

their evolution, varied types of locomotion, familiar to every one, of which the chrono-photographic analysis is very interesting. The tadpole of the toad, for example, exhibits progression in the first stage by the undulation of the fin, when the feet appear there is a mixed type of locomotion; the tail undulates, and on both sides the posterior members execute the movements of swimming which is usual to them. These movements of the posterior limbs alone remain some time after the tail has disappeared. Of these movements, which resemble so much those of human swimming, one is especially notice-

Did they belong to the same age as those of the Reindeer Period of the Dordogne? Or should they, on the other hand, be referred to some still living race of men already settled on that Ligurian coast in the "Polished Stone Period"? Other inquirers, again, have sought a third alternative, and referred them to an intermediate period, to which the name "Miolithic," or, better, "Mesolithic," has been speculatively given.

In view of these differences of opinion, the discovery in February of last year of fresh human remains in one of these grottoes associated with relics that throw a clearer light on the

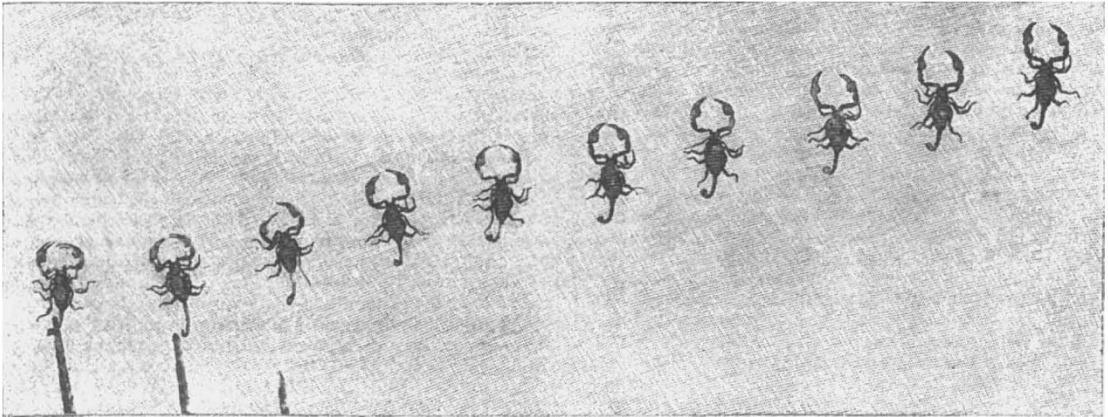


FIG. 1.—Movements of the Scorpion.

able; in this the anterior limbs do not take any part, and the posterior, after having formed a right angle with the axis of the body, approach each other till they become parallel, then bend and stretch themselves again to begin anew. The movements of the lizard's limbs escape direct observation on account of their rapidity, but on the chrono-photographic images, taken at the rate of forty to fifty a second, one can easily follow the successive movements of the limbs in front and behind. With the grey lizard, as well as the Gecko, the normal pace is that of a trot, that is to say, the limbs move diagonally. The great

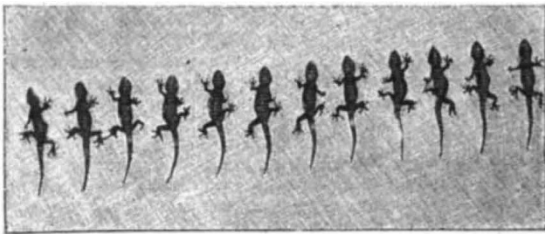


FIG. 2.—Movements of the Gecko.

amplitude of the movements of the limbs, combined with the undulation of the axis of the body, causes the limbs to approach one another very much on one side, and the next instant to separate. The Gecko carries its hind foot nearly under the armpit on the side where the body becomes concave; the instant afterwards, this side becomes convex, the anterior limb advances very much, and the two limbs (the body presenting on this side a convex arc) will be wide apart.

Many other very interesting observations can be made relating to the movements of insects and arachnids.

#### THE MAN OF MENTONE.<sup>1</sup>

FEW groups of prehistoric finds have provoked a more persistent controversy as to their date and character than those of the Mentone Caves. Were they Palæolithic or Neolithic?

<sup>1</sup> "On the Prehistoric Interments of the Balzi Rossi Caves near Mentone, and their Relation to the Neolithic Cave-Burials of the Finalése." By Arthur J. Evans. A résumé of a paper communicated to the Anthropological Institute. (The cuts are kindly lent by the Institute.)

culture and surroundings of those deposited with them than any hitherto discovered there, has naturally created considerable interest.

The caves in which these discoveries have been made are formed in the sea-face of the promontory of lower cretaceous limestone that rises just across the Italian frontier on the Ventimiglia side of Mentone, and which, from its red bastions, is locally known as Baoussé Roussé, or, in its Tuscan shape, Balzi Rossi. As early as 1858 the Swiss geologist, M. Forel, had obtained from a superficial layer of one of these caves various animal bones associated with implements. Subsequently Mr. Moggridge dug a section in the grotto known as the Barma dou Cavillou, revealing five floors "formed in the earth by long-continued trampling," with traces of a hearth in the centre of each, and around flint flakes, axes, hammer-stones, and bones of animals. The animal bones were, however, of existing species, and this evidence clearly pointed to Neolithic habitation. But later, M. Rivière, whose patient exploration of these caverns deserves our warm recognition, whatever may be thought of the conclusions drawn by him, unearthed in the same cave, only a foot or two from the point where Mr. Moggridge's excavations had ceased, the perfect skeleton of a man. The skeleton lay on its left side in the attitude of sleep. A stone lay beneath its head and another behind the loins. An ornament composed of bored shells—which may recall the trochus-studded nets still worn by Venetian peasants—was found adhering to the skull, their adherence being due to a ferruginous substance, fragments of which lay near, and which gave a ruddy colour to the whole. Evidently this ochreous substance had been used by the departed in his life-time to paint his face and body, and the whole character of the deposit clearly points to careful interment. From the discovery of bones of extinct animals mixed with the ashes in the overlying stratum, M. Rivière concluded nevertheless that the skeleton was palæolithic.

The fact that the skeleton of the Barma dou Cavillou was undoubtedly embedded amongst Quaternary remains lent some weight to M. Rivière's opinion, and his view of the matter found acceptance from such competent judges as Mr. Pengelly and others. But the presence of the Neolithic hearths, noted by Mr. Moggridge, in an adjacent part of the cave, combined with other circumstances, led M. De Mortillet and Prof. Boyd Dawkins from the first to take a different view. They saw only the evidence of a Neolithic interment in a Palæolithic stratum.

The annexed diagram (Fig. 1) will give an idea of the general conformation of the cave or cleft known as the Barma Grande,

in which the most recent discoveries have been made. From the data that I was able to gather on the spot from quarrymen who at one time or another had taken part in its excavation, the original floor of the cave, at its mouth, over the spot—that is, where the skeletons were found—was 7.50 metres above the stratum in which they lie. But this depth only includes what has been artificially removed from the cave. There are reasons for believing that the deposit had originally been somewhat higher, but that the original level of the floor had been previously lowered by natural agencies.

In 1884 a discovery of a human skeleton had already been made in this cave by Louis Julien, the foreman of the men employed in quarrying the cliff; and so far as the details of this

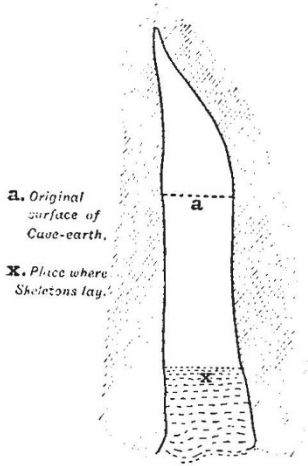


FIG. 1.

find have been preserved, they answer very closely to that of the Barma dou Cavillou. The discovery of 1892 was made close to the spot where the skeleton of 1884 had been unearthed.

Unfortunately, as in the former case, it was not made by a scientific excavator, but by men engaged in quarrying the limestone cliff. I visited the spot shortly afterwards on more than one occasion, but the ornaments and implements had been removed by the owner of the quarry to his house, and there was some difficulty in ascertaining the exact position in which the several relics were discovered.

The subjoined sketch (Fig. 2) will give a fair notion of the position in which the bodies were found. They lay across the present mouth of the cave, with their heads to the east. The

many *nassa neritea*, and on the legs a little below the top of the tibiae were two *Cypræas*.

Immediately behind this lay a skeleton, recognised by Dr. Verneau as that of a woman. It rested on the left side with the knees slightly drawn up, and its right hand almost resting

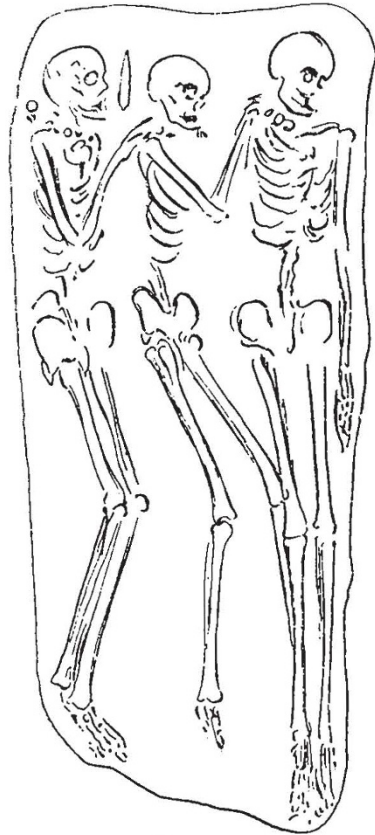


FIG. 2.

on the giant's shoulder. It is said to have held another flint knife. This female skeleton was not so richly decked with ornaments as the other two, the bone and tooth pendants being absent in this case. The third skeleton, of a youth, lay in much

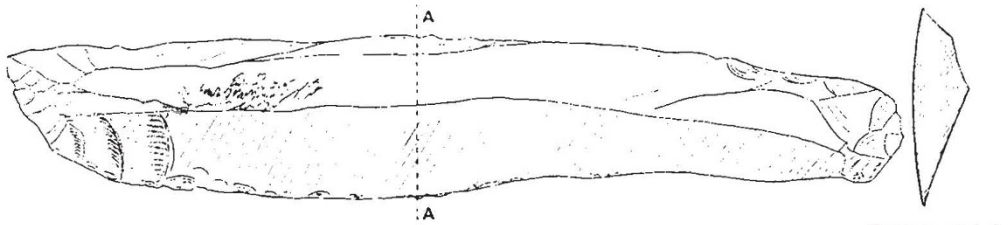


FIG. 3.—Flint knife found with first skeleton.  $\frac{1}{2}$  linear (23 x 5 cm.).

outermost skeleton was that of a man apparently well on in life. Unfortunately the skull was broken with a blow of a pick at the moment of discovery, and the length of the skeleton can therefore be only approximately given. From his heel to his shoulder he measured 1.85 metres, so that he was probably at least as tall as the taller of the three adult skeletons found in 1872-1873, which reached the length, according to M. Rivière, of 2 metres. This gigantic frame was somewhat turned to the left, but it lay more on its back than the other two. By his left hand, laid close to his femur, lay a long flint knife (Fig. 3). About the neck and on the skull were remains of ornaments of teeth and bone, fish vertebræ and pierced shells, among them

the same attitude as the second, with its right hand raised as if to be laid on the shoulder of the individual in front of it. Under or near its head a third flint knife was discovered. Both the two inner skeletons, though of tall stature, were distinctly smaller than the first discovered.

From the position in which the bodies lay it seems natural to conclude that the two smaller individuals here interred were in a position of dependence on the old giant. Amongst the objects found, chiefly, as far as I could gather, about the heads and necks of the skeletons, were remains of necklaces or head ornaments of shell and bone, amongst which may be mentioned bored shells, fish vertebræ, and teeth—apparently canines of

deer—which had been much rubbed down and in some cases adorned with incised lines and nicks (Fig. 4). Of the bone ornaments discovered, the most remarkable were some curious objects like double eggs or acorns connected by a common stem (Fig. 6). These, too, were incised in a similar manner. Amongst the bored shells found I was shown specimens of small *Cypræa* (*millepunctata*), *Cerithium*, and a kind of *Trochus*, and a quantity of *Nassa neritæa*—the same shell that formed the head ornament of the skeleton excavated by M. Rivière in the Barma dou Cavillou.

Another interesting correspondence between the present discovery and that of the Barma dou Cavillou was the presence, in the earth about the skeletons, of lumps of a ferruginous substance, which in this, as in the other cave, had partly stained the bones. There can be no doubt that this had been placed with the departed that he might have the wherewithal to paint his face and body for entry into the Spirit World.

On the osteological characteristics of the skeletons I cannot speak as an expert. They have, however, been examined by competent authorities, whose accounts in the main agree. The skulls were decidedly dolichocephalic. The large skull has prominent supra-orbital ridges, the smaller skull has these prominences less marked and is narrower across the frontal bones, but, still, stronger, thicker, and more definitely ridged than the Neolithic skulls of the Finalese. Professor Issel, M. Rivière, Mr. A. V. Jennings, and more recently Dr. Verneau have been independently led to compare the Cro-Magnon skulls—M. Rivière especially laying stress on the curious rectangular orbits. Prof. Issel, in a communication read before the Natural History of Genoa, although himself in favour of the Palæolithic date of the interments, was yet led to the conclusion that the crania and skeletons presented on the whole the same racial

Laugerie Haute and Basse, but there were included quartzite and other forms peculiar to the still earlier art of Le Moustier. In the same way the bones of extinct animals found lead us on this showing to the conclusion that the "Man of Mentone" dated back to the days of the earliest group of Pleistocene mammals. But as a matter of fact among several cases of bones of animals found in the immediate neighbourhood of the skeletons that have been recently examined all are of recent species, and not a single characteristic Quaternary form occurred. It is to be observed, moreover, that the mere fact that these were interments, implying as it does previous excavation, makes the appearance of Pleistocene remains, and even Palæolithic implements at higher levels in the cave-earth, of no value for determining the age of the skeletons.

The careful laying out of the dead in the attitude of sleep with his flint knife in his hand, his necklace and head ornaments, and the ochre beside him wherewith to paint his face and body in the other world—all this shows a development in religious custom which has hitherto in no single well-authenticated instance been carried back to Palæolithic times. It is characteristically "Neolithic." We may go further and say that the special forms of sepulture discovered here fit on in a suggestive way to the burial rites still practised at a later date on this same coast by the Neolithic people of the Finalese. There too we find the body laid out in the same attitude of sleep, with the legs partially drawn up, an attitude which, as distinguished from the still more contracted posture of the Northern races in primæval times, we may perhaps venture to regard as characteristic of a less severe climate, and the less habitual necessity for drawing up the legs under the shelter of whatever served them as a mantle. There too we find the same bored shells and teeth hung round the neck, and the same ferruginous substance laid

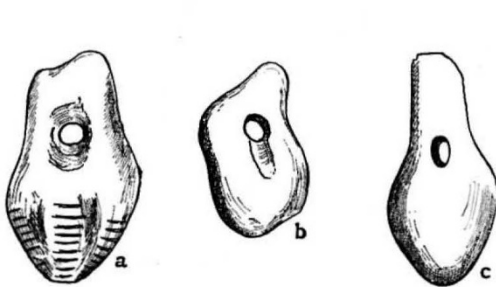


FIG. 4.—Deer's-tooth pendants.

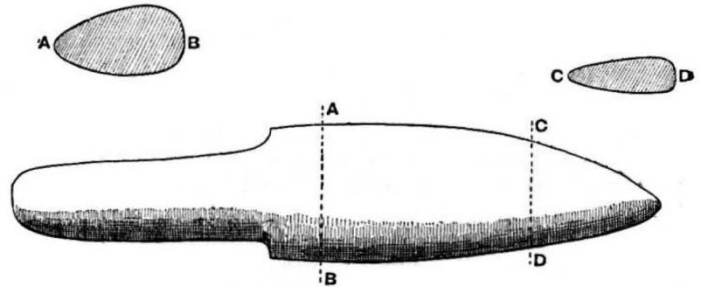


FIG. 5.—Bone arrow-head.

characteristics as the undoubtedly Neolithic skeletons of the caves of the Finalese further along the same Ligurian coast.

The great depth at which these skeletons occurred, and the absence, in this whole group of finds, of pottery, polished stone implements, and the bones of domestic animals, must be certainly taken to show that they date from a considerably earlier period than the Neolithic interments of the Finalese caves—in which all these elements of more developed culture are abundantly represented.

But are we therefore to conclude that the Balzi Rossi remains are of Palæolithic date?

It seems to me that there are other circumstances to be considered in connection with these latter finds, which do not admit of such a conclusion—unless, indeed, the word "Palæolithic" is to be given a sense different from its usual acceptation.

When we come to examine the views as to the extreme antiquity of the instruments, such as M. Rivière has not hesitated to put forward in the most unqualified manner, we find, in fact, a curious illustration of the danger of proving too much. The skeletons lie in all cases beneath a vast mass of cave-earth in which the remains of extinct animals are undoubtedly associated with implements of flint and bone that may justly be regarded as the work of Palæolithic man. Therefore we are told the interments themselves must belong to the same age. Long flint knives such as those discovered, may, it is true, find parallels in some of the later Palæolithic caves such as that of La Madeleine, though like implements were also in common use in Neolithic times. But the argument invoked by M. Rivière leads us to consequences far beyond this. In the cave-earth of the overlying stratum implements occurred not only of types characteristic of the Magdalenian group, of Solutré, and of

beside the departed to deck his person in the Spirit World; there too flint and bone objects (some of these latter of very similar forms) were placed ready to his hand. In the caves of Balzi Rossi, however, the skeletons were at most propped up or pillowed by large stones; in the Finale interments, such as those of the grotto of the Arene Candide, we find, in the case of the adults, stones placed round and over the skeletons so as to form a rude cist, though the children were still simply buried in the cave-earth. In these later interments, moreover, the polished axes and pottery placed beside the dead as well as the remains of domesticated animals attest the higher stage of culture amidst which they had lived. Still the points of similarity in the sepulchral rites practised in both groups are unmistakable. And in view of these points of resemblance the conclusion arrived at by Prof. Issel, that the Balzi Rossi skeletons, in spite of some more primitive characteristics, belong essentially to the same race as the skeletons of Finalmarina, gains additional force.

The bone implements supply us with some fresh points of relationship. The bored pendants, formed of canines of deer much worn down, found with the skeletons both in the Barma Grande and the Barma dou Cavillou are identical even to their notched decorations with ornaments of the same kind found by Prof. Issel in the Caverna delle Arene Candide near Finalmarina associated with undoubtedly Neolithic remains. Identical pendants have also been found in the Neolithic deposit of the Grotta di Sant' Elia in Sardinia. It is to be observed that very similar deer's tooth ornaments, though without the notches, were found in the caves of La Madeleine, Laugerie Basse and Les Eyzies, where they are ascribed to the Reindeer Period. A stumpy bone punch also found near the Barma Grande skeletons, in the possession of Mr. A. V. Jennings, is of the same type as a bone implement from the excavations of the Neolithic deposit

in the grotto of the Arene Candide. Another very close parallel is afforded by the cusped bone instrument represented (Fig. 5), which the Rev. J. E. Somerville, of Mentone, obtained from the neighbourhood of one of the last discovered skeletons of the Barma Grande. Though blunter and thicker, it greatly resembles some of the bone arrow-heads from the Neolithic burial-place in the Arene Candide cave.

Of all the bone objects, however, discovered with the present interments the most interesting are those already referred to as

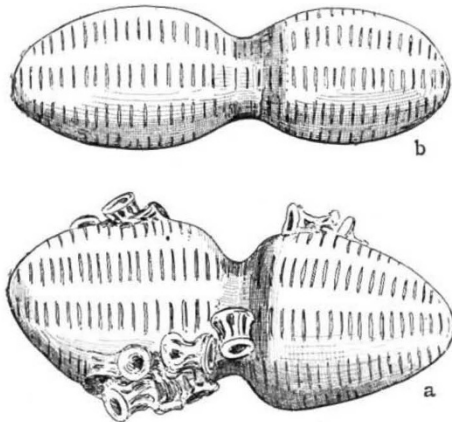


FIG. 6.—Bone ornaments, (a) with fish-vertebrae adhering.

resembling two small eggs, or acorns, with their big ends united with a connecting stem. The bossy part of these ornaments was decorated with rows of parallel lines running up the sides like the rungs of so many ladders. Seven or eight of these are said to have occurred in all, but, like other relics found, most of them have since disappeared. The shape of different specimens varied slightly, some being more elongated than others.

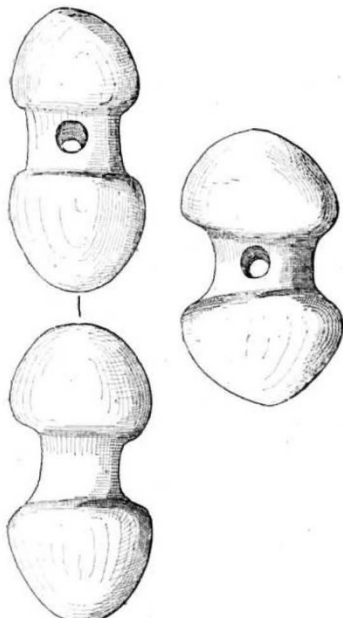


FIG. 7.—Scandinavian amber beads.

But what at once struck me on seeing these objects was the great resemblance they presented to certain amber ornaments discovered with early Neolithic skeletons in the galleried tombs of Scandinavia and North Germany. The objects in question are certain double-bossed ornaments of amber, in Scandinavia generally known as "hammer-shaped" beads, and which, from their supposed resemblance to the stone-hammers of the same period, have been by many supposed to have been worn as amulets. (Fig. 7.)

The geometrical system of ornamentation on the bone ornaments from the Mentone Cave seems to be foreign to that found on bone and horn relics of the "Reindeer Period." On the other hand, like the bone ornaments themselves on which it occurs, it presents the closest analogy to a style of decoration very characteristic of the Later Stone Age in Northern Europe.

The conclusion, then, to which we are led by these converging lines of evidence is that the interments of the Barma Grande and the other caves of the Balzi Rossi cliffs, though embedded in a Palæolithic stratum, are themselves of Neolithic date. On the other hand, however, the entire absence of pottery, of polished implements, of remains of domestic animals, as compared with the abundance of all these features in the Neolithic interments of the Finale Caves further up the same Ligurian coast, is on any showing a most remarkable phenomenon. A greater degree of petrification is also observable in the bone and other objects discovered. *In all probability, therefore, we have here to deal with an earlier Neolithic stratum than any of which we have hitherto possessed authentic records.* If the evidence of these Balzi Rossi interments is to count for anything, it must henceforth be recognised that a race representing the essential features of the later population of the polished Stone Age was already settled on the Ligurian shores of the Mediterranean at a time when many of the civilised arts, which have hitherto been considered as the original possession of Neolithic Man on his first appearance in Europe, were unknown. It will no longer be allowable to say that these supposed immigrants from Asia brought with them at their first coming certain domestic animals, and had already attained a knowledge of the potter's art, and of the polishing of stone weapons. And, if this is the case, something at least will have been done towards bridging the gap between the earlier and later Stone Age in Europe. Till such time, however, as remains of extinct animals are found in such association with human interments as to prove their contemporaneity we must still allow for a vast interval of years between the latest remains of the "Reindeer Period" and interments, such as those of the Mentone Caves.

The racial characteristics of the skeletons of the Balzi Rossi, while linking them at one end with the later Neolithic occupants of the Finalese, show that they had essentially the same physical type as the early skeletons found in Cro Magnon Cave with very similar ornaments of bored shells and teeth. The same features occur again in the skeletons from the Neolithic grotto of the Homme Mort, in Lozère, and in some of the French dolmens, as that of Vignettes. The type recurs East of the Apennines and in Central Italy, Sicily, and Sardinia; and the field of comparison extends to Southern Spain and the Canaries.

The physical connection with the Dolmen people derives additional interest from the comparisons established between the bone ornaments found with the Barma Grande skeletons and the amber hammer-beads of the Scandinavian Gallery Graves, and the decorative system of the pottery found in the same. It looks as if in the polished Stone Age the Neolithic settlers in the North of Europe had transferred to the new materials, such as amber and earthenware, forms and ornamentation which had already been an ancient possession of a race settled on European soil in still more primitive times.

Two shells found with the Balzi Rossi interments, *Pecten maximus* and *Cypræa millefucata*, seem to point to Atlantic connexions. In the later Neolithic interments of the Finalese, on the other hand, which may represent the same race in a more advanced stage of development, we see new influences coming in from a very different direction. Some of the shells found with these seem to have been derived from the Southern Mediterranean, and one, the *Mitra oleacea*, found by Prof. Issel in Caverna della Arene Candide, must have made its way by some primitive line of intertribal barter from the Indian Ocean.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

OXFORD.—Mr. Theodore J Pocock, of Corpus Christi College, has been elected to the Burdett-Coutts Scholarship in Geology. For the Merton Biological Fellowship a strong list of candidates is reported, including among others Mes-rs. F. E. Beddard, M. S. Pembrey, E. A. Minchin, P. C. Mitchell, and R. T. Günther.