

## GENERAL CONSIDERATIONS ON THE PHENOMENON OF BONE CAVERNS

M. Tournal, of Narbonne

(Translated and with Preface by A. B. Elsasser)<sup>1</sup>

The late eighteenth and early nineteenth centuries in Europe witnessed the publication of a number of articles in scientific journals which were concerned with associations of human bones or stone tools with bones of animals thought to be extinct. Not the least important of these articles appears reprinted here. The article by M. Tournal was first published in 1833 in France, in Annales de Chimie et de Physique, Vol. 52, pp. 161-181, under the title "Considérations générales sur le Phénomène des cavernes à ossements." So far as can be determined, the article has never since been translated and reprinted either in the United States or England.

While the spirit of objective inquiry into man's prehistoric past was certainly not lacking even as early as 1800, neither geology nor archaeology had yet been systematized, and interpretations, for example, of sedimentary deposits throughout Europe were still influenced by the story of the Noachian flood. M. Tournal was one of the early figures in the movement which sought to dispel the myth and folklore which surrounded the subject of early man. Prior to 1833 he had published two other articles dealing with the simultaneous occurrence in limestone caves of human bones and artifacts with bones of extinct animals. Glyn Daniel, in his A Hundred Years of Archaeology (1950), names Tournal, along with Schmerling of Belgium, MacEnery of England, and Jouannet and de Christol of France, for example, as contemporary pioneers in the early investigation of this association.

A tribute to Schmerling of Belgium by Charles Lyell (Antiquity of Man, 1863), quoted by Daniel in his 1950 work, may appropriately be applied here to Tournal and the others mentioned as well:

To be let down, as Schmerling was, day after day, by a rope tied to a tree so as to slide to the foot of the first opening of the Engis cave, where the best-preserved human skulls were found; and, after thus gaining access to the first subterranean gallery, to creep on all fours through a contracted passage leading to larger chambers, there to superintend by torchlight, week after week and year after year, the workmen who were breaking through the stalagmite crust as hard as marble, in order to remove piece by piece the underlying bone breccia nearly as hard; to stand for hours with one's feet in the mud and with water dripping from the roof on one's head, in order to mark the position and guard against the loss of each single bone of a skeleton, and at length after finding leisure, strength and courage for all these operations, to look forward, as the fruits of one's labour, to the publication of unwelcome intelligence, opposed to the prepossessions of the scientific as well as of the unscientific public--when these circumstances are taken into account, we need scarcely wonder, not only that a passing traveller failed to stop and

scrutinise the evidence, but that a quarter of a century should have elapsed before even the neighbouring professors of the University of Liège came forth to vindicate the truthfulness of their indefatigable and clear-sighted countryman.

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Many observations have been published concerning caverns with evidences of osseous faunal remains in them. This phenomenon, at first thought so simple, now appears to be very complicated, if one considers the observations and discussions that have taken place in the matter. The circle of interested persons in which the questions were originally discussed has become so vast that it seems useful here generally to review the principal questions involved today in this field.

I have thought that I was, in a manner of speaking, authorized to take charge of this work, because the attention of naturalists has again been fixed on these matters since I have published [1828] on the fossil human bone of the Bize Cavern, near Narbonne, and since the publication of Messrs. de Serres and Jules de Christol on several other caverns in the south of France.

I should like first of all to pay signal recognition to the works of Messrs. Buckland, Bertrand Jeslin and Constant Prevost, who were the first to have thrown light on the curious phenomenon of caverns which contain faunal skeletal remains. The work of Mr. Buckland (Reliquiae Diluvianae), to which one cannot take any exception save perhaps with the title, will always be an admirable model of description and an immense collection of carefully observed facts. It is annoying that we do not have a French edition.

The caverns or grottoes which one encounters so commonly in mountainous limestone formations have always caught the attention of the curious by the odd disposition of passages and rooms which are seen in them, by the impressiveness of the vaults and pillars and by the rocky deposits, called stalactites and stalagmites, which decorate the caverns' interiors in such a bizarre and capricious fashion. Several more or less ingenious theories have successively been set forth to explain the origin of these caves. Thus it has been suggested that they have been the result of the issue of springs charged with carbonic acid, by the dissolving action of water upon mineral materials which are often found in irregular agglomerations, like gypsum, marl, and so on, within calcareous soil. It seems to me that one might better attribute the origin of these caves to numerous disturbances which the soil has undergone, disturbances which must have, in displacing originally horizontal calcareous strata, produced these irregular hollows which underground water has then eroded and enlarged. This theory seems justified by the observation of upthrusting of earth strata in the area in which the caves occur, and also of the interior walls of these caves, where angular

projections are rarely seen: on the contrary, the surfaces are smooth, with rounded contours. However, I do not pretend to be certain that all the caves have been formed in this manner. I wish only to indicate what must have been the most probable general cause.

If the phenomena of the caves were limited to the simple observations that I have just made, and to the theories that have been conceived to explain them, they would not be worthy of attracting the attention of naturalists. But the whole matter is much more vast, interesting, and complicated than might first be imagined. Indeed, in examining closely several of the caverns, it is discovered that a vault sometimes contains bones, pebbles, and silt, all adhering together as a result of the calculous infiltration; that the soil is covered with an ordinarily reddish, silty deposit which also contains bone and pebbles; that the silt or mud, sometimes hardened, fills vertical fissures and more or less extended galleries. In breaking the often quite thick stalagmitic crust which one walks upon, almost always silt is found below it, and with it, bones and other material transported by streams. It is for caverns which present this phenomenon that the name "bone cavern" has been specially reserved.

This observation once recognized, a multitude of questions will present themselves; one asks first of all why certain caverns contain no bones whatever? To what species of animal do the remains buried in the silt belong? Were they (the animals) the same throughout, or did they vary from one location to another? One asks oneself finally how and since when they had been introduced into the caverns?

When these general questions were resolved, new ones presented themselves; these arose as a result of the solutions themselves of the preceding questions. We are going to try to set forth briefly some of the opinions which have been educed on these questions, and their most probable solutions. We shall say here a word about the most recent discussions which have produced several partisan and even opposing camps.

All the caverns, as we have indicated above, do not include bones; some contain only mud or silt and pebbles. In others, absolutely nothing is found except calculous infiltrations or prodigious quantities of guano from recent bats and birds of prey. It is again difficult to tell what the causes of the difference are, or at least to establish, as we have tried to do, a general rule in this regard. Actually, bone caverns are observed at all altitudes, in calcareous formations of very different ages, and at levels which are well above those of valleys of the present time. A point that one might be allowed to hazard is that generally the caves which animals could get into only with difficulty, which for example are located in the centers of high mountain regions, or too distant from water courses, or which must, because of their geographic position, have been out of the range of the animals, do not contain bones. It seems likewise that their presence depends on the age of the caves or upon the time of formation of the openings leading into them. One might easily conceive that the caverns which have remained entirely closed since the time of their formation, and which have been open only occasionally since, this caused by the slow and successive disintegration of mountains, could only have been filled up in quite recent times.

What we have just said naturally leads us to the examination of whether or not the different species of animals buried in the silt and gravel of the caves vary from one locality to another, and to the question of the cause of any such variation. Upon the latter point all the observers are in accord. To be sure, in the deposits of certain caves are encountered almost nothing but bones of a bear species of great size (Ursus speleus); very often the bones are still in articulation,\* (Mr. Pitorre has observed about 15 vertebrae in articulation.) and in perfect preservation.\*\* (Several species of bear have been found in the caves; the most common is one with a convex forehead. Mr. de Serres has observed in the caverns of Minerva (Hérault) a new species which must have equalled the size of a large horse. Those of Bize, near Narbonne, include remains of a small species which is distinguished only with difficulty from the brown bear of the Pyrenees.) In other caverns a considerable accumulation of partially gnawed bones may be observed. The bones belong to different species of animals, among which is noted a large number of hyenas and some perfectly preserved coprolites of these animals. Sometimes vertical crevices\*\*\* (Under the name of "bony breccia" are distinguished rock crevices filled with hardened alluvium, including bones and pebbles. The phenomena of bony breccia, being quite similar to those of the bone caverns, are accordingly found occurring together in the same locality. I believe I can dispense with further talk on the subject; this little note seems to me more than adequate.) contain nothing but the bones of small rodents, birds and small carnivores; but besides the differences which we have just pointed out, one very great one is yet noted in the distribution of the species, and this difference is in agreement with the geographical position of the caves and their situation, which could be in large forests, or better, on the edge of large plains.

It is easy, after what I have just said, to explain how the bones have been introduced into the caves, and one can easily see that the explanation must vary infinitely according to the locality under observation. In fact, in those (localities) where nothing but bear bones are encountered, it is evident that these animals must have lived peaceably in these deep retreats, and during a long period of time. Mr. Buckland has noted in England very narrow corridors, worn and polished by the friction brought about by the continual passage of these animals. After the death of the animals, when their cartilaginous tissue was entirely decomposed, the ground waters must have dispersed their bones and carried them even into narrow crannies.

The manner in which the broken and gnawed bones of different species are accumulated is equally easy to conceive. One has, so to speak, surprised nature in the act, when one has observed in our time the charnel houses of hyenas and other carnivorous animals which carry their prey into grottoes in order to eat them, and which at length accumulate immense quantities of gnawed bones, belonging to all sorts of animals. Now, in the case which concerns us, the identity is perfect, since with the hyenas are found the bones which they have gnawed, and even their coprolites.<sup>2</sup> At the same time it has been observed that in the caverns the bones accumulate in the most remote passages.\*\*\*\* (It is well-known that carnivorous animals have the habit of devouring their prey in dim, remote, spots. The house cat, although for a very long time living in domesticity, has not at all yet lost this habit.) What has just been said for the hyena bone caverns applies equally to caverns

which contain less ferocious or smaller-sized carnivores. In the cavern of Bize, near Narbonne, one crevice contains rat and rabbit bones exclusively; it is quite evident in this case that it must have served as the particular habitat of these small animals.

These examples, to which I could add several others, will suffice to prove that the bones of animals have not been introduced everywhere in the same manner, that the explanation must then vary necessarily according to the locality which one is observing, and that several circumstances could even have concurred to complicate this phenomenon.

It now remains for me to treat a very grave question, one which has given place to several explanations and has excited very animated discussions. I wish to speak of the introduction into the caverns of silty deposits and rolled pebbles in the midst of which the bones were buried.

Mr. Buckland and several other geologists had first of all thought that the cause which brought about transport of these materials into the caverns had been sudden, short-lived, and universal; they attribute it to one of the last upheavals of the earth, to a cataclysm, a general inundation, to a deluge, in short, making thus allusion to the Deluge of Moses,\* which they were trying to support, besides, by other proofs; they had named the soil which they supposed deposited during that tempestuous epoch, and of which the silt of the bone caves made up part, flood soil. (\*I would have liked to avoid speaking of the Deluge of Genesis because it has always seemed to me that one should avoid calling in the authority of religious traditions in scientific discussion. However, since some have wished to pass over the wall of separation, and to place the question on this ground, we must be permitted to pursue in all freedom the thread of our observations and inductions. I shall point out then that the naturalists who have needed the tradition of Moses to support their observations have all committed grave heresies in wanting to remain orthodox. I shall indicate but one: They say that one does not find human bones in the flood deposits. Yet the flood having occurred, according to Genesis, in order to destroy almost the whole human species, one should of necessity find, in the deposits that are said to have been laid down during that epoch, the remains of individuals who were its victims.) Proceeding with this notion, they divided the organic whole which is found buried in the late deposits which were laid down on the surface of the earth into "pre-" and "post-" flood deposits.\*\* (The strongest proof that was brought to bear in favor of the existence of "flood soil," which is designated also under the name "diluvium," was its composition and its wide distribution.)

Some naturalists still think that the diluvian cataclysm was occasioned by an alteration brought about in the axis and poles of the earth, by the collision of a star, or even by the sudden shift in a chain of mountains. They do not fail to cite in support of this opinion the vague traditions of great inundation, which have been handed down by groups of different people, e.g., the submersion of Samothrace, or the floods of Deucalion and Ogyges.

But it will suffice, to upset all these fictions about the shift of the axis of the globe, to put in opposition to them the opinion of Arago,

Fourrier, and La Place. Besides, a thorough examination of the terrain designated under the name "diluvium" proves in the most evident manner that, far from being the result of a single violent, general and short-lived inundation, there have been on the contrary deposits laid down during an extremely long period of time, and that they are the result of a multitude of local phenomena, generally slow but sometimes also sudden and transitory. Actually, to speak only of the silty deposit of the caves, it has been observed in certain localities that the silt alternated with very thick strata of stalagmitic deposit, and that consequently a long time must have elapsed in the formation of the entire deposit. One observes in other localities that this same silt shows several quite distinct layers, and that sometimes it is divided into laminae representing a number of small successive deposits.

I have said above, and I believe it necessary to recall again, that it was not accurate to say that the characteristics of the flood terrain might be everywhere the same. The color, which is in general reddish, depends on the composition of the different calcareous formations, all of which, under the prolonged influence of atmospheric agents, made up a silt colored red by the superoxidation of iron. It is this silt that must have been transported by the waters of rivers, streams, and springs into the caves or crevices where we still observe it today. What I have just said for the silt can partly be applied to the pebbles which it contains. Generally their composition is local, that is to say that they have been transported from adjacent mountains.

Almost always this silt and these pebbles must have been brought into the caverns from top to bottom, through the vertical crevices and not through the present openings to cuts in the horizontal plane, which did not exist at the time of the filling of the caverns.\* (I think, however, contrary to the generally credited opinion, that the streams which now flow in a generally horizontal plane, i.e., in "valleys," far from having filled up the caverns, very often served only to clear them out.) The surface relief must have undergone considerable changes in several places, such that the rivers which today flow in the valleys at that time might have had their courses on or near the summits of the mountains. These changes of relief must be attributed to the breaking down of soil, produced by internal agents, breaking down which was followed no doubt by a lowering of sea-level.

After having proved thus that the bone caverns varied from one place to another, and that they had been filled during a very long period and under the influence of very varied circumstances, it remains for me to speak of new questions which offer a large interest.

The most important is to know if the silty deposit of the bone caverns includes pottery and human bones, and, in the affirmative, if these objects are of the same date. In a word, the question is whether man has been contemporaneous with extinct animal species that are found buried in the caves, animals which have been considered by all the naturalists as fossils, and if consequently there are human fossil bones.

In the terrain considered as "diluvian" and in the silt of the caverns there had been observed for a long time remains of man's industry and some

fragments of human bones, but these objects had not caught anyone's attention because it was supposed that the jumble was later, and accidental. The important men of science wanted it thus and their opinion had the value of a thing already judged. Nevertheless the discovery of the caves of Aude, Hérault and Gard offered for observation a mass of human bone debris and remains of antique pottery, buried in the same deposit with bones of hyenas, lions, tigers, and deer, and a multitude of other animals belonging to extinct species. Attention was then fixed anew on these materials, and Messrs. de Serres, Jules de Christol, and myself, after a close and conscientious examination, thought that all of the objects were of the same date, from which we drew the conclusion that man had been contemporaneous with animal species disappeared today from the surface of the earth and considered as fossils by all the naturalists.

Our observation was based principally on the equal amount of alteration of the bones, and upon their manner of occurrence in the cave. To these proofs have been added others, such as the variety of species which could not have been produced except through domestication; also, the discovery of bones of extinct species, carrying the imprint of cutting implements presumably man-made and so on.

The problem being thus resolved, the secondary question of the existence of man in the fossil state was deduced, as it were, automatically, and became almost a question of terminology, since it was evident that the contemporaries of fossil animals would have to receive the same designation.\* (In a work published two years ago, and which has received wide publicity, I applied myself to demonstrating that the generally accepted definition of the word "fossil" (organic body buried in the successive strata of the earth) did not suffice when one wished to apply it to organic bodies buried in the last strata which were laid down on the surface of the earth, because it was impossible to say where the successive strata were terminated. I must point out again that the physical and chemical characters are hardly helpful in indicating that an organic body is fossil, since the name is given to everything which calls to mind the existence of an organized body. It is thus that one considers as fossils the molds, imprints, and the petrifications of every nature, in a word, the debris of all that has lived, or even everything that recalls a positive existence. Mr. Deshayes has developed this idea well in his work on the description of characteristics of land molluscs.) Also we did not hesitate, with Mr. Jules de Christol, and despite the objections which our observation must raise, we did not hesitate, I say, to proclaim, and we support the idea even today, that man exists in the fossil state. Geologists do not confuse, I hope, our observation with the mystification of the shapeless block of sandstone found at Fontainebleau, and other absurdities.

After what I said in the note above it stands well-established that the situation of an organic body is the sole characteristic to refer to in order to determine if a body is in reality fossil. But as the evidently successive strata are confused and vary but slightly from those which are still being deposited in our times, and as it is impossible to say where some begin and others end, it is equally impossible to say where the organic fossil bodies can be identified as such.

Several geologists, well aware of this difficulty, have admitted the existence of "sub-fossils" or "demi-fossils"; but the difficulty always remains the same, notwithstanding their efforts. Mr. de Serres has likewise attempted to avoid this difficulty by calling the organic bodies buried since the last retreat of the oceans "humatiles" (from humatus, buried body), reserving that of fossils for all those buried during the preceding period. But outside of the inconvenience of a new word given to these quasi-fossils, to these fossils which are not fossils, this new designation offers the disadvantage of depending upon an event which is not yet well fixed in geological chronology, and which, by its very etymology, can be applied to all the buried, organic bodies in the successive strata of the earth.\* (Moreover, if we adopt only the sense which Mr. de Serres attaches to the word humatiles, man would always exist in the fossil state, as it seems proved that since his existence the level of the oceans has risen from 100 to 150 feet above its present level, and that many caverns have been filled since that epoch. This is what would explain the presence of certain marine shells in the deposits of some caverns, and of some bony breccia. [See on this subject the excellent observations of Mr. Albert de Marmora.]) It is desirable then to leave things so that general terms may be adopted, to agree that no limitations be imposed, not to try to establish a division where it is yet impossible to make one, and to agree frankly that since man is contemporaneous with animal species regarded by all the naturalists as fossils, the existence of fossil man cannot be called in question.

The only division that should be adopted, and which has been, I believe, already proposed, is the following:

### Ancient Geological Period

This includes (1) the immense stretch of time which preceded the appearance of man on the surface of the globe, during which an infinity of generations have succeeded each other, and (2) the modern geological period or "Age of Man." This period perhaps divided into:

#### Prehistoric Period

This started with the appearance of man on the surface of the globe, and extends to the beginning of the most ancient traditions. It is probable that during this period sea level rose to 150 feet above its present level. Mr. Reboul is to publish on this subject a very important work, which will remove doubts and will settle many irresolutions.

#### Historic Period

This hardly dates beyond seven thousand years ago, i.e., to the epoch of the construction of Thebes, during the nineteenth Egyptian Dynasty (Josephus cites the kings of this dynasty month by month and day by day.)

This period could be extended farther back, following new historic observations.

This division offers, as one can see, the advantage of being based only on positive observations and of setting aside the solution of the question relative to the limitation of fossils, a question which as I have already said, does not seem to be able to be solved in the present state of science.

Before finishing the discussion relative to fossil human bones, I should state that Mr. Desnoyers thinks that these bones are quite recent, and that they belonged to the first inhabitants of Gaul who established their abode in the caves. This opinion, which seems probable for the cave of Fort near Miallet, in which Mr. Tessier has observed figurines, fragments of jars, bracelets and other antique objects, cannot by any means be applied to the localities which we have described with the Messrs. Marcel de Serres and Jules de Christol, and above all to the cavern visited and described with such care by the latter.\* (It does not much matter, after what we have just said, that the Aquitanians had retired into the caverns, and that Caesar had ordered that they be shut up there. Even the judgment of Florius in these affairs does not matter. To want thus to generalize all these examples, and to say that wheresoever one observes a melange of bones of human beings and extinct animal species, this mixture has taken place at a later time, is to present a conclusion of non-acceptance and to declare the problem a priori insoluble. But yet again, and notwithstanding what I have just said, I recognize that the observations of the Messrs. Desnoyers and Tessier are true and offer something of importance; only they do not seem to me amenable to general application.)

I now come to another order of considerations which, although not resting on such positive data as the preceding, nevertheless offer a great interest. I have already said that probably since the appearance of man on the surface of the earth, sea level had risen about 150 feet above the present level. The breccias of Cagliari, Nice, Gibraltar and Tripoli would be proof of this, since they include marine shells. It would be the same with a deposit of shell, including pottery, observed by Mr. de la Marmora at Cape Saint Hospice, near Nice. This same phenomenon is presented also in the bony breccia of Dalmatia and of Syria, which include likewise human bones, and, according to Count Rasoumovski, in the ossiferous gravels of Bades, near Vienna.

Mr. Boué has called to our attention that these occurrences had been noted in too many places to be able to fit the more or less ingenious explanations by which one has human bones introduced in these deposits since historic times.

Conceding then that these different observations are accurate; that the sea-level has diminished by fits and starts; that this diminution has been occasioned by shocks imparted to the soil and the sudden reëlevation of great mountain chains, and that the last retreat of the seas took place whilst man already existed on the surface of the globe, we shall have a new proof that all the bone caverns are not of the same epoch, that a great number were under water during the Tertiary Period, and that certain of these whose level is very little elevated, may well have been submerged during the prehistoric period. According to this viewpoint, the caverns would have been filled only in proportion to their immersion.

If it were permitted to set forth an opinion about the remains of our species, of which I have spoken above, and which are found buried in the caverns and bony breccias in several locations in Europe, I would have ranged myself on the side of the naturalists who think that our regions could have been successively inhabited by different races of men.\* (The form of the

heads found at Vienna approaches that of the African or Negro race. Those found in the fluviatile mud on the banks of the Rhine and the Danube show great resemblance to the heads of the Caribs or those of the ancient inhabitants of Peru and Chile. I would be able thus to multiply examples, but these that I have cited will, I think, suffice.)

It is true that, in attributing to our species such remote antiquity, one has the right to be surprised at not finding even in man's unwritten history the tradition of violent upheavals which the earth has undergone and following which mountains were suddenly uplifted, rivers have changed their courses, barriers which held back immense quantities of water have been broken down, and the shore lines of the sea were extended. If history remains silent on all of these events, or if we have only extremely vague or fragmentary reminders of them, this is because traditions diminish as sources of information in proportion as they are removed from their points of origin. It is not, then, in examining the old chronicles or even in studying the mysterious writings of the most ancient peoples that we shall be able to hope to discover the early history of the human species. Geology alone can reconstruct the time sequence; but this science is still brand new--it offers an immense field of observation and promises the furnishing of a supplement to our short records. It is necessary here more than elsewhere to apply philosophic doubt, to adopt nothing lightly, nor to reject anything except after severe and impartial examination.

I shall at this point terminate these observations, already quite lengthy, although I have tried to shorten them as much as possible. I think it necessary to review in a few sentences the principal points of this work, which is nothing, so to speak, but a summary of the present state of our knowledge upon one of the newest and most curious questions of geology.

1. The bones buried in caverns have been introduced there in several different ways.
2. The buried species vary from one locality to another, and this difference depends either on the time of filling or on the geographic situation of the cavern.
3. Man has been contemporaneous with extinct animal species which are encountered buried in the alluvial deposits of caverns, animals which are regarded by all the naturalists as fossils; man exists, then, in the fossil state.
4. The silt and the pebbles which are found in the bone caverns have not been introduced into these cavities by a sudden and shortlived cause, but on the contrary have been introduced almost always slowly and in several different ways.
5. The close examination of pebbles included in the silty deposit proves that they obviously have been carried from neighboring localities, and consequently that the agency which transported them was entirely local.

6. The period during which the bone caverns have been filled has been a long one.
7. In certain caverns, the silty deposit, the bones, and the pebbles have been introduced simultaneously; in others, on the contrary, the silt has been introduced later, and has thus moved in, as it were, on the bones.

Table of Animal Species Found in the Caverns  
of the South of France

Elephant	Lion	Hare
Rhinoceros	Leopard	Rabbit
Wild Boar	Lynx	Lagomis
Horse	Fossil Hyena	Field Mouse
Oxen, two species	Striped Hyena	Several species
Deer, five species	(Christol)	of bird
Antelope, of a very large size	Brown Hyena	Terrestrial tortoise
Chamois	(Christol)	Lizard
Goat	Dog, two species	Snake, of the size of the <u>Coluber</u>
Sheep	Wolf	<u>nutrix</u>
Bear, at least two species	Fox	Badger
	Polecat (Christol)	Tiger
	Marten (Christol)	

The sole difference which exists between the caverns of England and Germany, compared with those of the south of France, is that in England is found the hippopotamus, and at Sandwik in Westphalia, the glutton [Gulo gulo].

M. C. Prévost likewise has just observed bones of the hippopotamus in the caverns of Syracuse.

ENDNOTES

- (1) Mr. Elsassser is Archaeologist, University of California Archaeological Survey. The translator's and editor's notes will be indicated by number and found at the end of the paper. The author's notes are indicated by asterisks (\*) and are retained in the body of the paper (Ed.).
- (2) For an exhaustive review of this claim, see Dart, 1956 (Eds.).