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Originalveröffentlichung in: Field manual for museums (Museums and monuments Bd. 12), Paris 1970, S. 59-73; Online-Veröffentlichung auf Propylaeum-DOK (2024), DOI: https://doi.org/10.11588/propylaeumdok.00006555

The techniques of archaeological excavation

4

INTRODUCTION

Archaeology is a history discipline, but has its own research techniques, which make it akin to philology. Just as the philologist studies a text, so does the archaeologist study a monument. The aim of both is to decipher a portion of historical truth from the fragment which has been conserved, and to make a critical study of the past.

The basic technique of archaeological research which enables the research worker to obtain his study material is excavation. This is not the sole technique used by modern archaeology, for there are many others. Present research is complex in nature, and the choice of technique depends largely on the site, on the nature of the finds and on many other factors. It would take too long and serve little practical purpose to consider all the possibilities open to the researcher. For it has to be remembered that archaeological excavation is not a discipline on its own, but one among other research methods aimed at the scientific interpretation of history. On the other hand, there are undoubtedly certain categories of archaeological excavation from which any person of education, who finds himself called upon to uncover or preserve a relic of the past, can derive practical information.

The fact that excavation techniques are not taught at universities is not due to lack of basic rules, methods or systems of excavation, but because, as already stated, excavation is not an independent field, but an often complex set of actions which vary widely according to the geographical and demographic contect, type of terrain, etc. The only way of learning excavation techniques is by practice, and not by studying in libraries. We shall therefore confine ourselves here to presenting practical recommendations based on experience.

ACCIDENTAL FINDS

It often happens that extremely valuable relics of the past are accidentally found in the course of agricultural work, pipe-laying, the construction of foundations or the building of roads, or even by a passer-by scratching the ground with his cane. The question then arises of preserving chance finds of this type and, if they are transportable —sculptures, receptacles, etc.—of placing them in the nearest museum, museum store or other safe place, such as a school, administrative building and so on, so that they can be thoroughly studied by specialists under proper conditions.

Again, the find may not be a single transportable object but a whole group of objects, the discovery of one item on the site heralding that of many other similar vestiges of the past. A vessel turned up while tilling the soil may form part of a group of objects belonging to a tomb or an entire cemetery of perhaps major scientific importance, or a piece of old brick-work or worked stone turned up when laying foundations may be the remnants of an old building whose

presence there had been entirely unsuspected.

What should be done, therefore, when a discovery of this kind has been reported?

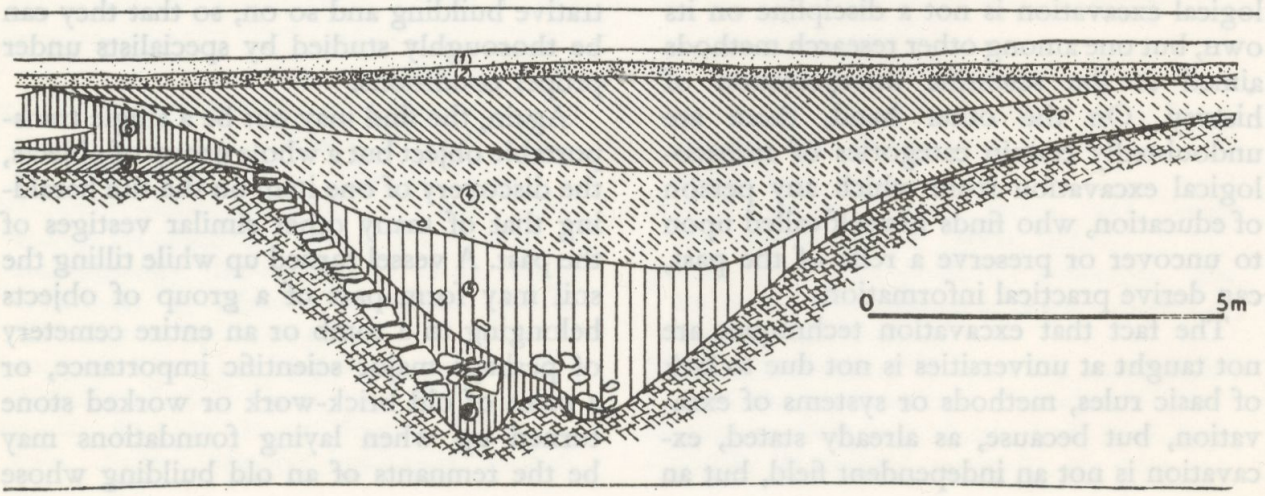
Study and protection of the site

The main thing is to make a detailed observation of all the ostensibly secondary factors which accompany the unearthing of the find. Next, the scene of the discovery has to be protected. Whereas the first operation involves simple actions, usually requiring nothing more than a camera, a ruler, a notebook and a pencil, protecting the site may often present serious problems as far as the administrative regulations of the country are concerned. In most countries, however, there are special regulations for safeguarding monuments which authorize the stoppage of work, even in progress, if the chance find has important scientific and historical implications.

The first thing to be done, on arriving at the scene of the find, is to photograph the object in its existing state, placing a ruler beside it in order to record its dimensions. At least two photographs should be taken —a close-up, and another showing the position of the object in relation to its surroundings. After that, the depth at which the object was found has to be measured, the seriation of the soil levels which cover or covered the object and are still visible in the trench has to be recorded in the notebook by means, say, of a rough sketch, and the sequence of layers beneath the object has to be indicated, if at all possible (Fig. 5).

Where the object has not simply been taken up (from sand, for example) the type of layer must be carefully noted. It soon becomes evident, when digging a trench, that the quality of the soil at a certain depth is not uniform, either as regards earth colouring or clay content. Traces of lime, ash of other substance are sometimes found to be present, for the object is usually found in a 'cultural layer' which was once the soil on which people lived. There will thus be fragments of ordinary earthenware, or sometimes rubbish, charcoal, ashes from domestic fires, and so on. All this should be noted as accurately as possible. If there is a building, road or other notable feature in the vicinity, the position of the find in relation to these visible and more or less permanent surface features should be meas-

Fig. 5. Profile of a tomb, Iwanowee, Poland.



ured. In addition, a lay-out plan should be made.

A not infrequent occurrence is for the chance find, such as a large vessel or fragment of sculpture, to be extracted by inquisitive onlookers before the person responsible for its conservation arrives. This is regrettable, for a chance find is as important, for the archaeologist, as the discovery of a murder is for the criminologist. It is common knowledge that if anyone finds a corpse in circumstances which point to murder, he should beware of moving it before the arrival of the police, whose job it is to take the photographs and measurements which are of vital importance for the investigation. The same applies to archaeological monuments. Archaeological methods resemble methods of criminal investigation, except that their object is to discover, not a murderer, but the historical setting of which the find is at once the expression and the evidence. And often the conditions under which it has been conserved up to the present are more important than the fingerprints found at the scene of a crime.

Where notification of the find arrives after its extraction, the same measurements, descriptions and photographs as specified earlier must be made *post factum*, with a specification of the point where the object was found. After that, check soundings must be made round about in order to ascertain whether the find is an isolated one or the first of a larger series of monuments, for, as already stated, the vessel, say, may be an item of funerary furniture or a vestige of an ancient habitation which the finder has come upon by chance.

Check soundings

The check soundings must be made with deliberation and close attention, particular note being taken, in the manner mentioned above, of the arrangement of the soil layers.

In the case of surface finds turned up by ploughmen, there is no need to make check soundings at any depth: a 50 cm trench might be all that is necessary. If the find is made during trenching, the sounding should go down to a considerably lower depth than the trench. It should be borne in mind, incidentally, that check soundings are essential even when it is the archaeologist himself who duly extracts the object after notification of its discovery.

Extraction and care of the objects

The extraction must be done with the utmost care. To keep a cracked vessel in shape, for example, use has to be made of paraffin wax, spreading it over the visible parts of the object before trying to separate the latter from the soil with the aid of a knife or spatula.

Objects that have been lying in the soil are usually impregnated with salt, and are therefore very liable to deteriorate when exposed to the atmosphere. Suitable boxes padded with shavings or cotton-wool must therefore be prepared in advance for encasing fragile objects after their removal from the soil. Each object removed should be immediately measured and recorded in the notebook in the order of discovery. An object may occasionally fall to pieces during removal, but where the earth is firm an imprint of its shape may sometimes remain. Where this happens, plaster casts are made of the negative imprint in the soil. It is desirable to have extracted objects photographed forthwith, even before cleaning, which as a general rule should be done in suitable premises. Once all the objects in the find have been extracted, the site should be carefully cleaned with a broom and re-photographed. All photographs of the site should include a graduated ruler.

The transport of the objects, even if only to a temporary museum store, should be effected with great care, avoiding any jolting.

But where the object found is a non-transportable monument, such as a mosaic forming part of a building, its extraction has

to be carried out on the spot, exact measurements recorded, photographs taken and a detailed description made, for example, of the ornamentation or of the scene represented on the mosaic. In the case of architectural fragments, precise note must be taken of the state of preservation of the building of which they form part.

With non-transportable objects, of course, the utmost pains must be taken to conserve them on site, it being necessary, very often, to employ guardians to keep watch over them. The chance find of a non-transportable monument is often the prelude to systematic excavations of the site.

The steps to be taken on unearthing a monument of this kind are accordingly described in the following section of our recommendations, concerning excavations proper. In either case, once the chance find has been conserved, a detailed report should be drawn up giving full results of the observations and measurements made and a copy of it sent to the higher authority concerned. The report should also include an exact inventory of the objects found, together with a brief description of them and particulars of their dimensions and composition.

The present practice is to use colour photography as far as possible for photographic documentation, and modelling clay and latex for casts. When extracting fragile vessels made of bronze, acetone is used for cleaning surfaces and vinavyl for reinforcing the parts uncovered prior to extraction.

EXCAVATIONS

Prospection

As stated above, a chance find may give rise to systematic excavations, although this is not always the case. Very often, the choice of excavation sites is based on other indications. Take, for example, that cradle of mighty civilizations of the past, the Mediterranean basin, concerning which the information given by ancient authors, later literary tradition and fragmentary inscriptions containing geographical names are important pointers to the location of a bygone human settlement which has disappeared from surface level. In order to choose the site effectively and begin systematic excavations, the site has to be 'prospected', this operation comprising two phases: (a) observation of the surface; and (b) check soundings. It is usually possible, on the basis of the data thus collected, to determine broadly the area of the soil covering the ancient ruins.

The results of this first operation can never be definite or decisive, for ancient towns, settlements and even groups of religious buildings have undergone repeated changes during the centuries, and the area used by man has expanded and contracted in turn. Usually, the likelihood is, after prospecting, that a number of layers—urban ones, for example—will be found on the site, each of them sometimes representing several centuries of occupation.

Aerial photography

Prospecting is greatly facilitated by aerial photography. Taking photographs from an aeroplane, and on occasion from a captive balloon, makes it possible to correct the data obtained by surface observation and soundings. But aerial photography also makes it possible to reconnoitre places of which there is no historical mention, groups of ruins, settlements or cemeteries. It is sufficient to recall the discovery, by this method, of large numbers of Etruscan tumuli in Italy, or ancient settlements in North Africa. For it is well known that at a certain altitude, and if the sun's rays make an appropriate angle of lighting with the ground, the remnants of ancient walls, ditches etc. which are invisible at ground level are rendered highly visible in photographs by differences in vegetation or sand coverage.

Before beginning excavations on the site generally defined by prospecting, detailed topographical documentation has to be prepared with the aid of a theodolite. A contour map of a scale of 1 : 50,000 or 1 : 100,000 is drawn up, depending on the extent of the area which is of interest to the archaeologist, with indications of the elements visible on the surface, such as existing structures, clumps of trees, or even surface ruins. It is true that all these may disappear as the excavation work proceeds, but during the first phase of site operations they may constitute important markers. A few photographs should also be taken of the complete site so that they can be co-ordinated with the contour map—i.e., so that the corresponding sections of the latter can be found and identified on them. Where the site is level and not covered by large-scale ruins, with ancient structures buried beneath débris and sand only, the contour map should be immediately marked by a grid (usually 20 × 20 m), which will serve for pinpointing the ruins or objects subsequently discovered.

Geological analysis

The second preliminary operation is the geological analysis of the soil. Advantage can be taken, in this connexion, of the check soundings already made, with a study being made of the profile of the soil layers. This kind of preliminary study is specially important for prehistorical excavations. In any case, the archaeologist starting to excavate should be completely familiar with the nature of the soil covering the relics buried underground. The technique will not be the same for excavations in driftsand of the desert as for those in 'sebakh', or the powdered organic products of old middens containing a high proportion of nitrogenous compounds. Similarly, the measures to be taken will differ according to whether the ruins are covered by river silt due to flooding, or whether humus is present. In North Africa, rock débris due to erosion is also a frequent occurrence. Finally, the method to be followed will be quite different if the site is filled with débris from vaults and walls.

The preliminary analysis of the soil is also important for establishing the thickness of the sterile overburden (archaeologically speaking) covering the monuments. By this is meant a layer of soil containing neither potsherds, nor tool fragments, pieces of wall, etc.—in short, anything testifying to human activity and capable of serving as an index for designating the cultural stratum *(Plate 4)*.

Excavation techniques

Once it has been established that down to a certain depth, which may sometimes be only a few centimetres, the soil covering the ruins is not in the nature of a cultural stratum, and after subjecting it to a geological analysis, the process of clearance can be expedited by using machines of the bulldozer or excavator type in order to remove the surface layer from the archaeological site. Great circumspection must be exercised, and there are sites on which the use of such equipment is neither possible nor desirable. But an experienced archaeologist tagging along behind the bulldozer and regulating the levelling depth runs less risk of damaging the cultural layer than if he had to supervise several dozen excavation workers. This excavation technique is commonly used in the Soviet Union; it is very effective, and makes the clearing process much quicker.

One of the most important decisions the archaeologist has to take when beginning the excavation work is to select the place for dumping the spoil. This is no easy matter. In principle, it should be dumped at a point where no further trenching will be done —away, that is, from the actual archaeological site previously studied by soundings. The aim is to avoid the unnecessary work of shifting earth from one place to another. Unfortunately, it is not always possible to keep to this programme completely. It depends on the size of the archaeological

site and on the technical aid available. In the case of large-scale excavations, the earth is shifted by means of tubs or tip-wagons. For smaller-scale excavations where suitable equipment is lacking, other arrangements need to be made, such as the use of rock-beds or natural reservoirs (for example ponds, lakes, the sea and even rivers, like the Nile).

And what of the nature of the excavation itself? As stated at the outset, there is no technique which is applicable in all cases; techniques are legion, and the choice of method depends on the nature of the monuments and sites. In the case of the remains of structures made of such materials as wood or beaten earth, great care must be taken once the first cultural layer has been removed.

Grid method

We have already referred to the grid made on the contour map. Sometimes this grid is first traced on the site itself and then transferred to the map. The 20 m squares are then divided into smaller ones. Mention may be made, in this context, of the grid method successfully used by Sir Mortimer Wheeler. The site divided into miniature squares is excavated in such a way as to leave the baulks separating the squares intact, the thickness of these virgin baulks depending on the solidity of the soil. As the excavation of the site within the squares progresses, the surface will begin to look like a large furnace grate. Another advantage of this method is to facilitate stratigraphic studies in the individual squares.

Within these, the earth is removed with a spatula and a knife, instead of a shovel, and observations and notes of all the soil tints are made on the spot, using coloured pencils, once the cleared surface has been cleaned with a brush. These tints also provide an indication of the texture of the soil, for a layer of beaten earth, for example, differs in appearance from one of driftsand or silt. The charred remains of wood are unlike the crumbled débris of walls of buildings, and the remains of piles, ditches, wells and so on are different again.

The position of every object found should be measured both horizontally and vertically. Only strict documentation and very exact observation of the location of the horizontal layers can provide a basis for archaeologically sound interpretations. The objects found will be treated in the same way as when preserving chance finds (see above).

Stratigraphy

As the work advances and exact observation proceeds, a picture of the causes of the destruction of the edifice in question (fire, earthquake, etc.) will emerge with increasing clarity. As the digging goes deeper, the outline of the cultural layers begins to appear on the profile of the excavated square. In this way, excavation by layers provides us with a very clear picture of the stratigraphy of the site. It now becomes a question of being able to date each level in an adequate manner. To that end, use is made of the objects found and their correlation with the superposed ones. The finds may consist of intersecting walls separated by a layer of alluvium, food remains or bones of animals dating from the periods of human occupation of the site. The history of archaeological excavations provides us with numerous examples of the superposition of several cultures on a single site: an experienced archaeologist can sometimes identify more than twenty down to a depth of 20 m.

If, even at only a few levels, objects are found which are not difficult to date, such as coins or fragments of vases which can be chronologically placed with complete certainty, it will be possible, by carefully noting the position of the levels, to establish a hypothetical chronology having a high degree of probability, even for levels not containing precisely dated objects.

For the archaeologist, the carefully cleaned profile of the excavated sector will constitute a chronological table, as it were, of the site.

Plate 4.

Layer of lime, dating from the middle of the third century, on the forum of Diocletian's camp, Palmyra.

Plate 5.

Composition of the strata, Serock, Poland.

Plate 6.

Unearthing a first-century oven in Diocletian's camp, Palmyra.

Plate 7.

Cleaning out a second-century lime kiln, Tell Atrib.

Plate 8.
Classifying pottery, Palmyra.

Plate 9.

Reinforcing a third-century column in Diocletian's camp, Palmyra.

Plate 10.

The conservation expert Gazy cutting out a fresco in the great cathedral, Faras.

Where stratigraphical dating is concerned, however, it must not be forgotten that objects in upper layers may sometimes have been subject to transfer to lower layers through the action of burrowing animals or by some other cause. For this reason, scrupulous observation is necessary as regards the stratification of an archaeological site. It should be remembered, in this connexion, that 'comparative stratigraphy', or the study of analogies between the stratigraphies of different sites, is a very useful aid to the archaeologist. Claude Schaeffer's work, *Stratigraphie Comparée et Chronologie de l'Asie Occidentale (III^e et II^e Millénaires)* is a good example. Stratigraphy is of manifest value at the present time in conducting archaeological research on large numbers of excavation sites. It should nevertheless be noted that stratigraphy was first applied in the case of prehistory discoveries, especially in caves and grottoes, which means that it was used for studying periods for which we have neither the coinage nor the epigraphic material which make the dating of cultural levels so very much easier. All that the experts specializing in the most ancient epochs could apply was a relative chronology based on a very careful study of layers of food remains, of certain tools often covered by a layer of silt, or refuse stemming from later human activity. It was thereby possible to specify different periods of utilization of the 'shelter', abandoned by man for a certain period and then re-used *(Plate 5)*.

Documentation

But taken together, our methods of archaeological documentation, even the most modern, such as precise measurement, detailed photography, chemical analysis of soil and monuments, dating with radioactive carbon C^{14}, the use of radio-isotopes for photographs of the X-ray type, an analysis of the animal or human bone remains and organic products carbonized or impressed into the soil, are simply the application of the advances made by science at a specific historical stage in its evolution.

The archaeologists of past generations were also convinced that the documentation they were using was completely methodical. But just as today we pass severe judgement on the shortcomings of former documentation procedures, so we can confidently expect that future generations of research workers will have much to criticize us for. The present shortcomings can be partially offset by leaving 'control' plots on the excavation site, i.e., plots protected from erosion and left untouched by the shovel or spatula, and covering, perhaps, 10 m^2 or even less, depending on the nature of the archaeological complex. Almost a century ago, Heinrich Schliemann, the discoverer of Troy, left control plots of this kind on the mound of Hissarlik, and it is thanks to them that the merican Aarchaeologist Blegen was able, in the 1940's, to establish a more precise chronology of the results of the excavations made by his illustrious predecessor.

Specific cases

We have given an example of only one method of conducting excavations. But if it was proposed, say, to use that method for work on large groups of ruins in the Mediterranean world, such as those of Palmyra, it would be tantamount to entering a large scientific or even specialized library containing thousands of books and setting about reading all of them, beginning with the first book on the top shelf on the left. In cases like the above, a different method of excavation has to be applied, for if great heaps of rubble comprising large architectural blocks of decorated stone, inscribed slabs and so on had to be removed in layers, the results would be nil; apart from which any kind of excavation work would be rendered impossible.

In the case of monumental architecture, observation of soil colourings beyond a depth of a few centimetres is completely

pointless. Other criteria for soil stratigraphy must therefore be used in order to determine the process and period of construction of the edifice, and to decipher its history. In clearing groups of ruins covered by débris and piles of earth, usually of alluvial origin, a study must be made of the composition of the débris itself, of the traces of deposits on the walls of the edifice, and of surface or buried blocks. It is often possible to deduce therefrom the cause of the collapse of the building and to determine, by means of smaller finds, the date of the catastrophe; and by noting later changes and the nature of the wall structure of additional parts built on, it is often possible to make a fairly accurate reconstitution of an historical phenomenon. This is not to say, however, that while clearing a room, for instance, or a well belonging to the group of monumental ruins studied, a more precise stratigraphy of the site would not be useful; and in such cases the application of the method described above might well be desirable.

Necessary destruction; reconstitutions

Hardly a day passes without the archaeologist directing excavations finding himself faced with the necessity of taking decisions of extreme importance. To reach the lower levels or to clear a room which had at a later stage been sealed by a wall, he has to dismantle the wall and hence destroy the whole or part of a structure, of ancient origin, indeed, but later than the building as first designed. He sometimes has to take the decision to dismantle an entire section of an ancient town constructed on the walls of dwellings dating from an even earlier period. In other cases, it may be road pavings that are superposed. Occasionally, the decision may concern a fine building, itself ancient and fairly well preserved, but topping an older building *(Plate 6)*.

In difficult situations like this, the findings of an international committee of experts are essential, as in the case, for example, of the famous Roman theatre at Bosra, in Syria, which was later converted into a mosque. But in practice, as stated, the archaeologist himself has to make the decision about destroying a relic of the past, not only from day to day but sometimes even from hour to hour.

What, then, should be done?

Apart from compiling architechtonic documentation and making special plans and sections, descriptions must be made of the piece of wall or entire building to be eliminated and must be included in the general site plan. When dismantling walls, care should be taken to make sure that they are not composed of blocks derived from even older buildings, for it is quite possible that these may have been used for the reconstruction of a major monument. It was common, in ancient days, to use components of older and disused buildings for construction purposes. How many fine sculptures and inscribed stones have been found incorporated in walls which at first sight seemed all of a piece, or embedded in the foundations of ancient buildings! The Egyptian pharaohs of the New Kingdom made use, in building the pylons of their temples, of materials from the older temples of the Middle Kingdom, which were probably partially in ruins at that time or were deliberately destroyed in order to serve their new purpose. The material thus disengaged is sometimes so abundant as to permit the reconstruction of an ancient monument which at a late stage was used as a quarry (as at Karnak, in Upper Egypt).

But in the ancient world, buildings were made not only of stone. In areas where there were no stone quarries, the principal material used was unbaked brick. This was the case, specifically in the Nile delta, and especially in other parts of Egypt and in Mesopotamia, where fortifications several metres high as well as forts and palaces were built of unbaked brick. Where these structures have been covered with alluvial mud, an additional difficulty arises during exca-

vation: it is sometimes almost impossible to distinguish between the brickwork and the earth cover. In this case, it is necessary, after digging a deep trench, to wait until the sun's rays have dried out the profile of the trench, and the difference between the wall and the mud then becomes apparent. Where deep trenches are dug in wet soil, it is sometimes necessary to use pumps which at least make it possible to disengage the structure quickly so that measurements can be taken and documentation prepared. On dry sites, the present practice is to use an inclined conveyor belt in order to remove rubble and earth from deep trenches.

Excavation methods

We have referred here to two diametrically opposite methods of excavation work. But there are many other methods in between. The system of deep wide trenches is sometimes used in order to make what might be called extended soundings. This makes it possible not only to work out the stratigraphy of the site, but also to study the position of certain structures whose nature and state of conservation do not justify total clearance and detailed exploration.

Another method that is sometimes used is for clearing tumuli. These are usually in the form of a hemisphere; the latter is divided into four quadrants, two of which, on opposite arcs of the circle, are cleared in the initial operation, for it may prove to be not worth while clearing the other two.

In clearing cemeteries, all the above-mentioned methods may be used, provided that a separate inventory of finds and complete photographic survey documentation are prepared for each grave. It is extremely important, when clearing graves, to take accurate note of the position of the skeleton and the arrangement of the funerary furniture—i.e., the vessels and other objects placed beside the body.

In the case of the large underground tombs known as hypogea, the utmost care must be taken in clearing the underground corridors, which are liable to collapse as the penetration of the tomb advances; and props are therefore used, as in mines. Speaking of safety measures during excavations, it should be borne in mind that old walls cleared of sand and earth are also liable to collapse. In particular, when dismantling latter-day walls which block access to earlier structures, all the necessary safety rules should be observed, especially if the walls are built on sand.

Inventorizing

The archaeologist should never be without his notebook, ruler and camera on the site. But his work does not end when the day's work on the site is done, for its completion leaves him and his colleagues free to begin the actual listing of the objects which were found during the day and which will be transported to the temporary storehouse as the work proceeds.

The techniques of inventorizing have already been discussed in respect to chance finds. There are certain monuments which call for rapid cleaning and conservation operations *(Plate 7)*. At present, casts and prints are made of inscriptions so that they can be given a first reading. Similarly, coins and metal objects are given a first cleaning with a diluted mixture of soda lye and zinc. But before the archaeologist's heavy day is finished, he has yet another task to fulfil —completion of the excavation log in which he records the major finds, the decisions taken and his preliminary (and sometimes mistaken) conclusions, which he will correct in due course.

In addition, the archaeologist making excavations on a Mediterranean site is obliged, at regular intervals, to carry out another operation from which his colleagues excavating in, say, Central or Northern Europe are normally exempt. He has to classify thousands of potsherds, turned up

in hundreds every day. It would be irrational to try to inventorize and describe every one of them, as with isolated finds or as in excavations made in Europe, where pottery is often the only archaeological document available. Here, again, the example to be cited is that of the research worker in the library: the archaeologist has to know where and how to look, and what is important for his research, and be able to place documents in order of their priority significance. To try to retain everything is to retain nothing. The archaeologist therefore has to classify the earthenware objects, this being done in two stages.

The first stage will cover a single area, not too large, such as one room of a building. Among the hundreds of shards found, the archaeologist selects those which he adjudges to be pieces of a vessel and which he thinks will help in its reconstruction, those characterized by striking ornaments and those characterized by a particular type of clay or by an unusual mode of firing *(Plate 8)*. The material thus separated into two groups—as a rule, there are twice as many rejected shards as there are retained for the next grading—should be stored away in a suitable place (not necessarily a store-room) with an indication of the date and place of the find. On completion of the excavation work in a given section, for example, after clearing an entire structure or collection of graves, the archaeologist proceeds to the second stage of classification of the previously selected shards. Once again, a large proportion of the material is discarded and the only pieces kept are those which constitute valuable and important documents from the historical or artistic point of view. They are then inventorized. Obviously, the classification of pottery requires a certain amount of experience and a good knowledge of the site. The tiniest fragment of a black-varnished Attic vase, which would be of little value in Greece, will be carefully listed if it turns up in excavations in Egypt.

Conservation of walls and frescoes on the site

As the excavation proceeds, the archaeologist must give thought to the state in which the excavated site has to be conserved. The problem, where cultures are superposed, is not easy to solve. The archaeologist has to try to conserve what is most important and constitutes a definite group of relics of the past. Before the season ends, the excavated walls have to be conserved so as to secure them from deterioration by rain. Only in Upper Egypt are archaeologists spared this worry.

To consolidate excavated walls, cement is used in blends carefully worked out so as not to detract from the original nature of the structure. In some cases, a certain amount of consolidation has to be done as the excavation work proceeds. There are occasions when the archaeologist has to see to the anastylosis of a column or pillar as part of excavation work *(Plate 9)*. Clearly, all these are makeshift processes. Conservation proper, accompanied by partial reconstruction of the archaeological assemblage, is a field on its own.

Mention should be made here, perhaps, of the methods used to conserve on site the fragments of mural paintings unearthed in the excavation area. The process recently developed by the Polish mission at Faras, during the archaeological work conducted in Nubia under Unesco's auspices, was as follows. After cleaning the frescoes, one or two layers of Japanese vellum were applied by ironing it on, together with a mixture of beeswax, rosin and turpentine, suitably blended after several experiments made on the spot. Once the surface was covered with the paper, a second sheet, this time of gauze, of larger size than the mural, was applied with a hot iron and wax mixture, as before. After that, the painting thus preserved had only to be protected from the sun. To remove the paintings, special saws were used to saw them away from the wall. (In general, if the sawing is done by a skilled

operator, there is no risk of paintings being damaged *(Plate 10)*. Before removal of the paintings from the wall, a wooden scaffolding shaped like a sledge was backed on to the wall by means of ropes tied to the upper edge of the cloth projecting beyond the mural. Each sawn-out fresco was then deposited slowly on the scaffolding and the latter placed in a horizontal position, after which the fresco was shifted on to a plank, using the same ropes, and the parts of the wall and rough-cast weighting down the back of the fresco were filed off so as to leave a smooth surface. For transport, the frescoes were packed in special cases with inside quilting.

Report

The archaeologist's last task, after completing the excavation, is to prepare a detailed report on his finds. In theory, for each excavation site there is a basic library collection enabling a first comparative analysis of the finds to be made. Apart from a full inventory, the report should include a tentative historical interpretation of the archaeological assemblage discovered. It is quite useless to specify that an object was found at such and such a depth, or at such and such a point in a given square of the grid (with an indication of its number): this type of information tells nothing to anyone, and even the discoverer himself will find it meaningless after the lapse of a few years. To include particulars of this kind under the catalogue entry for the selected objects may indeed serve some purpose, but to include them in the report is completely pointless, and, worse still, makes attempts at interpretation more difficult.

The archaeologist, like all research workers, may be mistaken in evaluating his finds. Just as, in his excavation log, he corrects the errors of the preceding days, so the succeeding excavation seasons enable him to develop earlier hypotheses. His report should not only be an account of his activities, but should also constitute an attempt to draw conclusions from the investigation of a specific segment of history, for which the documents used are archaeological monuments. And above all, in preparing his report on the work of the excavation season, the archaeologist should always remember that excavation is not an art in itself, but only one of the main research methods of that branch of historical science.

BIBLIOGRAPHY

ATKINSON, R. J. C. 1946. *Field Archaeology*. Methuen, London.

DAUX, Georges. 1958. Les étapes de l'archéologie. *Que sais-je* nº 54. Paris, Presse Univ. de France.

DE LAET, Siegfried J. 1954. *L'archéologie et ses problèmes*. Bruxelles, Berchem.

DU MESNIL DU BUISSON, R. 1934. *La technique des fouilles archéologiques; les principes généraux*. Librairie Orientaliste P. Geuthner, Paris.

HEIZER, Robert F. 1954. *The archaeologist at work*. Harper, New York.

LAMING, Annette. 1952. *La découverte du passé*. Picard, Paris.

LEROI-GOURHAN, André. 1950. Les fouilles préhistoriques. *Techniques et méthodes*. Picard, Paris.

LEROI-GOURHAN, André. 1939. *Manuel de la technique des fouilles archéologiques*. Paris, Office International des Musées.

——. 1964. *Restaurierung und Konservierung*. Berlin, BJV Ergänzungsband.

SCHAEFFER, Claude F. A. 1948. *Stratigraphie comparée et chronologie de l'Asie occidentale (III^e et II^e millénaires)*. Oxford University Press.

WHEELER, Sir Mortimer. 1954. *Archaeology from the earth*. Oxford, Clarendon Press.

WOOLLEY, Sir Leonard. 1954. *Digging up the past*. Harmondsworth, Middlesex, Eng., Penguin Books Ltd.