |  |
| - ${ }_{2}^{1}$ | 30 | - | 1 <br> 2 <br> 3 | - | $8 \cdot 5$ 8.5 9 | 1910. |  |  | 1910. |  |  |
|  |  |  | 4-10 | - | - | 1 2 3 | ca. 37 | $6 \cdot 3$ <br> - | $\begin{aligned} & 1 \\ & 2 \end{aligned}$ | - | $6 \cdot 9$ |

Table 9. Tibla.


Table 10.-Metatarsus.

| Left. |  |  | Right. |  |  | Lefit. |  |  | -Right. |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| No. | Length. | Lower Art. | No. | Length. | Lower Art. | No. | Length. | Lower Art. | No. | Length. | Lower Art. |
| 1906. |  |  | 1906. |  |  | 1908 | (cont.) |  | 1908 | (cont.) |  |
| - | - | $\sim$ | 1 | $20 \cdot 5$ | $4 \cdot 6$ | 22 | - | $4 \cdot 9$ | 22 | $21 \cdot 3$ | 5 |
| - | - | - | 1 | 20. |  | 23 | - | 5 | 23 | $21 \cdot 7$ | $5 \cdot 1$ |
|  |  |  |  |  |  | 24 | - | 5 | 24 | $20 \cdot 9$ | $5 \cdot 2$ |
| 1907. |  |  | 1907. |  |  | 25 | - | 5 | 25 | , | $5 \cdot 2$ |
| 1 | - | $4 \cdot 5$ | 1 | $20 \cdot 2$ | $4 \cdot 5$ | 26 | - | 5 | 26 | - 7 | $5 \cdot 3$ |
| 2 | $21 \cdot 3$ | $4 \cdot 5$ | 2 | - | $4 \cdot 6$ | 27 | $\cdots$ | 5 | 27 | $21 \cdot 7$ | $5 \cdot 3$ |
| 3 | 21 | $4 \cdot 6$ | 3 | $19 \cdot 8$ | $4 \cdot 6$ | 28 | $20 \cdot 7$ | 5 | 28 | -- | $5 \cdot 5$ |
| 4 | -_ | $4 \cdot 7$ | 4 | - | $4 \cdot 7$ | 29 | $20 \cdot 8$ | - | 29 | - | $5 \cdot 5$ |
| 5 | $20 \cdot 4$ | $4 \cdot 7$ | 5 | - | $4 \cdot 8$ | 30 | $21 \cdot 1$ | 5 | 30 | 21 | $5 \cdot 5$ |
| 6 | 20.4 | $4 \cdot 8$ | 6 | 21.5 | $4 \cdot 8$ | 31 | $21 \cdot 5$ | 5 | 31 | - | $5 \cdot 6$ |
| 7 | -- | $4 \cdot 8$ | 7 | $20 \cdot 5$ | $4 \cdot 9$ | 32 | - | $5 \cdot 3$ | 32 | 21 | $5 \cdot 6$ |
| 8 | 21.4 | $4 \cdot 9$ | 8 | -- | 5 | 33 | - | $5 \cdot 5$ | 33 | $21 \cdot 5$ | $5 \cdot 6$ |
| 9 | $20 \cdot 2$ | 5 | 9 | - | 5 | 34 | - | $5 \cdot 7$ | 34 | 23 | $5 \cdot 7$ |
| 10 | $21 \cdot 2$ | 5 | 10 | $21 \cdot 5$ | $5 \cdot 1$ | 35 | $21 \cdot 7$ | - | 35 | - | 6 |
| 11 | $19 \cdot 9$ | $5 \cdot 1$ | 11 | - | $5 \cdot 3$ | 36 | 22. | 6 | 36 3766 | - | 6•1 |
| 12 | - | $5 \cdot 5$ | 12 | $21 \cdot 7$ | $5 \cdot 4$ | 37 | $22 \cdot 9$ | 6 | 3766 | No | meas. |
| 13 | - | $5 \cdot 5$ | 13 | $22 \cdot 8$ | $5 \cdot 8$ | 38 | - | 6 |  |  |  |
| 14 | $20 \cdot 5$ | $5 \cdot 8$ | 14 | 22 | $6 \cdot 1$ | 39 | $24 \cdot 4$ | $6 \cdot 3$ |  |  |  |
| 15 | $20 \cdot 9$ | -. | 15 | - | $6 \cdot 5$ | 40 | -- | $6 \cdot 3$ |  |  |  |
| 16.23 | - | - | 16 | - | -- | 41-73 | No | meas. |  |  |  |
| 1908. |  |  | 1908. |  |  | 1909. |  |  | 1909. |  |  |
| 1 | $20 \cdot 6$ | $4 \cdot 3$ | 1 | $19 \cdot 3$ | $4 \cdot 2$ | 1 | - | $-4 \cdot 5$ | 1 | $20 \cdot 5$ | $4 \cdot 5$ |
| 2 | - | 44 | 2 | - | $4 \cdot 3$ | 2 | - | $5 \cdot 6$ |  |  |  |
| 3 | 20 | $4 \cdot 4$ | 3 | - | $4 \cdot 5$ |  |  |  |  |  |  |
| 4 | - | $4 \cdot 5$ | 4 | $18 \cdot 1$ | $4 \cdot 5$ | 1910. |  |  | 1910. |  |  |
| 5 | - | $4 \cdot 5$ | 5 | $19 \cdot 2$ | $4 \cdot 5$ | 1910. |  |  |  |  |  |
| 6 | $19 \cdot 5$ | $4 \cdot 5$ | 6 | $19 \cdot 7$ | $4 \cdot 5$ | $\square$ | - | ${ }_{5}^{4} 7$ |  | $20 \cdot 2$ 20 | $4 \cdot 5$ $4 \cdot 6$ |
| 7 | $20 \cdot 7$ | $4 \cdot 5$ | 7 | $19 \cdot 7$ | $4 \cdot 5$ | 2 | - | 5 | 2 | 20 | $4 \cdot 6$ $4 \cdot 7$ |
| 8 | - | $4 \cdot 6$ | 8 | - | $4 \cdot 6$ | 3 | - | 5 | 3 | - | $4 \cdot 7$ $4 \cdot 7$ |
| 9 | - | $4 \cdot 6$ | 9 | 19 | $4 \cdot 6$ | 4 | 20 | 5 | 4 | - $0 \cdot 3$ | $4 \cdot 7$ $4 \cdot 7$ |
| 10 | -. | $4 \cdot 7$ | 10 | .. | $4 \cdot 7$ | 5 | $19 \cdot 8$ | $5 \cdot 1$ | 5 | $20 \cdot 3$ | $4 \cdot 7$ |
| 11 | - | $4 \cdot 7$ | 11 | - | $4 \cdot 7$ | 6 | -- | $5 \cdot 5$ | 6 | $20 \cdot 3$ | - |
| 12 | $19 \cdot 4$ | $4 \cdot 7$ | 12 | $20 \cdot 6$ | $4 \cdot 7$ | 7 | $20 \cdot 7$ | $5 \cdot 6$ | 7 | - | $4 \cdot 8$ |
| 13 | $19 \cdot 8$ | $4 \cdot 7$ | 13 | - | $4 \cdot 8$ | 8 | - | $6 \cdot 5$ | 8 | 20.4 | 5 |
| 14 | 20 | $\cdots$ | 14 | - | $4 \cdot 9$ | 9 | - | - | 9 10 | $20 \cdot 4$ $20 \cdot 8$ | 5 |
| 15 | $20 \cdot 1$ | $4 \cdot 7$ $4 \cdot 8$ | 15 | - | 5 | 10 | - | - | 10 | $20 \cdot 8$ 21 | 5 |
| 16 | - | $4 \cdot 8$ | 16 | - | 5 |  |  |  | 11 | 21 | $\stackrel{5}{5} \cdot 2$ |
| 17 | - | $4 \cdot 8$ $4 \cdot 8$ | 17 | - | 5 |  |  |  | 12 | - | $5^{5}{ }^{\prime 2}$ |
| 18 19 | $20 \cdot 1$ | $4 \cdot 8$ $4 \cdot 8$ | 18 19 | 20-2 | 5 |  |  |  | 13 | 20.6 | 6 |
| 19 | $20 \cdot 1$ | $4 \cdot 8$ $4 \cdot 8$ | 19 $\cdot 0$ | $20 \cdot 2$ $20 \cdot 9$ | 5 |  |  |  | 14 | $20 \cdot$ | - |
| 20 | 20•2 | $4 \cdot 8$ $4 \cdot 9$ | $\stackrel{20}{21}$ | $20 \cdot 9$ $21 \cdot 2$ | 5 |  |  |  | 16 | -- | - |
| 21 | - | $4 \cdot 9$ | 21 | 21 | 5 |  |  |  |  |  |  |

## SHEEP．

The only parts of the skull remaining were fragments，two of which gave lengths of the horn core of 45 and 5 cms ．Most of the specimens referred to young animals，only a small

Sheer．

| Lower Jaw． |  |  |  |  |  | Metacarpal． |  |  |  |  |  | metatorsal． |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Left． |  |  | Right． |  |  | Left． |  |  | Right． |  |  | Left． |  |  | Right． |  |  |
| $\stackrel{\circ}{4}$ |  | $\begin{aligned} & \stackrel{3}{\overleftarrow{W}} \\ & \stackrel{\oplus}{H} \end{aligned}$ | 安 |  | $\begin{aligned} & \stackrel{4}{\mathrm{~A}} \\ & \stackrel{\otimes}{\oplus} \end{aligned}$ | 8 |  | 苞䓣 | B | $\begin{aligned} & \text { 淢 } \\ & \text { [1 } \end{aligned}$ |  | $\stackrel{\circ}{2}$ | 呂 |  | $\stackrel{8}{8}$ | －¢ |  |
| 1 | － | $5 \cdot 3 *$ | 1 | － | 5＊ | ］ | 12.3 | 2.0 | 1 | $10 \cdot 6$ | $2 \cdot 0$ | 1 | $10 \cdot 8$ | $1 \cdot 7$ | 1 | 11.8 | 1.9 |
| 2 | － | $5 \cdot 8$ | 2 | － | 5.5 | 2 | － | $2 \cdot 1$ | 2 | $10 \cdot 7$ | $2 \cdot 1$ | 2 | 115 | 2 | 2 | $12 \cdot 3$ | $1 \cdot 9$ |
| 3 | 16.6 | 6－2＊ | 3 | － | 6．4＊ | 3 | 109 | $2 \cdot 1$ | 3 | 11.8 | $2 \cdot 1$ | 3 | 11：5 | 2 | 3 | 12.2 | 2 |
| 4 | － | － | 4 | － | $6.5 *$ | 4 | 12.5 | $2 \cdot 2$ | 4 | － | $2 \cdot 2$ | 4 | 12 | 2 | 4 | $12 \cdot 8$ | 2 |
| 5 | －． | $6 \cdot 2^{*}$ | 5 | －－ | $6.5 *$ | 5 | $13 \cdot 5$ | $2 \cdot 2$ | 5 | $12 \cdot 4$ | $2 \cdot 2$ | 5 | 12.8 | 2 | 5 | － | － |
| 6 | 16.5 | 6．4＊ | 6 | $15 \cdot 4$ | 6.3 | 6 | 12.6 | $2 \cdot 3$ | 6 | 12.5 | $2 \cdot 2$ | 6 | $12 \cdot 3$ | $2 \cdot 1$ | 6 | － | ＇－ |
| 7 | －－ | 65 | 7 | － | $6.6{ }^{*}$ | 7 | 12.2 | 24 | 7 | － |  | 7 | － | － | 7 | － | － |
| 8 | － | $6 \cdot 6$ | 8 | － | 6.8 | 8 | －－ | $2 \cdot 4$ | 8 | － | －－ | 8 | － | － | 8 | －－ | － |
| 9 | － | 68 | 9 | － | 6．8 | 9 | － | － | 9 | －－ | － | 9 | － | － | 9 | － | － |
| $10+$ | － | 7＊ | 10 | － | 6．9＊ | 10 | － | $\cdots$ | 10 | － | － | 10 | － | － | 10 | － | － |
| 11 | － | 7 | 11 | － | 7 | 11 | － | － | 11 | －－ | － | 11 | － | － | 11 | － | － |
| 12 | 16.8 | 7 | 12 | － | 7＊ | 12 | － | － | 12 | － | －－－ | 12 | －－ | － | 12 | － | －－ |
| 13 | － | $7 \cdot 1$ | 13 | － | 7＊ | 13 | － | － | 13 | － | － | 13 | － | － | 13 | － | － |
| 14 | － | $7 \cdot 4^{*}$ | 14 | 15 $8^{*}$ | 7＊ | 14 | － | － | 14 | － | － | 14 | － | － |  |  |  |
| 15 | － | $7 \cdot 6$ | 15 | $16 \cdot 5$ | 7＊ | 15 | － | － | 15 | － |  |  |  |  |  |  |  |
| 16 | － | －－ | 16 | $16.5 *$ | $7 \cdot 2$ | 16 | － | － | 16 | － | － | Innominate． |  |  |  |  |  |
| 17 | － | － | 17 | － |  | 17 | － | － | 17 | － | － |  |  |  |  |  |  |
| 18 | － | － | 18 | － | － | 18 | － | － | 18 | － | － | Left． |  |  | Right． |  |  |
| 19 | － | － | 19 | －－ | － | 19 | － | － | 19 | － | － |  |  |  |  |  |  |
| 20 | － | － | 20 | － | － | 20 | － | － | 20 | － | － | No． |  | cet． | No． |  | cet． |
| 21 | － | －－ | 21 | － | － | 21 | － | － |  |  |  |  |  |  |  |  |  |
| 22 | － | － | 22 | － | － |  |  |  |  |  |  |  |  | $2 \cdot 2$ |  |  |  |
| 23 | － | － | 23 | － | － |  |  |  |  |  |  | 2 |  | － | 2 | 2 |  |
| 24 | － | － | 24 | － | － |  |  |  |  |  |  |  |  |  | 3 | 2 |  |
| 25 | － | － |  |  |  |  |  |  |  |  |  |  |  |  | 4 | 2 | 2 |
|  |  | － |  |  |  |  |  |  |  |  |  |  |  |  | 5 |  |  |

number，for example，had the third molar well－developed．The head was smaller，and the bones of the limbs were shorter and more slender than in the better known domesticated breeds of the present time．In these respects the corstopitum material agrees with the sheep described from the excavations in the
south of England, and also in Scotland. It would appear that a number of the sheep were actually smaller with a larger head than the Rotherley examples, and some degree of variation in size and proportion is evidenced.

Sheep.


* Juvenile.

In point of view of size, as other writers have pointed out, the sheep of the Roman period are more closely represented at the present time by the sheep of the Hebrides and Orkneys and Shetland, more particularly by the small sheep of Soay Island near St. Kilda. But they are also very like in character to the Black-faced or Highland sheep.

A lower jaw of a young sheep-No. 8 in the accompanying table, had been broken right across, earlier in its life, for it was completely mended. The sheep would only have been about eighteen months old when it was killed, for the third molar is just piercing the jaw.

A metacarpal (cannon bone) was pierced in the middle of the shaft by a hole, 35 mm . in diameter, in such a manner as to suggest it may have been used to keep a door shut-like that figured by Pitt Rivers on the right hand of the figure on page 175 of vol. I, Excavations in Cranborne Chase.

GOAT.
Only one undoubted specimen which could be referred to this species was met with, the upper part of the head with long horn cores (incomplete, however), gently curving backwards. from the upper plane of the frontals.

## RED DEER.

The deer was very sparsely represented by the bones sent in from corstopitum. We could not find a single skull or part of a skull though there were 92 portions of antlers, from only 14 of which the widest diameter at the base could be measured. In nearly all of these the direction of the brow tine could be seen, so that, by comparing them with specimens of skulls and antlers in both the Hancock and College museums, we could separate them into right and left antlers. There were 10 right and 4 left large antlers, and the measurements obtainable did not vary much-two of them being 4 cms ., five 4.5 cms ., one 5 cms ., and one 55 cms .

In some cases, as has been described by others, tines were obtained which, from their polished condition, had been evidently used for some mechanical purpose. Marks similar to those referred to in the case of the horse and the ox were found
near the burrs of two antlers, but these penetrated only to a slight depth. We have not, as has been stated, any remains of the skull, but these marks on the antlers so near the head must have been produced in the same way as those already referred to in the case of the ox.

The following is an analysis of the bones found, other than those of the skull:

The Scapula: Three right and three left scapulae were found, the measurements obtainable for which are given in the following table:

| Left. |  |  | Right. |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| No. | Neck. | Glenoid. | No | Neck. | Glenoid. |
|  |  |  |  |  |  |
| 1 | $3 \cdot 3$ | $4 \cdot 3$ | 1 | $3 \cdot 4$ | $4 \cdot 2$ |
| 2 | $3 \cdot 4$ | $4 \cdot 3$ | 2 | $3 \cdot 8$ | $4 \cdot 6$ |
| 3 | $3 \cdot 7$ | $4 \cdot 4$ | 3 | $4 \cdot 1$ | 5 |

The Humerus :- Only two right bones were found, each giving one measurement, that of the lower articulating surface which was $5 \cdot 1 \mathrm{cms}$. broad in the case of one, and 5 cms . in the case of the other.

The Radius:This was represented by 4 bones, 1 belonging to the left limb and 3 to the right. The smallest length was 28.1 cms ., and the largest 31.7 cms., the breadths of their lower articulations being respectively 4.4 cms . and 5 cms .

The Metacarpus: Only one out of the two bones present gave two measurements, and these were: length, 28.5 cms ., breadth, 4.5 cms .

The Innominate: Only one innominate was represented, the measurement relating to the acetabulum of which was 3.9 cms .

The Femur: A single femur of the right limb gave the breadth of the lower articulating surface as 6.9 cms .

The Tibia: A fine specimen of a right tibia gave a length of 37 cms . and a breadth of lower articulating surface of 4.3 cms .

## ROE DEER.

This species was represented by the antlers of three animals, one measuring 2 cms ., another 2.7 cms . at the base, the third one being split. The proximal portion of a metatarsal evidently also belonged to this species.

Pig.


Note.-The asterisks indicate that the measurements are approximate.

PIG.
The skull was represented by fragments from which it was impossible to make measurements. As in the case of the sheep, the animals were for the most part not fully developed, but many were old enough to have lost the first pre-molar as does the pig of the present day when just over 2 years. The tusks of the males were relatively large, approximating in this respect to the wild boar, but the large proportion of young animals point to their having been domesticated.

Our measurements are below those both of the wild and the present-day varieties, but too much stress must not be laid upon this, -since our examples were undeveloped.

A large proportion of the specimens was obtained during the excavations of 1907.

DOG.
Two outstanding varieties of the dog are represented-a normally proportioned one running into several varieties, and a small one with bent legs; strongly resembling a Dachshund or Turnspit.

The latter must have been small in height, about 25 cms . ( 10 inches) at the shoulder, and about 60 cms . ( 24 inches) in length, not including the tail. The short legs were both bent outwards, but still preserving their vertical disposition, as in the present-day Dachshund, and the bending was associated with a twisting of the long bones. The head was short and rounded on the top.

The skulls and the long bones of the most frequently represented specimens belong as has been said to a more normally proportioned dog, but they exhibit at the same time a good deal of variety in size and in appearance. Some recail that cross between the fox terrier and the greyhound known as the whippet. But one can see also the collie, the terrier, even the

Dandie Dinmont, as well as the greyhound, amongst the skulls, particulars of the measurements of which are given in the accompanying table.

Dog.

| Skull. |  |  |  |  |  |  |  |  |  | Lower Jaw. |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 |  | 2 | 3 | 45 |  |  |  |  |  | Leff. |  |  | Right. |  |  |
| $\stackrel{\circ}{4}$ |  |  | ntal width Temp oral |  |  |  |  |  |  | $\stackrel{8}{4}$ |  |  | \% |  | 宸安 |
| 1 | $14 \cdot 3$ | $2 \cdot 7$ | $3 *$ | $4 \cdot 2$ | 68 | $6 \cdot 87$ | $7 \cdot 9$ | $4 \cdot 9$ | $4 \cdot 3$ | 1 |  | 5 | 1 |  | 5 |
| 2 | $15 \cdot 7$ | $2 \cdot 7$ | $2 \cdot 9$ | $4 \cdot 1$ | $7 \cdot 5$ | $7 \cdot 73$ | $8 \cdot 3$ | 5 | $5 \cdot 3$ | 2 | 9•8* | 5 | 2 | - | 5 $5 \cdot 5$ |
| 3 | - | $2 \cdot 8$ | $2 \cdot 7$ | 4.0* | $7 \cdot 5$ | $7 \cdot 89$ | 8 | 5 | 53 | 3 | $9 \cdot 8$ | $5 \cdot 4$ 6 | 3 | $\overline{10 \cdot 2}$ | 5.5 5.5 |
| 4 | $15 \cdot 3$ | $3 \cdot \overline{3}$ | $3 \cdot 8^{*}$ | $4 \cdot 8 *$ | 8 | $6 \cdot 61$ | $8 \cdot 5$ | 5 | $5 \cdot 4$ | 4 | 11.2 | 6 $6 \cdot 1$ | 3 4 | $10 \cdot 2$ | $5 \cdot 5$ $5 \cdot 6$ |
| 5 | - | $3 \cdot 6 *$ | $3 \cdot 5$ | $5 \cdot 2$ | $8 \cdot 3$ | 6.75 | -- | - | - | 5 | 11.6* | $6 \cdot 3$ | 5 | $11 \cdot 2$ | $5 \cdot 6$ $6 \cdot 1$ |
| 6 | 16.5* | $3 \cdot 3$ | $3 \cdot 4$ | $4 \cdot 0$ | $8 \cdot 1$ | 7-57 | $9 \cdot 4$ | 5* | $5 \cdot 3$ | 6 | 110 | 6.3 6.3 | 6 | $12 \cdot 5$ | $6 \cdot 5$ |
| 7 | 18 | $3 \cdot 5$ | $3 \cdot 5$ | $5 \cdot 1$ | $8 \cdot 4$ | $6 \cdot 94$ | $10 \cdot 4$ | $5 \cdot 7$ | 6.1 | 7 | $13 \cdot 1$ | $6 \cdot 3$ $6 \cdot 8$ | 6 7 | 12.5 | 6.5 6.8 |
| 8 | - | $3 \cdot 3$ | $3 \cdot 1$ | $4 \cdot 6$ | $8 \cdot 7$ | $7 \cdot 91$ | $9 \cdot 8$ | - | $5 \cdot 8$ | 8 | $13 \cdot 7$ | - 7 | 8 | $12 \cdot 1$ * | 6.8 |
| 9 | $17 \cdot 7$ | $3 \cdot 4$ | $2 \cdot 8$ | $4 \cdot 5$ | $8 \cdot 9$ | 8-32 |  |  | $6 \cdot 4$ |  |  |  | 9 | $13 \cdot 5$ | 6.8 |
| 10* | , | $2 \cdot 9$ | $3 \cdot 4$ | $4 \cdot 4$ | 76 | $6 \cdot 54$ | $7 \cdot 8$ |  | 6.6 |  |  |  | 10 | -- | $6 \cdot 9$ |
| $11^{*}$ | - | $2 \cdot 8$ | $3 \cdot 8$ | $4 \cdot 2$ | 7.* | $7 \cdot 04$ |  |  | 56 |  |  |  | 11 | - | $6 \cdot 9$ |
| 12 | - | - |  | - | - | - |  |  |  |  |  |  | 12 | 12.5 | $6 \cdot 9$ |
| 13 | - | - | - | -1 | -1 | - |  |  | 5.8 |  |  |  | 13 | $14 \cdot 2$ | $7 \cdot 4$ |

Scafula.


Humerus.

| Lefr. |  |  | Right. |  |  |
| :---: | ---: | :---: | :---: | :---: | :---: |
| No. | Length. | Condyle. | No. | Length. | Condyle. |
| $1^{*}$ | 8.5 | $1.3^{*}$ |  |  |  |
| 2 | 15 | 1.9 | 1 | 15 | 1.9 |
| 3 | - | 2 |  |  |  |

Note.--In the above tables an * indicates the Dachshund variety when applied to a 'No. ' and approximate when applied to a measurement.

Dog.


CAT.
The remains of the cat are not sufficient to determine whether it was a wild or a domesticated variety. They consist of (1) a left ramus of the lower jaw, length 63, alveolus of canine is 6 cm ., and the molar area is $2 \cdot 1$. (In a wild cat in the Hancock museum the corresponding measurements are 6.6, 6 , and 2.2 ). (2) A right femur 10.6 cms . in length with a condyle width of 18 , much smaller than the wild variety; and (3) a tibia about 113 cms., again smaller and lighter in build compared with the wild cat. (See the interesting note by Herbert

Jones, with regard to the remains of the cat, and of their footprints on two tiles obtained at the excavations at Silchester, Archaeologia, vol. 53).

FOX.
The fox was represented by a right ramus of the lower jaw with a molar area of $5 \cdot 7$, and a remnant of a right humerus.

BADGER.
A fully developed and almost complete skull, was obtained from site xI, along with the Dachshund skull No. 11 in the table referring to the dog. The skull of the badger measured in length from supra occip. protuberance to tip of pre-maxilla 13.3 cms .

BEAVER,
The left ramus of the lower jaw of the European beaver which was obtained in the excavations of 1907 had a total length from condyle to the anterior tip of 10.5 cms ., the molar area measuring 3.8 cms . The corresponding bone of an American beaver in the College museum measures length 9 cms ., teeth area 31 .

## WATER VOLE.

Both rami of the lower jaw of a water vole were obtained from site xI, s.e. The total length including the incisors is 2.8 cms . and the molar area 9 mm .

Hare.
A right tibia measuring 152 cms . of the hare with the fibula broken off close to its attachment to the tibia was obtained during the excavations of 1907 .

MOLE.
Site XI also furnished the skull, several of the bones of the limbs and a few ribs of the mole. It is possible that this and the water vole, for example, may not truly belong to the period now under consideration.

The animals other than mammals will be described in a section of the paper to be published later.


[^0]:    'The coins do not here permit of very definite conclusions. The rubbish pit in the eastern building can hardly be later than 110, and may belong to the last decade of the first century. It follows that the site was not occupied by buildings before the reign of Trajan, though the high proportion of early coins found in both buildings argues their priority to the main building. The east, if not the west building may have been in use until the end of the occupation, though it is impossible to distinguish between periods.'

[^1]:    ' My readers will excuse the fact that the block shewing it, which was made for use elsewhere, contains five other bits of bronze from Aldborough.
    ${ }^{2}$ The reading cvit, given in Eph. iv, p. 144, is, I think, an error. It is, of course, attractive, since a cohors vi Thracum was in Britain, though only in early times, and no cohors vir Thracum is known. But all the specimens I have seen agree in vir, while the letters are so grouped that a misreading would be more or less easy.
    ${ }^{3}$ The explanation proposed by Mr. Coote, that they were identification or initiation tokens of individual soldiers (see Arch. Ael., 2 ser. viri, 59), is now generally given up.

[^2]:    ${ }^{1}$ Compare R. A. Smith, Proc. Soc. Antiq. London, xx, 347.

[^3]:    ${ }^{+}$The following types were noted:--D $39,52,55,60,64,78 ; 146,153,156$, 175, 185; 236, 261, 264, 265, 270, 277, 278; 322, 330, 331, 374, 377, 393; 403, 411, 413, 449, 467, 469a, 472, 499 ; 505, 523. 534, 574; 696 ? ; 708, 711, 766, 79; 805, 808, 832, 860, 867, $871,879,895,898$; $950 a, 971$ ? ; 1010, 1068, 1069a, 1071, 1088, 1094 ; 1114, 1115, 1129, 1160. Many of these occurred several times over.

[^4]:    * Arch. Ael. 3 ser. v, p. 420 ; and vi, p. 226.

[^5]:    ${ }^{1}$ Curle, A Roman Frontier Post and its People, 1911, pp. 385-415.

[^6]:    ${ }^{2}$ A 'second brass' of the second century was incorrectly assigned in the 1908 report to Trajanus Decius.

[^7]:    ${ }^{2}$ Excavations of the Cranborne Chase, vol. 2.

[^8]:    * The teeth of the skull of the Cadzow ox preserved in the Edinburgh Museum are in the same condition as those of the Chillingham described above.

