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Methods For Organizing And Carrying Out Various Types Of Archaeological Excavations

مناهج تنظيم أنواع الحفريات الأثرية وكيفية تسييرها

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Abstract:

An archaeological excavation is an application of what the archaeologist has learned theoretically through the use of effective methods and techniques, and these works are carried out in a systematic manner, different from any other excavation work, with the goal of extracting antiquities from the ground and searching for foundations for theories to derive an honest picture from them. As a material witness to the past human civilization and its development, the ancestors did what they did. Excavations of all types and methods seek to safeguard antiquities, identify remains discovered in the ground, and demonstrate the aesthetic aspect of the site or remnants.

Keywords: Fossils, Types of Fossils, Excavation Methods, Excavation Means.

الملخص باللغة العربية:

الحفرية الأثرية تطبيق لما تعلمه الأثري نظريا عن طريق استخدام أساليب وتقنيات ناجعة، وتتم هذه الأعمال بطريقة منتظمة وممنهجة، تختلف عن أي أعمال حفر أخرى ، وهي الأسلوب والمنهج العلمي للبحث عن الآثار بهدف استخراج واستخلاص الآثار من باطن الأرض، والبحث عن دعائم للنظريات،لاستنباط منها صورة صادقة عما أبدعه الأسلاف، وإلقاء أضواء جديدة على الحضارة الإنسانية الماضية وتطورها باعتبارها شاهدا ماديا لها. وتهدف الحفريات إلى حماية الآثار، ومحاولة التعرف على البقايا المتواجدة في باطن الأرض، وإظهار الجانب الجمالي للموقع أو للمخلفات ، مهما اختلفت أنواعها ومناهجها.

الكلمات المفتاحية : الحفرية، أنوع الحفريات، مناهج الحفرية، أساليب الحفرية.

1. INTRODUCTION

The origins of heritage interest can be traced back to BC. Despite the fact that the term archeology is Western in origin, its roots can be traced back to Greece. Archeological excavation, on the other hand, can be traced back to the Babylonians, who spread among them a group of kings and princes who were fond of collecting archaeological finds and artifacts inherited from their ancestors and then allocating a place for them to be preserved in their vast palaces so that they could be enjoyed. Among the most notable of these kings is Nabonidus, the last king of the Babylonians, who ruled these kingdoms between 555 and 538 BC and is regarded by archaeologists as the first excavator and restorer in history.

Study problem:

The main issue revolves around: The extent to which the excavations are effective in saving, protecting, and preserving antiquities? As well as answering the multi-faceted sub-questions. Because archaeological excavation is so important in archeology, it was necessary to look for sources and learn about the finds discovered inside the excavation as well as the method used in the excavation. What role does it play in safeguarding recently discovered archaeological finds?

Study objective and importance:

Archaeological excavations are important sources of archaeological finds because they reveal and then extract archaeological finds, which are among the material remnants left by man. Scientists can use them to interpret and analyze the results of those excavations, which helps to date these finds and determine their cultural and artistic importance, as well as their historical significance, allowing them to identify many details about the economic, social, religious, urban, artistic, military, and other relationships of those who inhabited those areas and their surroundings.

Study Approach:

To answer these questions, we used the historical-analytical method in the research, which is reflected in the definition of excavations in general, and then we explained the archaeological research methods. Then we studied the excavation's objectives and principles, the different types of excavations and their methods, and how to organize and run them.

Study structure:

This study was divided into three parts, as follows:

- Fossils and their objectives
- Techniques used in excavations.
- Fossils and their organization and management.

To provide a comprehensive understanding of the most important fundamental principles for organizing excavations in a systematic and scientific manner

2. The fossil and its objectives

2.1. Fossil Definition:

The term fossil refers to archaeologists' work in the archaeological field, and excavations are excavations in the ground[1], to extract antiques, finds, and archaeological remains buried underground[2],

which are things made by human hands in a place where humans were in ancient times, archaeological excavations usually take place inside archaeological sites[3].Archaeological excavation is also regarded as one of the primary and most visible methods of collecting archaeological finds and artifacts of various types and materials, such as buildings, pottery, money, jewelry, and so on[4].The methods and means have changed the curricula that codify and establish excavation work, in which it became a requirement first and foremost to ensure the safety of the antiquity and the recording of all information related to its discovery, from the date, location, and layer in which it was discovered; photographing it; drawing up plans for it; and providing protection, preservation, and complete maintenance of it. From the moment it is discovered, even the first ax strike on the site, until it is transferred to the exhibition or stored in the museum[5].

The excavation usually starts with removing the top layer of soil that has accumulated over time due to natural factors and has covered the archaeological sites. Then, in the same manner, other quantities are excavated and their traces are extracted, and so on until the depth reaches about three feet, at which point the rubble is considered the first layer. Excavation continues in the second and third layers until the pristine soil is reached, allowing the archaeological researcher to study a specific historical period and excavate for archaeological remains that indicate their presence at some point in a specific region, as well as search in wider periods of the region's history[6].

2.2. The archaeological excavation's goals and principles

The archaeological excavation aims to save antiquities that are in danger as a result of nearby projects such as road construction, house construction, dam construction, and others. The archaeological excavation must be based on a question, and if the means available to the archaeologist, such as texts or archaeological explorations, cannot answer it, the problem must be based on solid foundations. As a result, archaeological excavation is driven by a series of events that may be scientific or touristic in nature[7], one of which is answering questions posed in the archaeological field, such as when a researcher excavates at a Neolithic site. In order to learn more about the origins of agriculture, historical texts frequently appear to us in conflict with one another, necessitating excavations[8].

The various excavations also aim to protect the antiquities, as the dangers to which the archaeological remains located below ground are exposed are no less than those to which the antiquities located above ground are exposed. Perhaps it is possible to control antiquities above the earth's surface while archaeological remains below the ground die slowly and man is unable to protect them while they are in that state without excavating them[9].The goal of the tourist-oriented excavation is to find the most appealing and exciting aesthetic side in order to highlight the luxurious buildings, exquisite decoration, and valuable completed utensils at the expense of pottery shelves and simple monuments. In many cases, they beautify the sites by removing rubble, making them more appealing to tourists[10].This is the distinction between a scientific and a tourist excavation, as the scientific excavation does not prioritize the aesthetic element. A stratigraphic system

fossil results in penetrating the floor of a house or a mosaic panel to identify the stratigraphic sequence and thus determine the date of settlement and purposefully digging a trench, a well, or a cemetery.

3. Methods used in excavations

3.1. Types of archaeological excavations

3.1.1. Organized Excavations

This excavation is carried out by the archaeological researcher assigned to it and his or her accompanying team, who must prepare an archaeological file about the site using historical sources and references, maps, and aerial photographs, collect all historical and archaeological evidence and clues related to the site, identify the accompanying members, and present this file. To the Ministry of Culture, which studies and decides on it, and if approved, the entity responsible for supplying the excavation is determined with a specific budget, after which the project owner will provide the necessary material capabilities to carry out the excavation, such as excavation means, shelter, means of transportation, and so on[11]. It is important to note that the goal is to answer pre-defined questions.

3.1.2. Rescue Fossil

Often, public or private institutions build roads or other structures, and while doing so, they may come across traces buried in the dirt. When this occurs, it is necessary for this institution to halt its operations and notify the authorities in charge of antiquity protection[12], as well as the municipality closest to it, which contacts the relevant authorities.

3.1.3. Protective Fossil

Any excavation or construction project must be reviewed by a committee that includes a representative from the Directorate of Culture. During his project research and field inspection, he discovers that the site contains landmarks or archaeological remains. Then he will create a file about this site and submit it to the relevant ministry, which will then plan a preventive excavation. The difference between this type of excavation and the previous type is that in the first, parts of the archaeological site have been touched, whereas in the second, work has not begun, thus the excavation is called preventive.

3.1.4. Fossils in the seas and under water

Underwater excavations have been known in Europe for a long time, but they are experiencing a significant delay in Arab and African countries, despite the fact that many ships have crashed on the beaches and sea in these countries' territorial waters, and antiquity ports are still submerged in water. Occasionally, it is discovered by chance, as happened in Mahdia, Tunisia, when a group of statues was discovered by chance to be excavated between 1907 and 1913 AD.

3.1.5. Random Fossils

By random excavations, we mean excavations conducted by French researchers without regard for accurate scientific bases, in which scientific registration and archaeological inventory of archaeological finds were neglected. The finds were mixed and collected in bags and then placed in the museum for display or storage in a chaotic manner, so there is no distinction between them, neither by symbols nor signs indicating the place of original discovery of them, although knowing this place is necessary in the

interpretation and historical and archaeological analysis of the site, but that These researchers did not take this into consideration, so they lost our knowledge of many aspects of the heritage and history of our archaeological sites[13].

3.2. Archaeological excavation methods

3.2.1. Wheeler Method:

Mortimer Wheeler, an English researcher, developed a method for excavation that he used in 1954 AD, which is based on dividing the excavation site into networks of equal squares. Many prospectors in the archaeological field use the squaring method[14]. The method is to create a grid map of the site, then divide it into a group of equal-sized squares with a size of 5 m * 5 m, leaving a distance of 1 m between the squares as a separator. One disadvantage is that it prevents us from seeing an aesthetic view of the site because it keeps the buried antiquities beneath it from being excavated. We put the square's destination (east, west, north, and south) and the square number after defining these squares (A-1, A-2, B-3, B-4)[15]. The top layer of soil is usually removed first, and its thickness ranges between half a foot and two feet, or approximately 15.24 cm and 70 cm, depending on the dryness and humidity of the area. After removing this soil, the excavation continues vertically to a depth of about a foot, then horizontally to extract the traces from the excavated spot, and all relevant information is recorded and photographed. The other quantities are then dug in the same manner and their traces extracted, and so on until the depth reaches three feet, at which point this rescue is considered the first layer. The excavation continues until the second and third layers, the virgin soil and the rocky bottom, where traces cease to appear.

3.2.2. Harris Method:

This method is credited to its creator, Edward Harris, who created it in 1973 and explained it in a book titled "Principles of Rich Stratification." Unlike Wheeler's method, which leaves the passages, it is based on open-digging without leaving any part of the site. This method allows for a complete and comprehensive view of the finds, as well as identification of their identity, nature, and plans. This method of excavation involves removing layer after layer while recording everything related to each layer in terms of area and height and drawing up plans that show each finder in a location that is within its surroundings. Finally, the stratigraphic vertical record of the entire site can be obtained using this method[16].

3.2.3. Chessboard drilling method

This method is a hybrid of Wheeler's method and Harris' Matrix method, in which the site is divided into equal squares and the four squares that touch the sides of the middle square are dug, leaving the middle square unexcavated. This intermediate square serves as a witness for determining the stratigraphic layers of the site and replaces corridors in the Wheeler method. The engraved squares can be of a large size (10 * 10 m). The Harris Matrix method is used in this case because each square is dug horizontally layer by layer and all discoveries are drawn in a horizontal scheme.

As a result, it appears that this approach combines and mixes the two methods of Wheeler and Harris and while it does not allow us to have a comprehensive view of the site by keeping squares without

digging, it does allow us to see a larger field than Wheeler's method, and these squares are excavable whenever the need arose[17].

3.2.4. The Van Kevin method

This method is especially useful in small hills, and the excavation is planned by dividing the hill into four equal parts, beginning from the center of the hill and ending in the form of a circle divided into corners, each of which is estimated at 90 degrees Celsius, and the excavation begins in two vertically opposite parts and leaves the other two parts alone. The stratigraphic layers of the site are drawn, but this method is limited to circular sites with small sizes[18].

4. The management of fossils and how to organize them

The archaeological researcher must always keep in mind a few fundamental principles that serve as the general guidelines for excavations: accuracy in work, organization in work, and cleanliness in the archaeological field. Moving away from accuracy will result in unimportant scientific results, and neglecting organization will result in the loss of a lot of important information, which should not be lost on the researcher's mind and without cleanliness, the researcher will be unable to understand what is happening on the excavation site. Working in the fossil field requires little preparation, so what are the special requirements for preservation? , and the more we prepare for them, the less risk the pieces face until they reach their final destination, as well as the information needed to be gathered about the excavation itself and the medium in which it takes place[19].

4.1. Excavation's Preliminary Procedures

We cannot predict with certainty the discoveries that will appear during the course of excavation work in the field when scheduling archaeological excavations and subsequent maintenance work. However, if we can make rough estimates of the types of finds and materials used in their manufacture that we can find, we will have a better chance of keeping them in good condition, and forecasting will be easy if the archaeological site conducts at least one archaeological season. If we have to conduct the first season of excavations in the area with no knowledge of its history, a careful superficial walk around the perimeter and a bibliographical review of the available studies on other contemporary archaeological sites in the same area will provide us with clues about the evidence that can be found at the site on which we are working[20].As a result, all of this information represents the start of the first stages of the excavation, according to which information about the archaeological site is gathered, and this information represents the keys through which the excavation is fully prepared. It is critical to understand[21]:

- The type of archaeological site: where we intend to begin work (a community, a cemetery, a temple, etc.). Each location has distinct characteristics.
- The cultural time period: the cultural epoch to which the location belongs (over the ages, different architectural techniques, various funerary rituals, and different materials were used to prepare tools and decorations).
- Its geographical location: near the coast or valleys, for example, in order to determine the degree of relative humidity and temperature.
- The region's natural resources: through them, we will be able to deduce the

techniques, tools, and materials that we may require to carry out the maintenance work on the successive finds that appear to us.

4.1.1. Archaeological site identification

The archaeological site represents the location where there is evidence of human activity in previous historical periods[22], and as a result, determining the archaeological site is the first step that the archaeologist must take, and we distinguish three types of sites in this place, including what is visible above the earth's surface, what is below the earth's surface, and what is beneath the water's surface. The prospector's methods of guidance for determining the archaeological site vary. Some are traditional methods that rely primarily on observation and research, whereas others rely on observing differences in the appearance of the earth's surface and recording these differences through aerial photography, then interpreting the collected images[23].

There are historical sources or books from which we can investigate preliminary information about the site, and there are archaeological sites that are less clear and require some effort to identify. Archaeologists use scientific methods to find archaeological sites, so field work begins with a comprehensive survey, which includes studying the various types of maps available, such as ancient and modern geographical maps, geological maps, plant maps, soil maps, and so on[24], and information related to the archaeological site can be obtained by walking, which is very important, especially when the site is small and dependent. This method is based on accurate surface observation while walking on the site's surface, and the walking process begins from a specific point and continues in an organized manner, accompanied by an accurate recording process for all observations and phenomena seen on the surface, and the recording is done in writing, drawing, and pictures, and recorded on a map of the site, and Walking on the site's surface Participants in the survey process collect samples of archaeological finds that are typically found on the site's surface, such as pieces of pottery, glass, and metal, among other things[25].

4.1.2. Identification aids for archaeological sites

- **Aerial Photography**

This process is based on the fact that a person can see details of things on the earth's surface, or near the surface, better from a high place, even if they are on the surface itself, the means used in aerial photography vary from plane, balloon, or high tower...etc. Recently, some advanced devices, such as satellites, have been used to use this remote sensing process. It is a very modern imaging technique that employs electronic scanners to convert chromatic or thermal data reflected from various objects on the Earth's surface (the archaeological site) into digital data. Visible and multi-spectral rays (infrared and ultraviolet) are used to predict the earth's nature and whether or not it contains traces[26].

- **Scanning by measuring electrical resistance**

It is based on the fact that soil, rock, and other materials have a special resistance to the passage of electric current. If traces of materials other than soil are found in the place, the electrical resistance in this place is different, and the electrical resistance in this place is read by a device that measures the electric current, and the source of the

electric current, connections, and metal pegs are used with it[27].

❖ **Magnetic force scanning method**

It is to measure the ground magnetic field of the area to be surveyed, and a device called a magnetometer is used, which gives a unified reading if the soil is free of any traces and has one nature, and if traces that have a magnetic effect are found in the soil, such as pottery, iron, and milk-clay-burnt furnaces, it gives a unified reading. The device produces unusual readings[28], and it can also be used as a radiometer. It operates on the same scientific principles, and one of its benefits is that it measures the degree of magnetic field inclination and can assist in distinguishing between the effects caused by archaeological and geological landmarks. The method of measuring magnetism is distinguished by the speed of the results and the speed of their interpretation, as well as the ability to detect effects at great depths of up to 6 meters with high accuracy[29].

❖ **Scanning with metal detectors**

Depending on the strength of the device and the size of the metal blocks[30], these devices can locate various metals underground and at varying depths. However, this method is ineffective in areas with large amounts of waste piled over archaeological sites because they almost certainly contain large quantities of minerals, rendering the survey useless.

❖ **Analysis by periscope or nephroscope**

It begins with an excavator and ends with a photographic machine. If it is determined that there are underground chambers or tombs, the contents are photographed and examined with an endoscope. We must have obtained as many written and photographed documents as possible at the end of the survey process, which will aid us in our work in the library or laboratory, because this will aid us when we are exposed to some doubts about any of the studied sites, and it will be easy for us to return to the studied place to conduct the necessary investigations[31].

5. Obtaining a permit for excavation and funding sources

5.1. Obtaining a permit for excavation

Most countries' antiquities and heritage laws require the obtaining of a permit in order to carry out any work around archaeological sites, particularly excavations. As a result, this permit must be obtained from the competent authorities by following the necessary steps, which include the archaeologist submitting an integrated report to the interests involved in order to obtain a permit to conduct an excavation, as this report details the need to carry out specific excavations in one of the sites, simplifying the scientific program and the base that was prepared, and the users who will be part of the archaeological expedition[32].

5.2. Funding for the excavation and its sources

The most fundamental and critical component in the excavation stages is funding. It is through it that the excavation tools or tools for maintenance and restoration, or the wages of workers in the case of workers, or the acquisition of food supplies for the excavation mission, can be obtained. The excavation can be completed to the greatest extent possible as long as sufficient funding is available. On the contrary, the duration of the excavation and the number of expedition members may be reduced, lowering the desired goal and to be

achieved, which may result in serious complications for the excavation site.The archaeologist can obtain funding from the following sources[33]:

- Heritage-related state administrations
- UNESCO and other international organizations concerned with antiquities and heritage.
- Departments of antiquities, museums, universities, and private institutes
- Private cultural institutions, as well as private sector businesses and institutions

5.3. Formation of a drilling team and provision of all necessary materials

- **Formation of the fossil expedition:**

Given the problems that may arise during excavation operations, and the composition of the mission is determined by the type of excavation[34], the work team must include a highly qualified excavation manager as well as specialized assistants in certain fields such as the photographer, painter, restorer, and recorder. Considering that these fields must be present at all times in the excavation, as well as the presence of specialists in them, and then the team, so that the appropriate number of workers or trained students must be chosen[35], in addition to other periodic elements such as topography, geology, chemistry... etc., because they are not required only occasionally[36].Some students with some knowledge or acquisitions in these disciplines can also take their places in the excavation based on this knowledge that they acquired through studying in universities or specialized institutes that study these important subjects in the excavation, according to what the excavation's head appreciates, and this is what makes the students In direct and applied contact with everything they learned in these institutes, they gain experience and accuracy more quickly, have a greater sense of and love for archaeological work, preservation and protection of discoveries, and the ability to transform knowledge and experience gained into fruitful work during the excavation season itself, then in the succeeding seasons[37].

- **Excavation supplies**

The requirements that must be provided in the excavation vary from excavation to excavation, depending on the material capabilities available to the excavation chief, who is the only one authorized to address this issue and decides the specific needs of the excavation. Taking into account that the length of the excavation and the size of the excavation increased the needs and requirements of the expedition members, we can summarize the most important needs in the following[38]:

- **Painting and archaeological tools:** They are office tools such as rulers of various types and sizes, holders for various drawing scales, field and engineering drawing boards, pottery and porcelain drawing tools, pens and inks, and so on.
- **Photography and recording tools:** Cameras of various types, sizes, and lenses, a video device, a video camera, audio recording devices, a laptop and stationary computer with its accessories, a digital camera, and an image scanner are among the many.
- **Consumables:** Such as transparencies and millimeter paper...etc.

All of these means, tools, and devices play an important and necessary role in the excavation, in everything that is prepared for it, and they provide good and accurate results if used in the right way, at the right

time, with a high degree of efficiency and control. There are numerous materials available for maintenance and restoration.

6. CONCLUSION

In this study, we dealt with the fundamental concepts that constitute a thorough introduction to the concept of the fossil, which is one of the most important sources of archaeological finds. After preparing the excavation project, which must be comprehensive in all aspects, and then identifying the members of the mission, which must include specialists in more than one of the auxiliary sciences to archeology, all of the steps and stages necessary to begin the excavation process, particularly obtaining licenses, have been discussed, so that all of the means, material, and financial capabilities that the excavation requires are determined, it should be noted that the size of the capabilities is determined by the goal, duration, and number of members of the archaeological mission excavating the archaeological site, as well as the significance of the archaeological site itself.

In addition to the foregoing, the excavation's head must draw broad lines with the members of his mission, on the one hand defining the general responsibilities, and on the other hand specifying the special responsibilities of each member of the mission, in addition to the nature of the work entrusted to them, in order to avoid all problems that may arise during excavation, which may impede the course of field work.

If the primary goal of extracting and inventorying the finds is to complete an administrative document proving the presence of certain antiques, their condition, and their source during a specific time period this does not mean that the task is finished because the administrative function, even as a guarantee for the management of archaeological collections, is insufficient to be considered valuable work because the scientific aspect of technical characteristics (sizes, manufacturing technique, photography...etc.) must be controlled whenever necessary.

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[34]- Abdel Aziz, M: The Excavation of Al-Mansour in Tlemcen from Preparation to the Governorate (Foundations and Methods), Book of the Third Forum of the Arab Archaeologists Association, Egypt, 2002, p. 131.
[35]- Ezzat Zaki, H, Ibid, p. 55.
[36]- Abdel Aziz, M, Ibid, p. 939.
[37]- Ibid, p. 939.
[38]- Ibid, pp. 940-941