

Studies in Egyptian Culture

No. 5

THE ARCHITECTURE OF "KOM EL SAMAK"

AT MALKATA-SOUTH

—A Study of Architectural Restoration—

by

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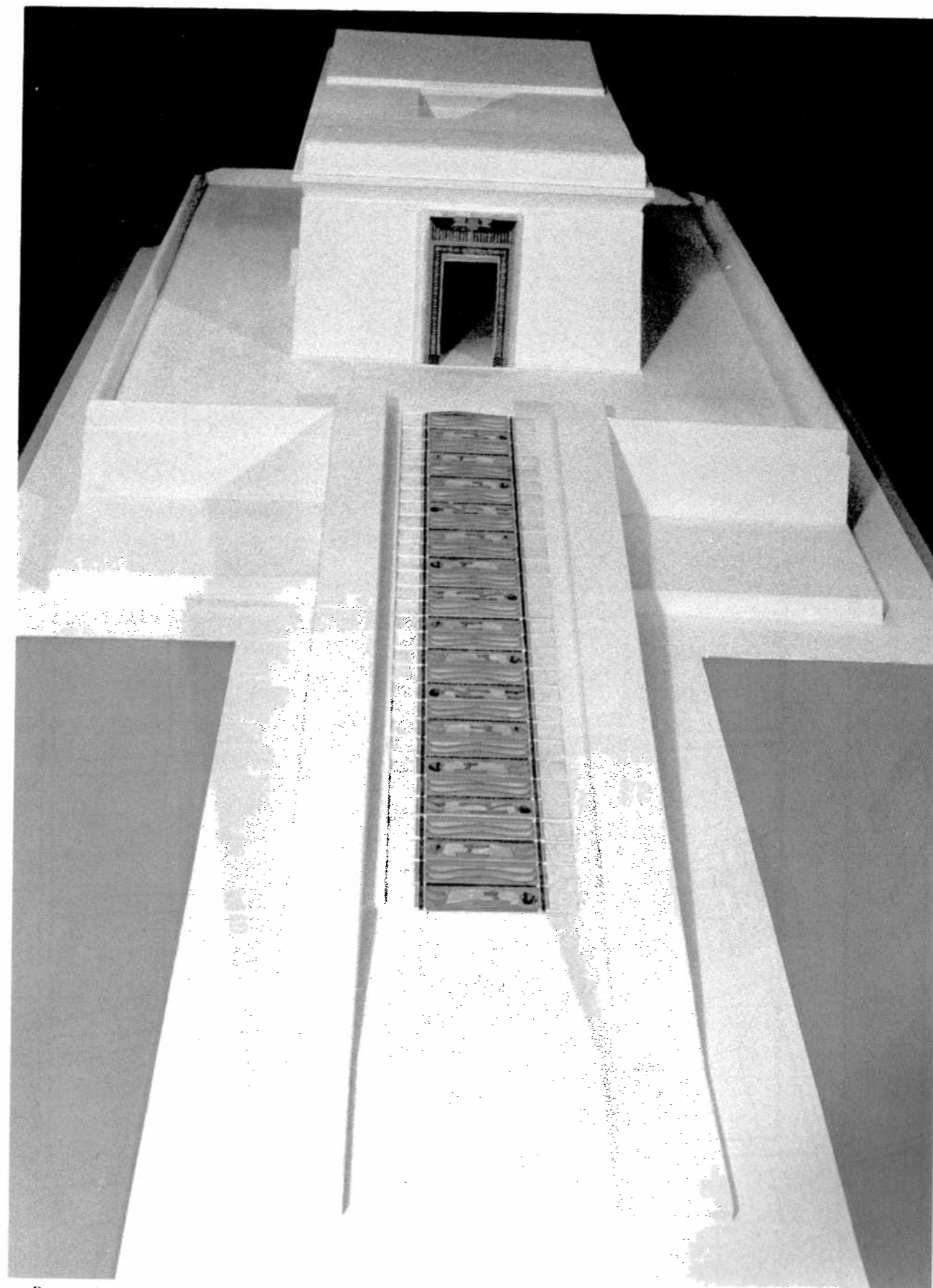
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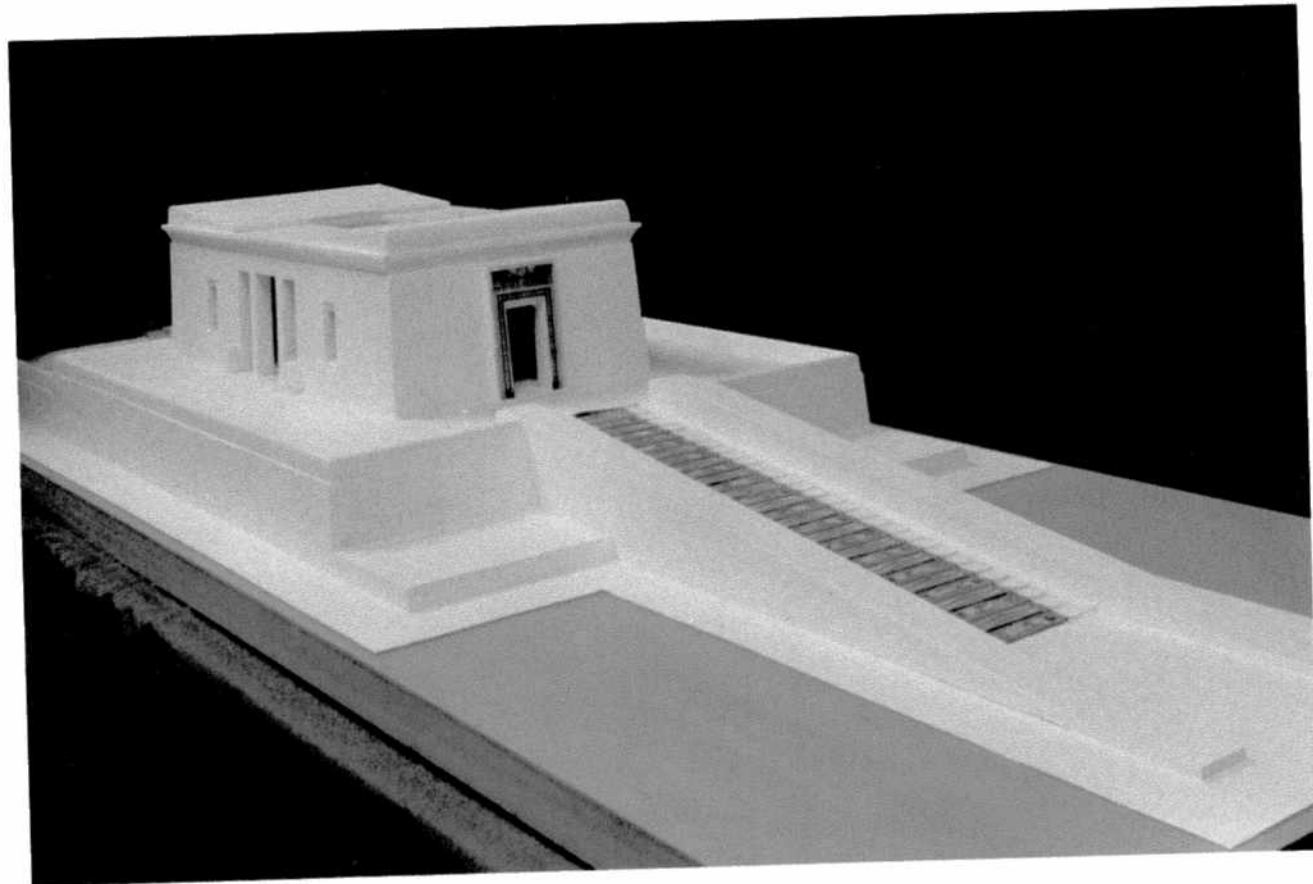
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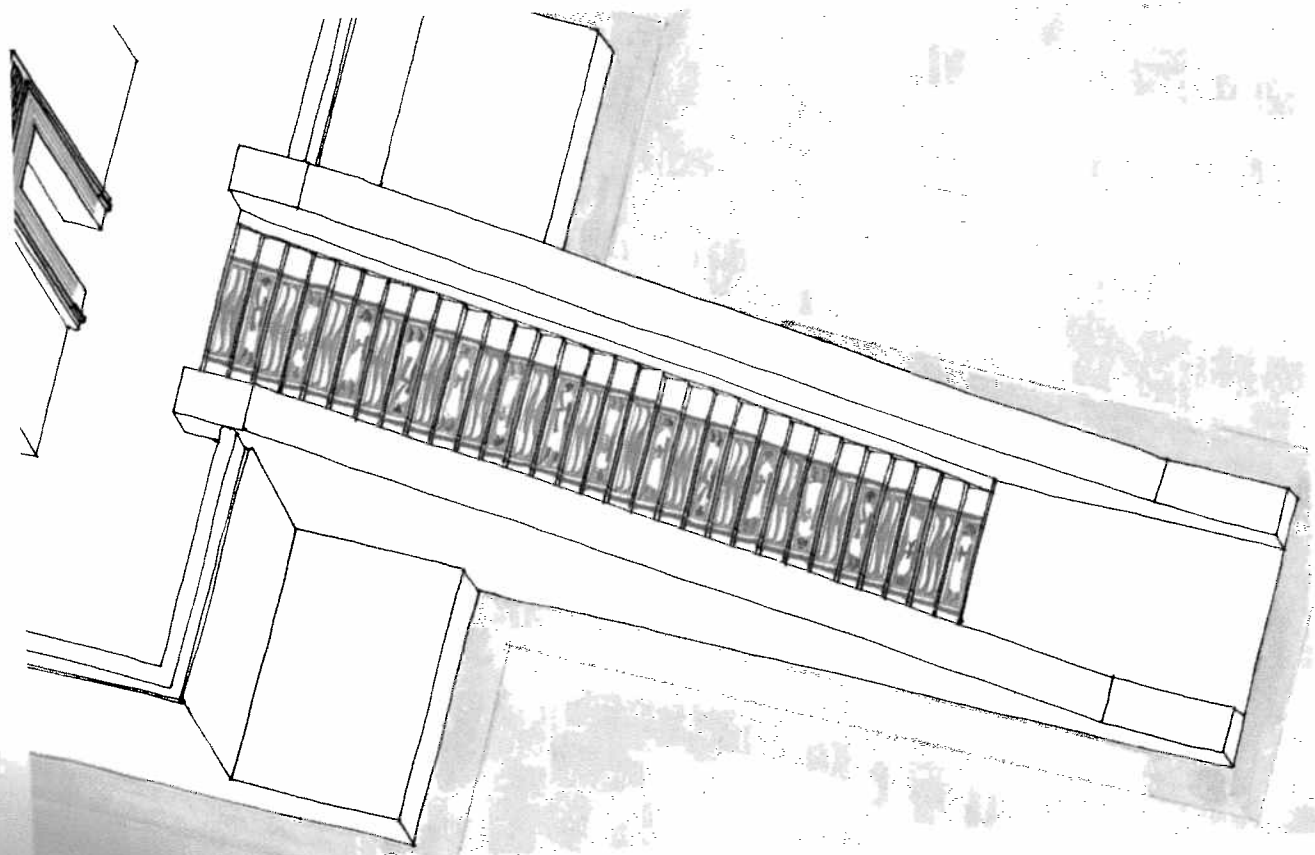
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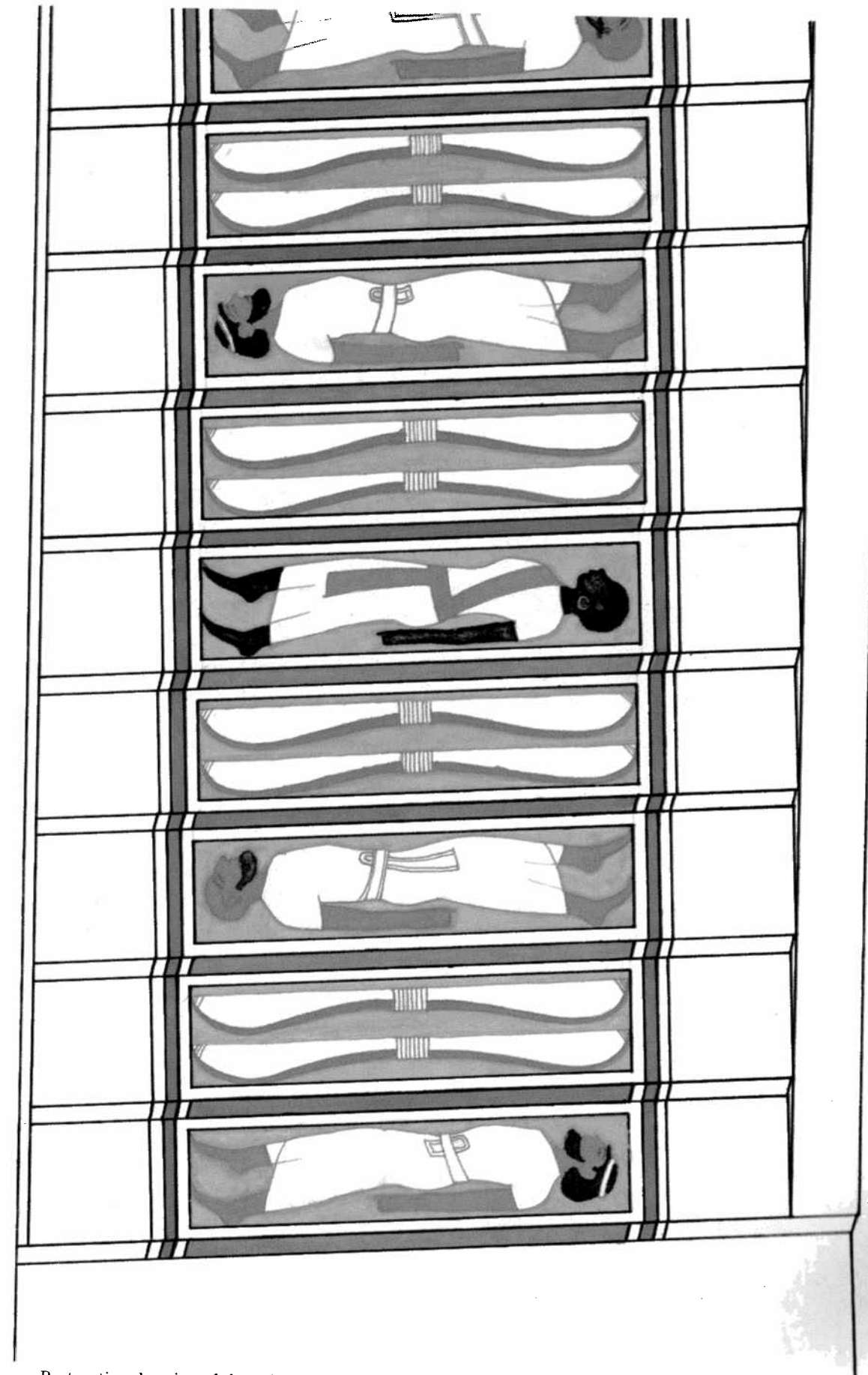
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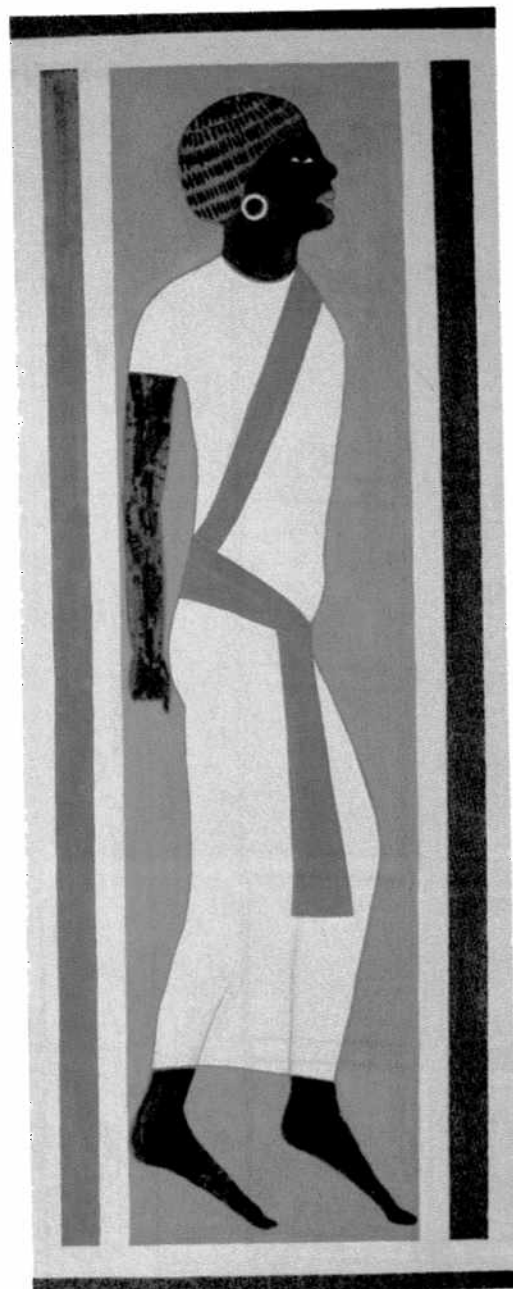
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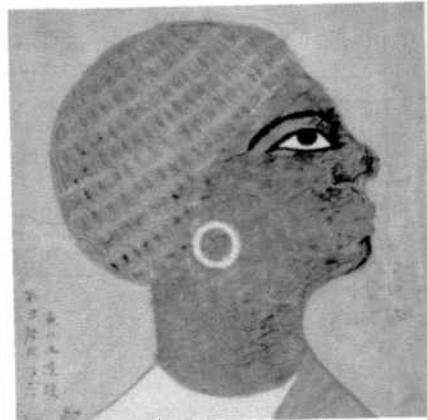
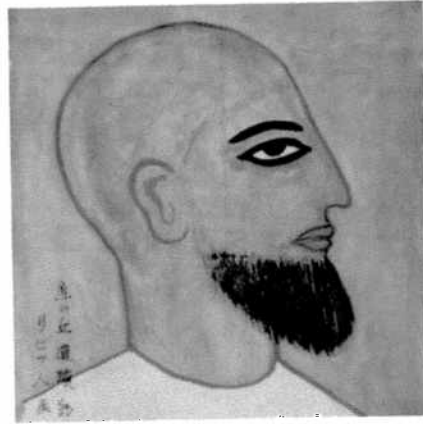
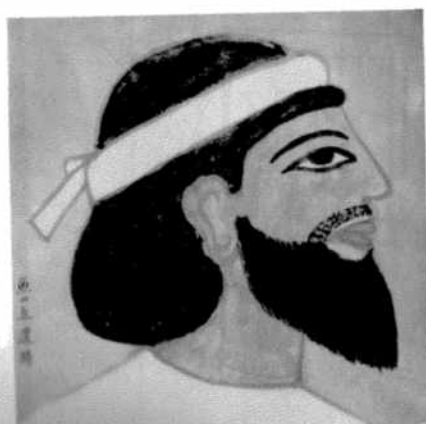
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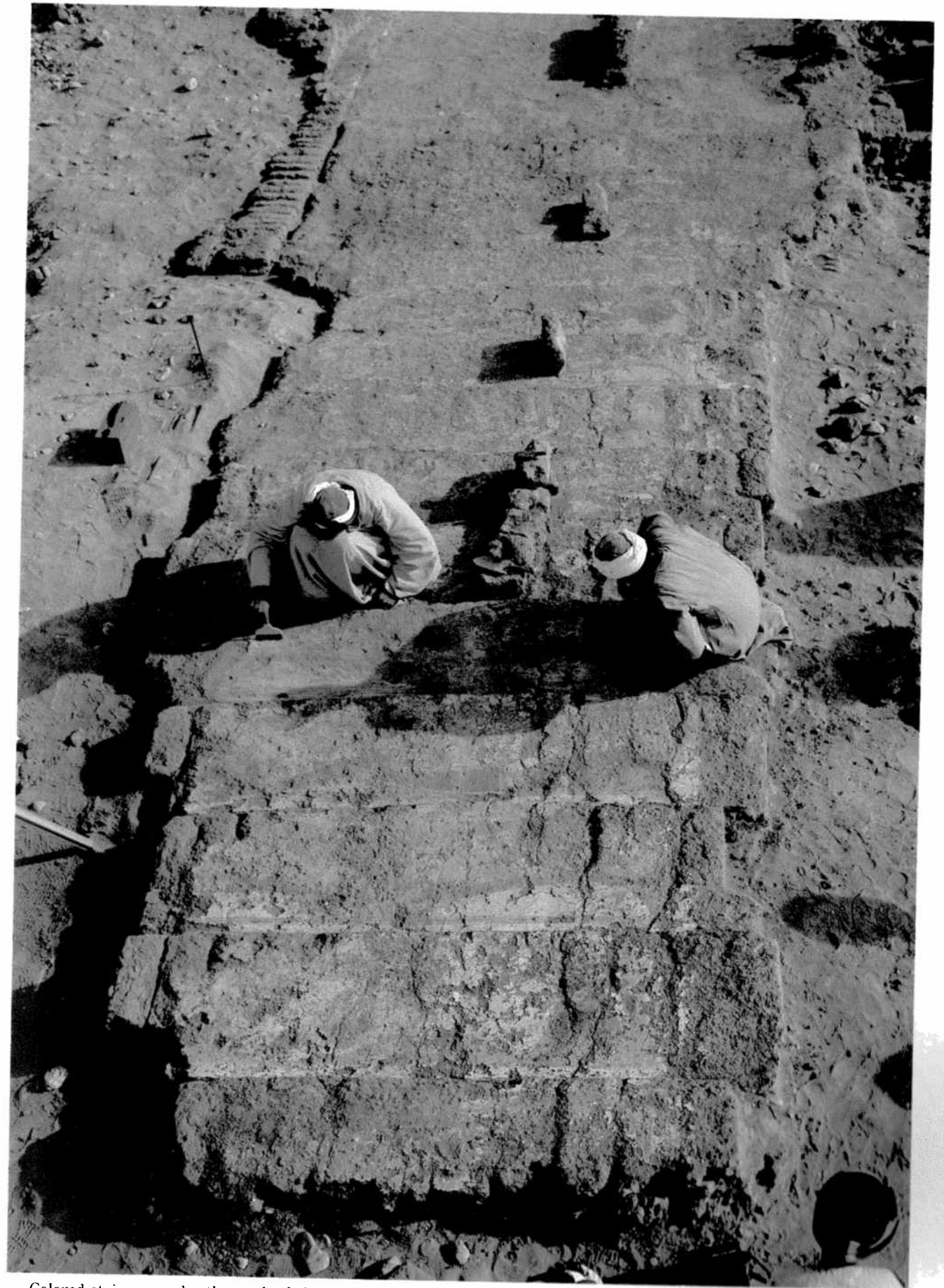
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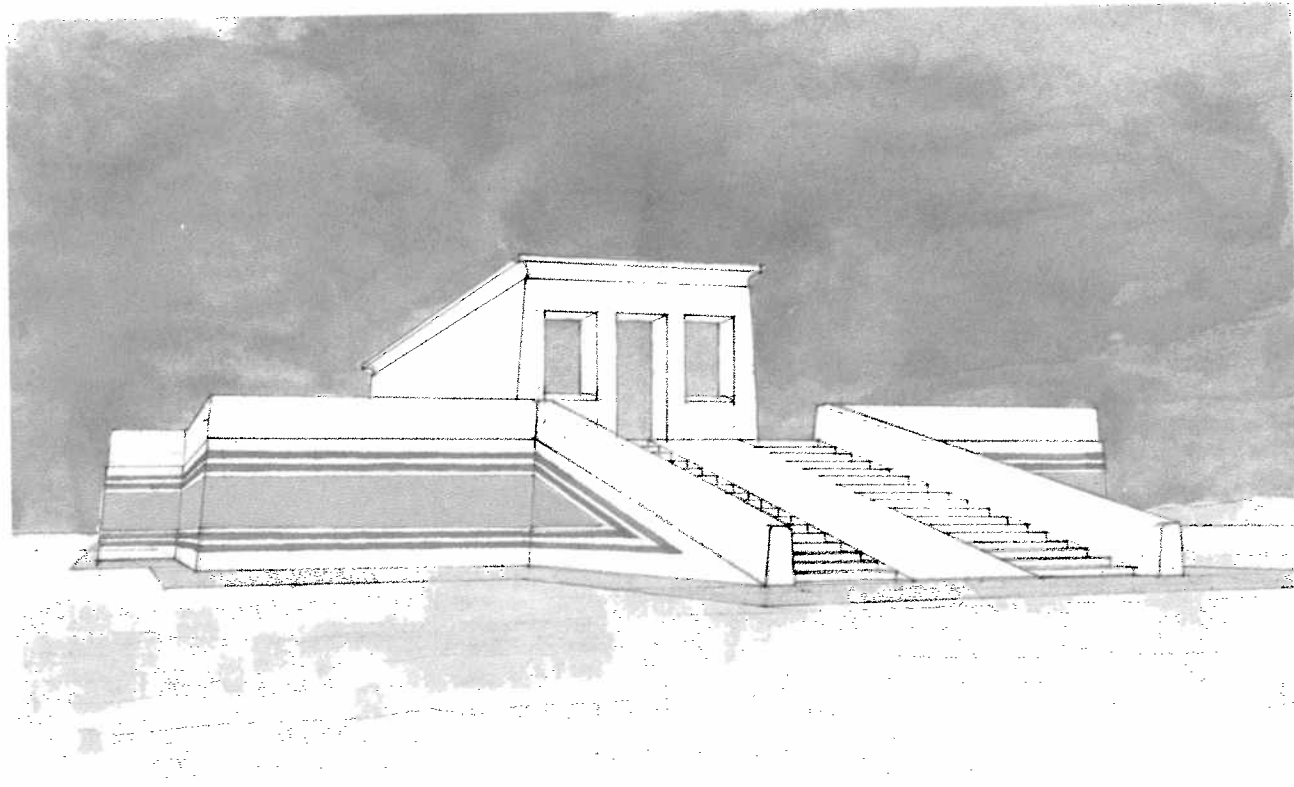
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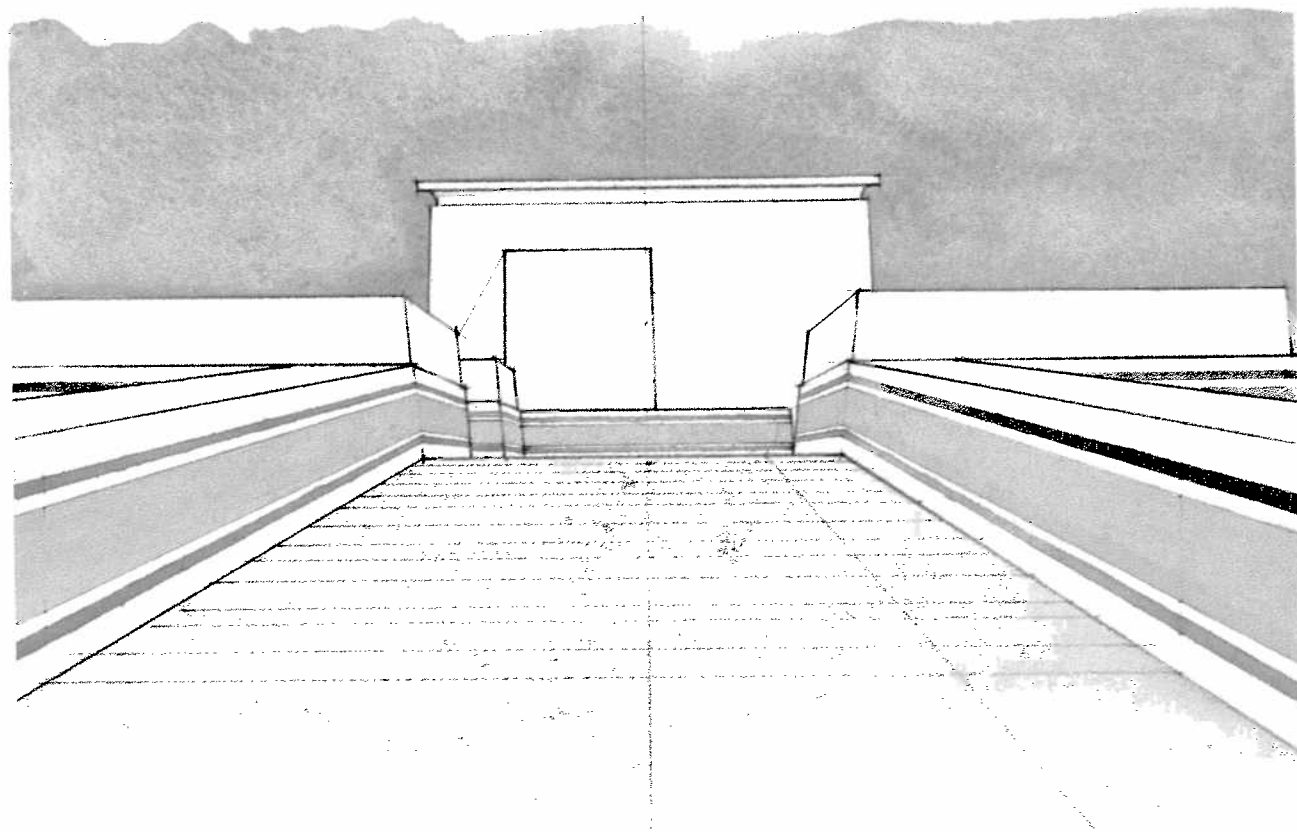
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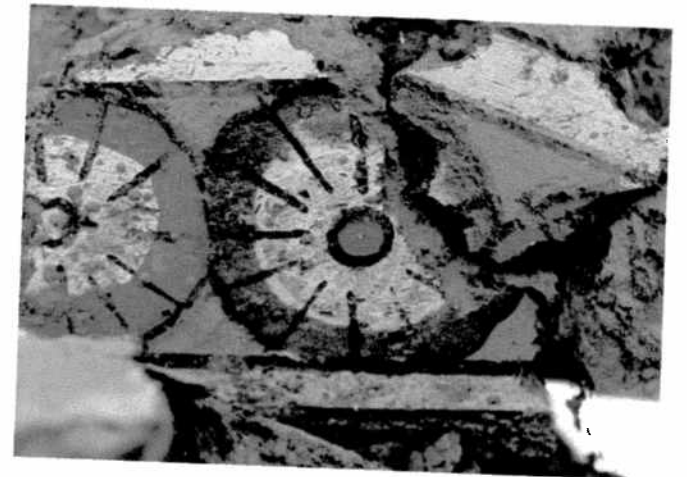
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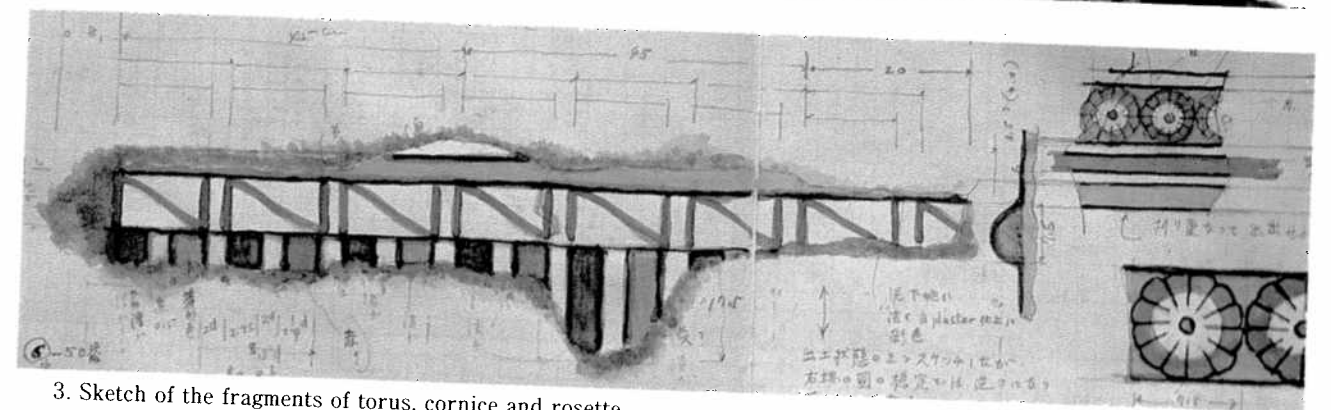
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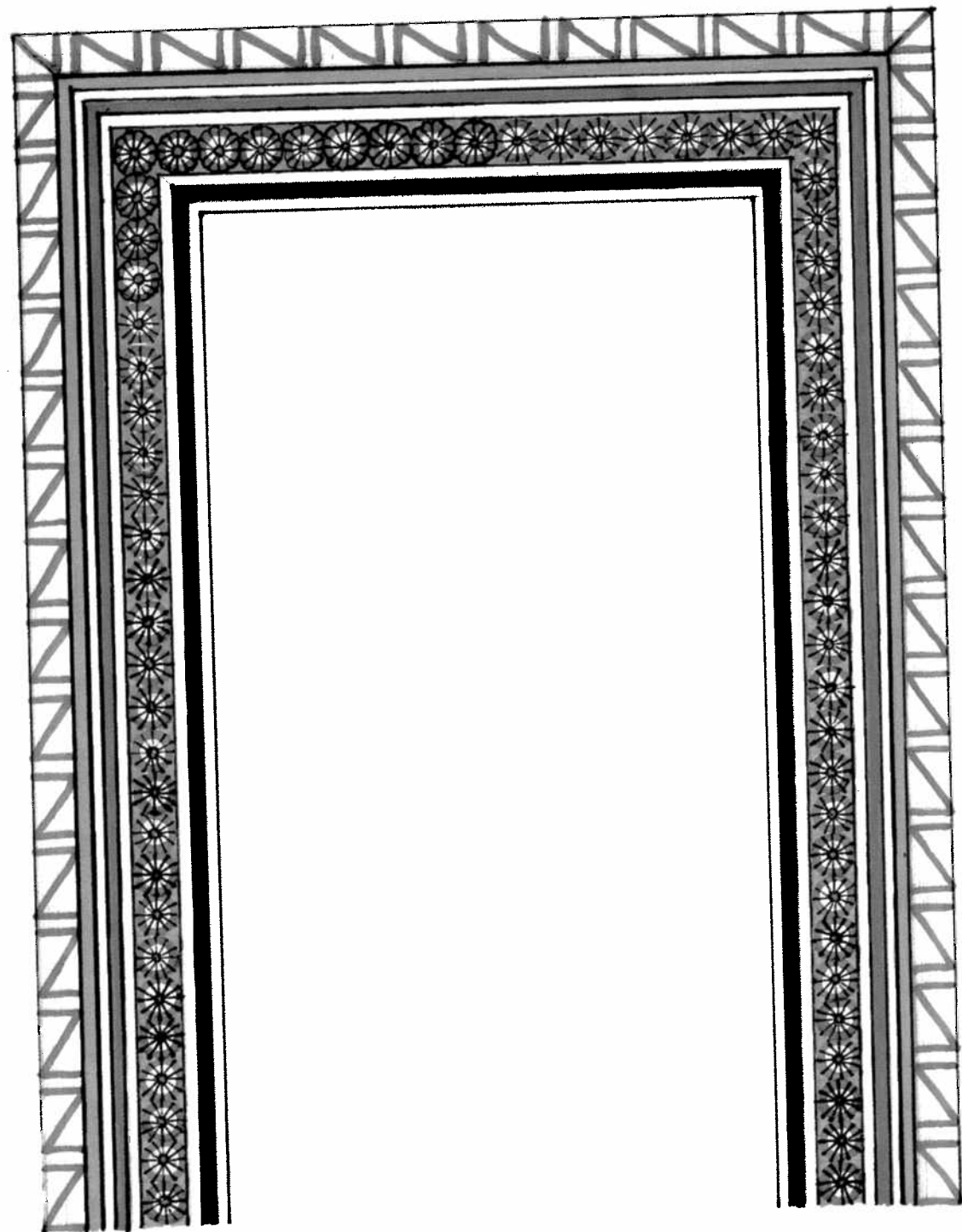
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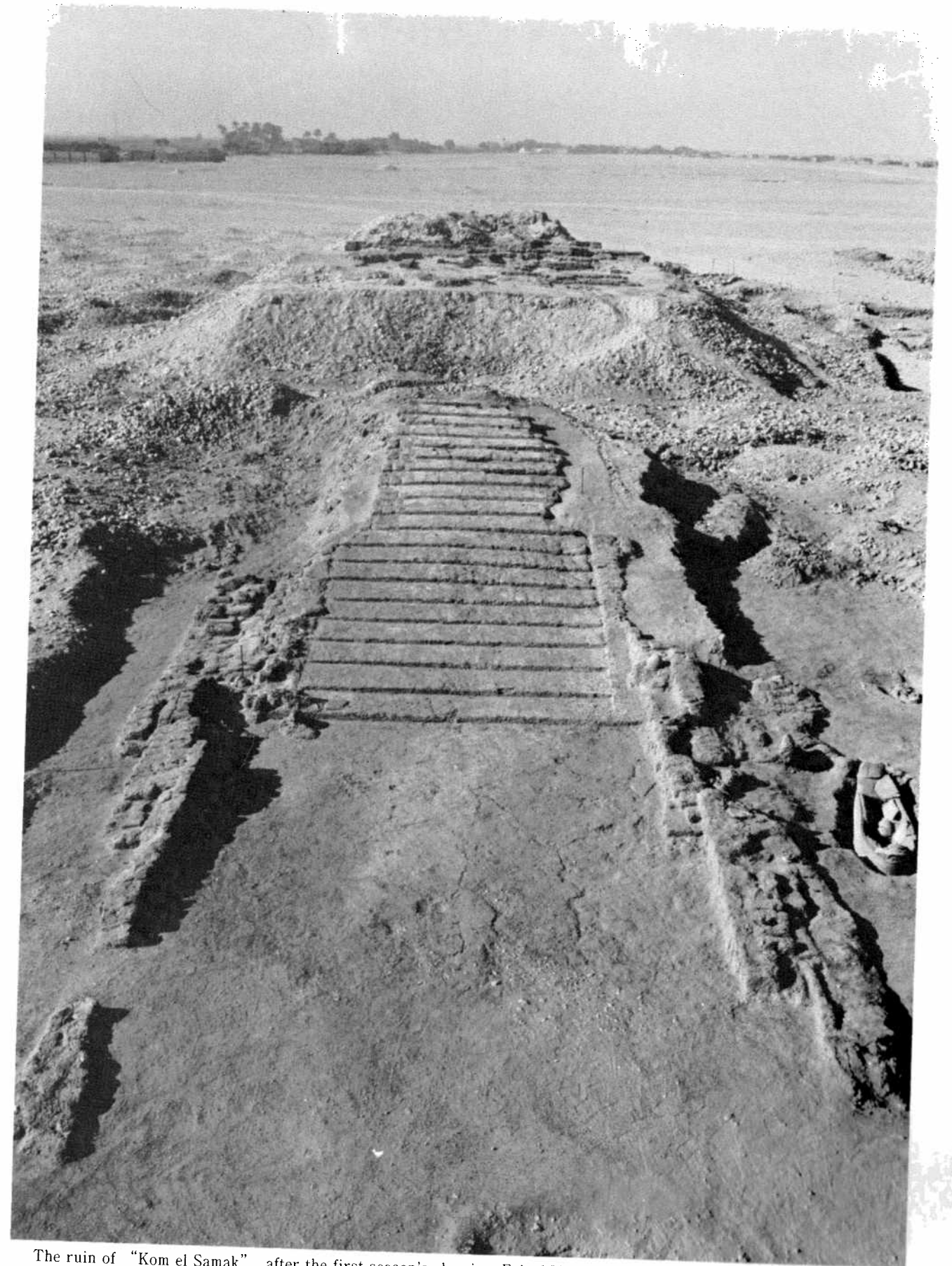


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MALKATA 魚の網遺跡 西ラニ  
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Restoration drawing of the ornament with torus and rosette-border pattern on the portal.



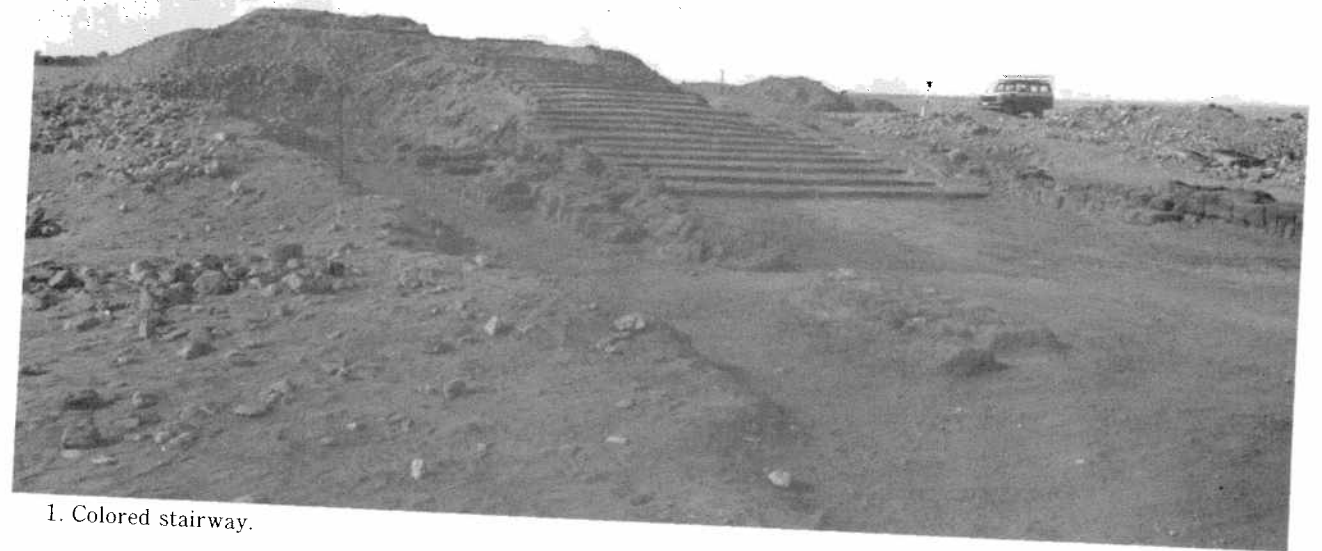
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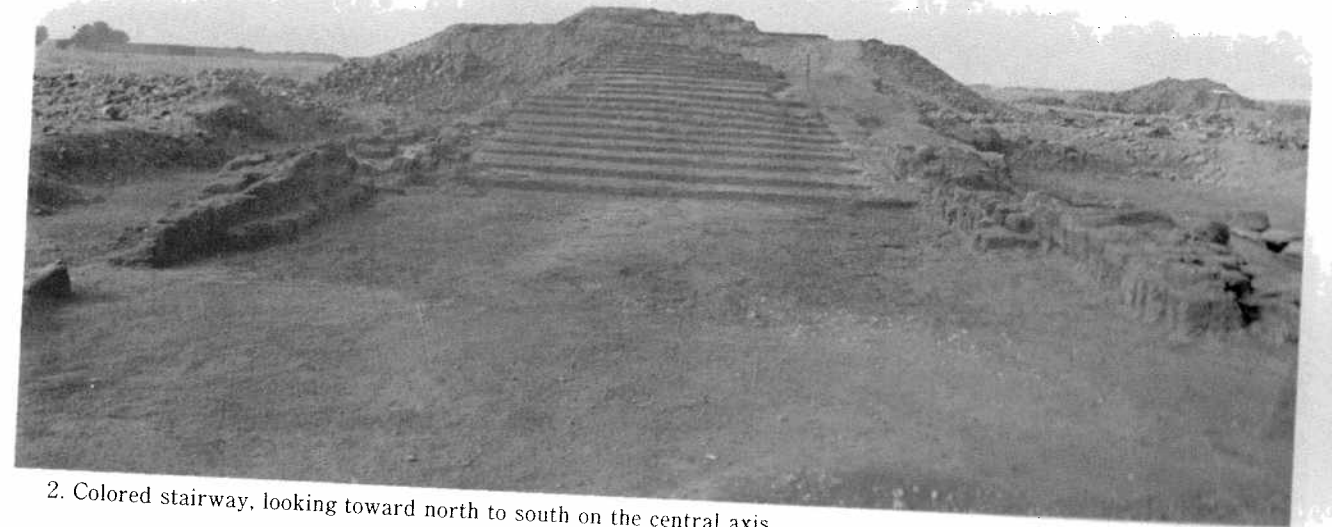
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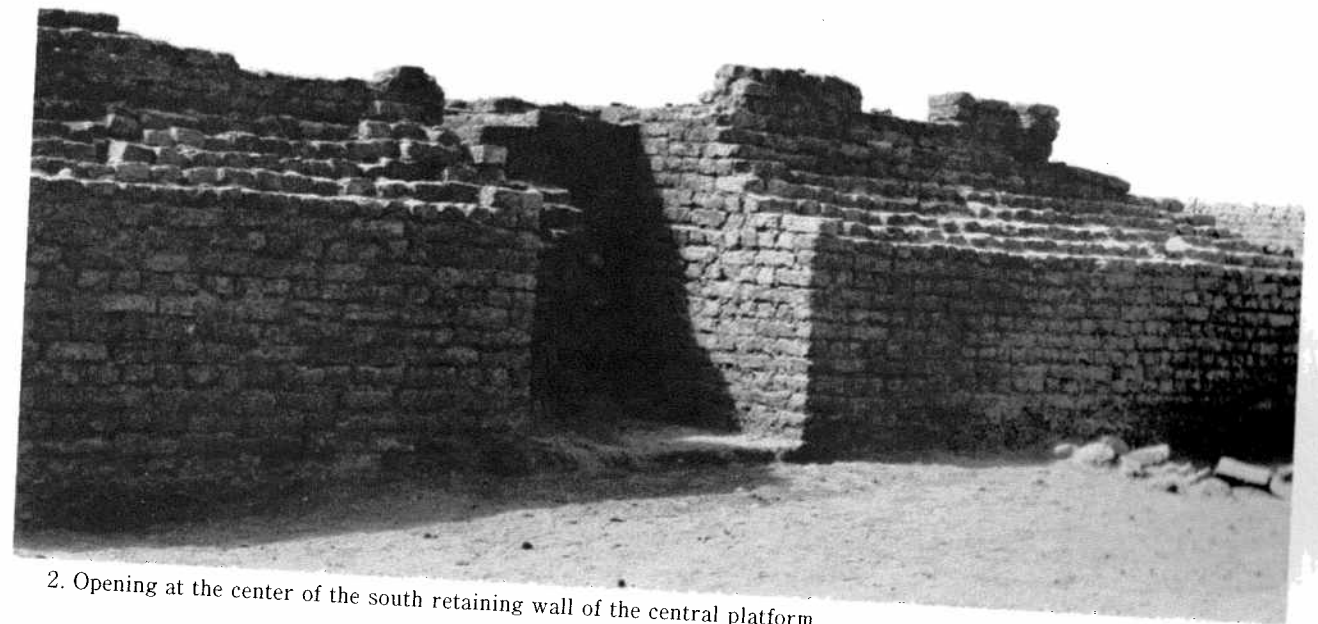
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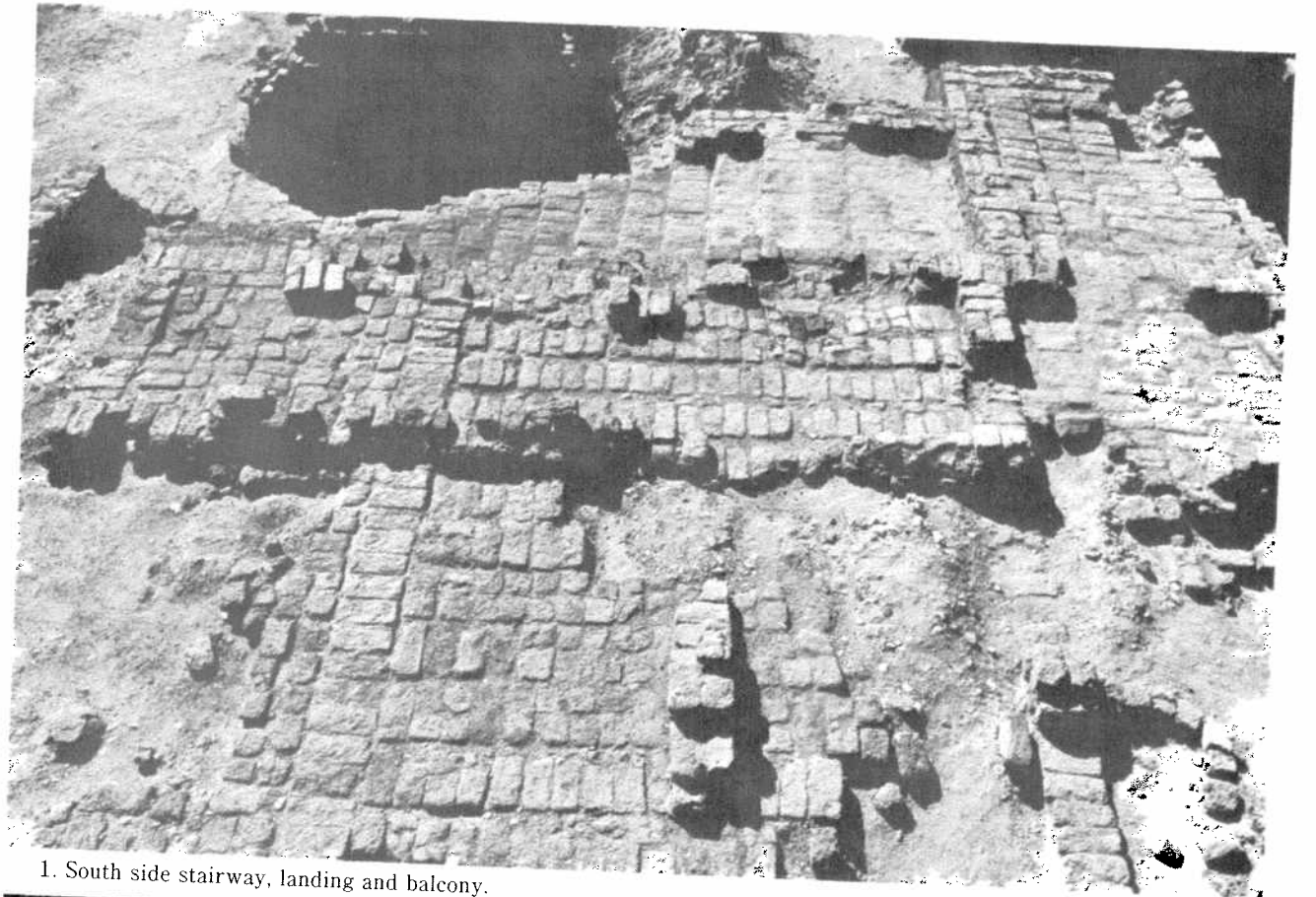


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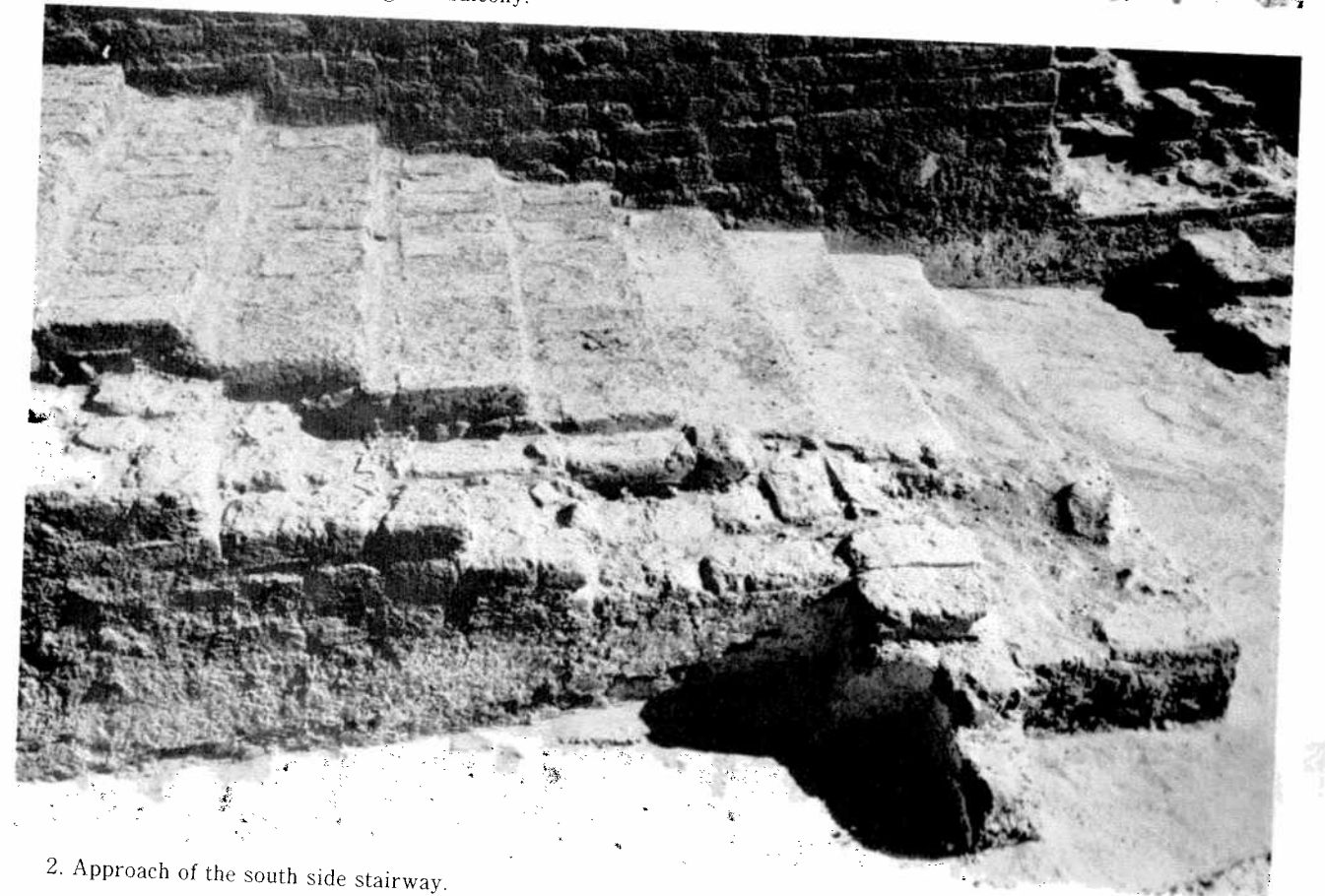




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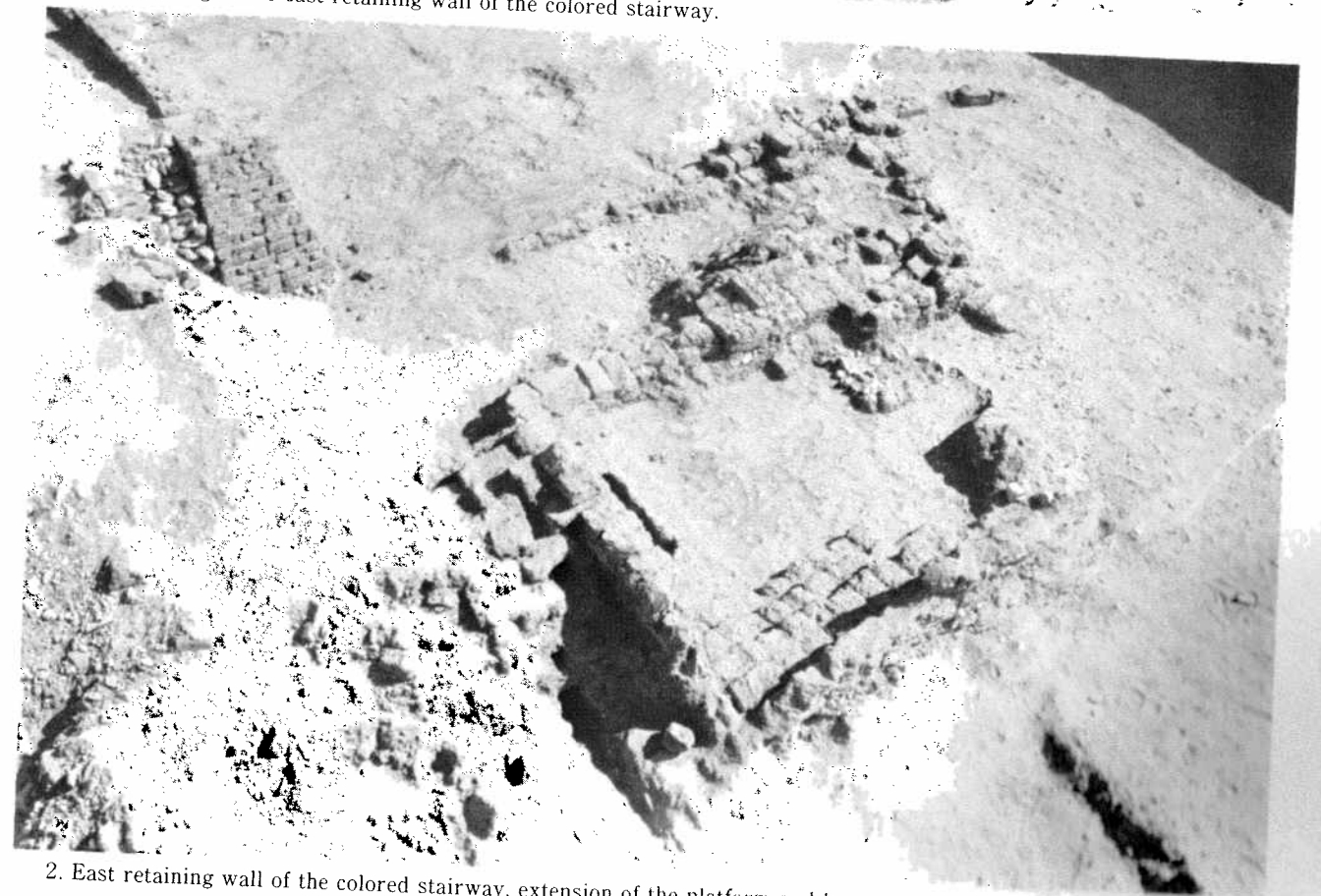
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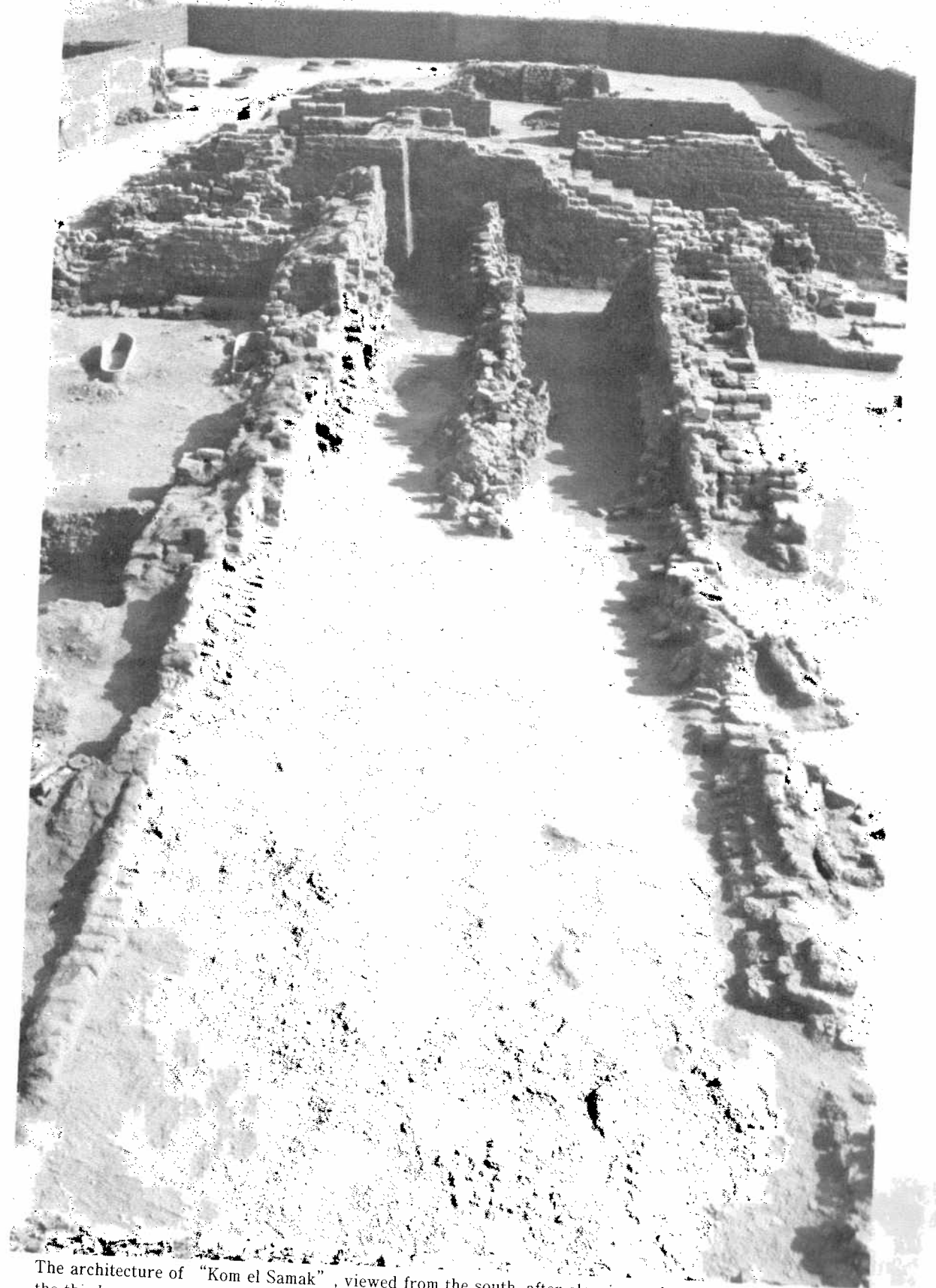
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## 1. PROLOGUE

### 1 - 1 SITE AND LOCATION

The ruin of "Kom el Samak" is located at Malkata-south,the area on the west bank of the Nile in Luxor,Egypt. It is about 2km southwest from the Palace of Amenhetep III at Malkata the 18th dynasty,New Kingdom.

The low desert which links the evergreen fertile land along the Nile,and the Libyan Desert plateau spreads widest in the west bank area of Luxor. The ruin is located in the desert about 250m from the boundary of green and the desert. The hill has been called "Kom el Samak" (Hill of Fish) by the local people.

The ruin was buried under the two hills in the low desert. The hill,originally one,was divided into two hills,large one and small one,by thievish diggings.

Its dimension is approximately 80m x 20m and the summit of hill is 3.7 m high from the present ground level.

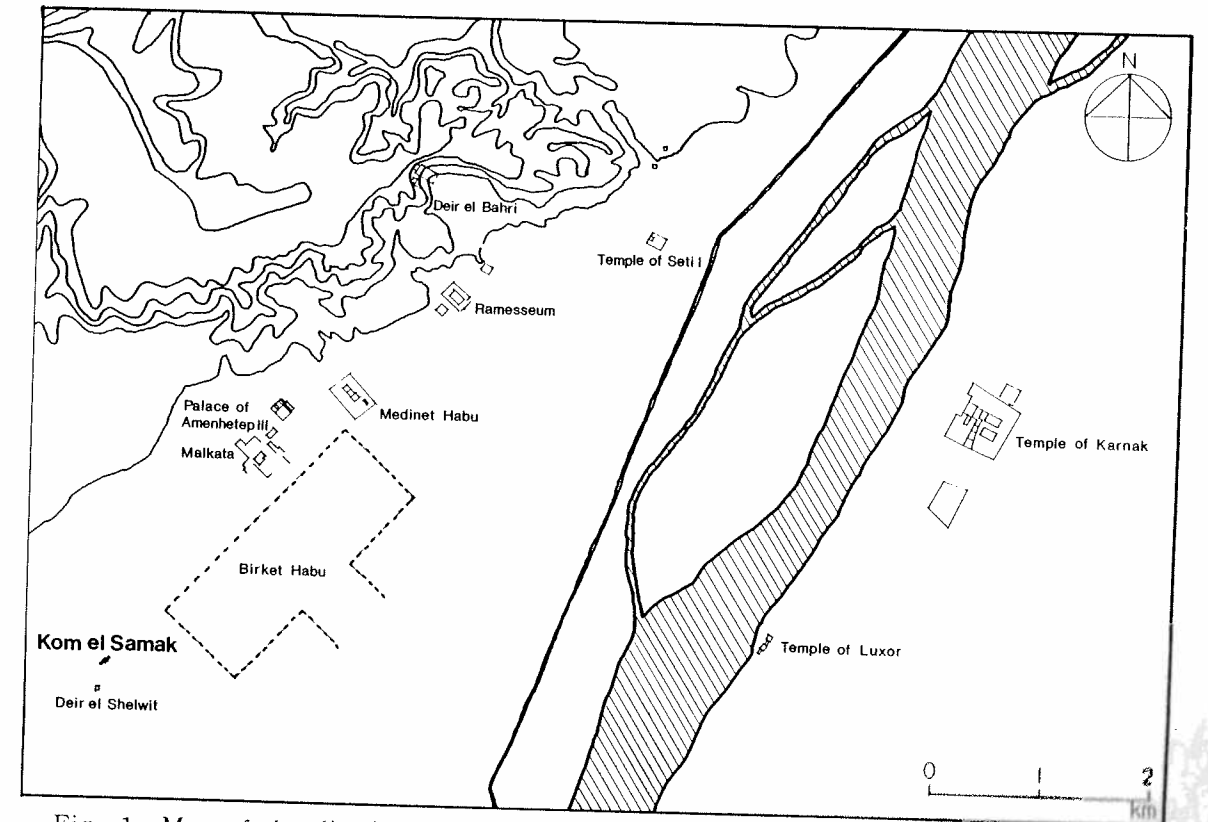


Fig. 1 Map of the district of Luxor.

## 1-2 DISCOVERY AND EXCAVATION

The ruin of "Kom el Samak" was discovered by the Egypt Archaeological Mission of Waseda University, Tokyo, Japan, conducted by Professor late Kiichi KAWAMURA, in January 1974 during the third season's field work in Malkata-south. The mission first discovered a part of the colored stairway made of sun-dried bricks buried under the smaller hill. On the surface of the steps, bows and three kinds of prisoners of conquered tribes were colorfully depicted. This was the first discovery of its kind ever made throughout the history of Egyptology.

Field works were executed in successive years, and four major seasons concerning "Kom el Samak" were as follows.

1. Dec. 1973 to Feb. 1974.

Excavation of the smaller hill and discovery of the colored stairway.

Partially excavated the bigger hill.

2. Dec. 1974 to Jan. 1975.

Excavation of whole of the bigger hill, and cleaning of central platform, south side stairway, south extension of platform and around the south ramp area.

3. Dec. 1976 to Feb. 1977.

Cleaning of the north extension of the platform, and dismantled south ramp, central platform and its retaining wall.

4. Nov. 1978 to Jan. 1979.

Removed upper part of the retaining wall, examined the ground soil under the central platform, and dismantled a part of colored stairway.

## 1-3 ORIENTATION

The longitudinal axis of the ruin runs at 45 degrees to due north, and the colored stairway takes its rising axis from northeast to southwest. This inclined orientation is found not only at "Kom el Samak" but at all the ruins on the west bank area in Luxor, because those buildings were built to the Nile whose stream runs at 45 degrees, from southwest to northeast.

But, forming an enormous valley, the Nile runs from south to north throughout the land of Egypt. So, no matter where its direction actually is at each point, it always was, the Nile stream was the ideal index of the direction of north-south for the ancient Egyptian. And, an axis perpendicular to the Nile was the east-west index of the direction.

It is inferred that the orientation of the ruin of "Kom el Samak" followed the same index. Then, the longitudinal axis runs from north to south, not as in the modern concept of orientation, magnetic north or true north, but as in the ancient Egyptian concept. Therefore the colored stairway rises from north to south.

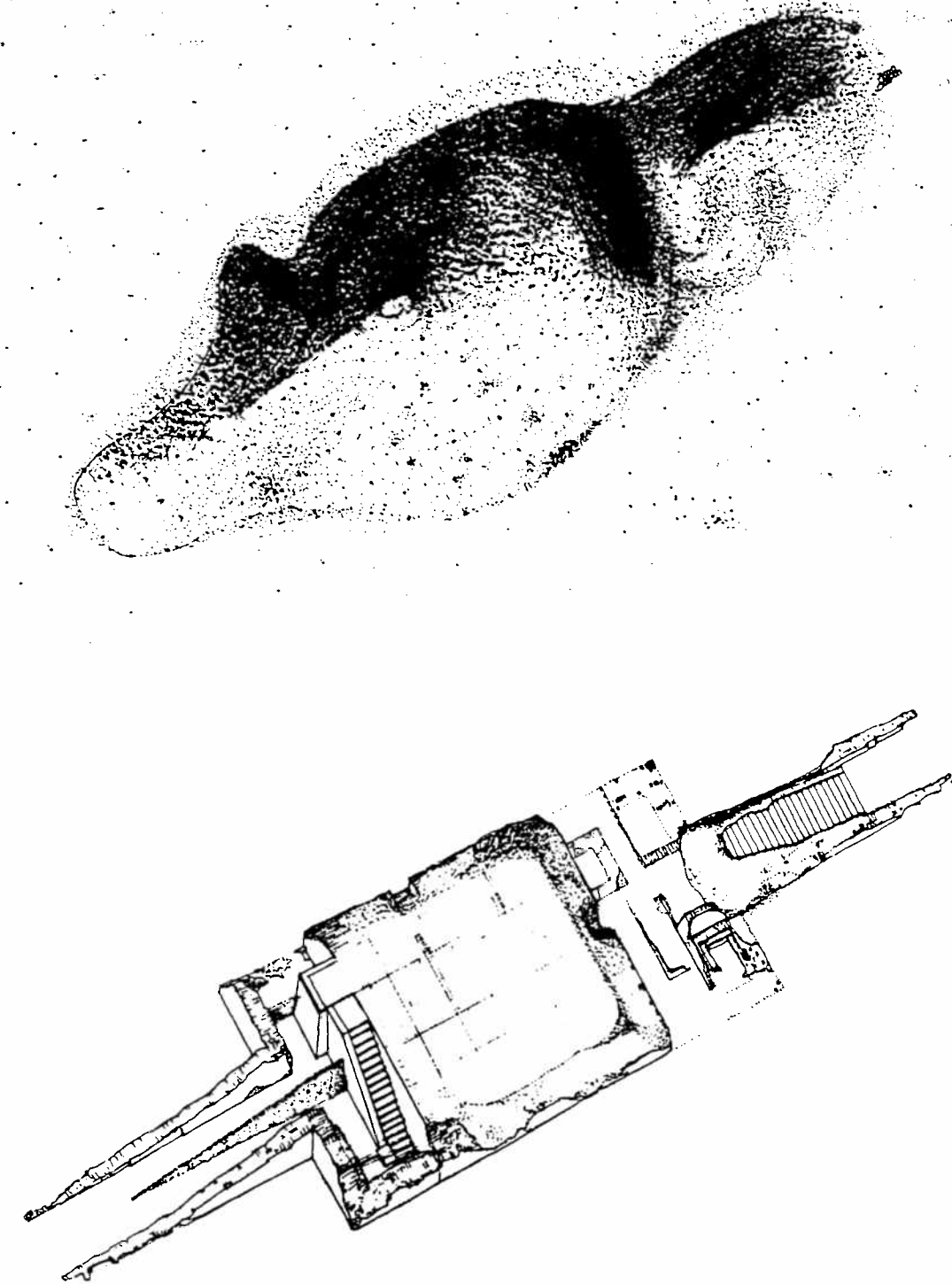


Fig. 2 Ruin of "Kom el Samak", before excavation and after cleaning.

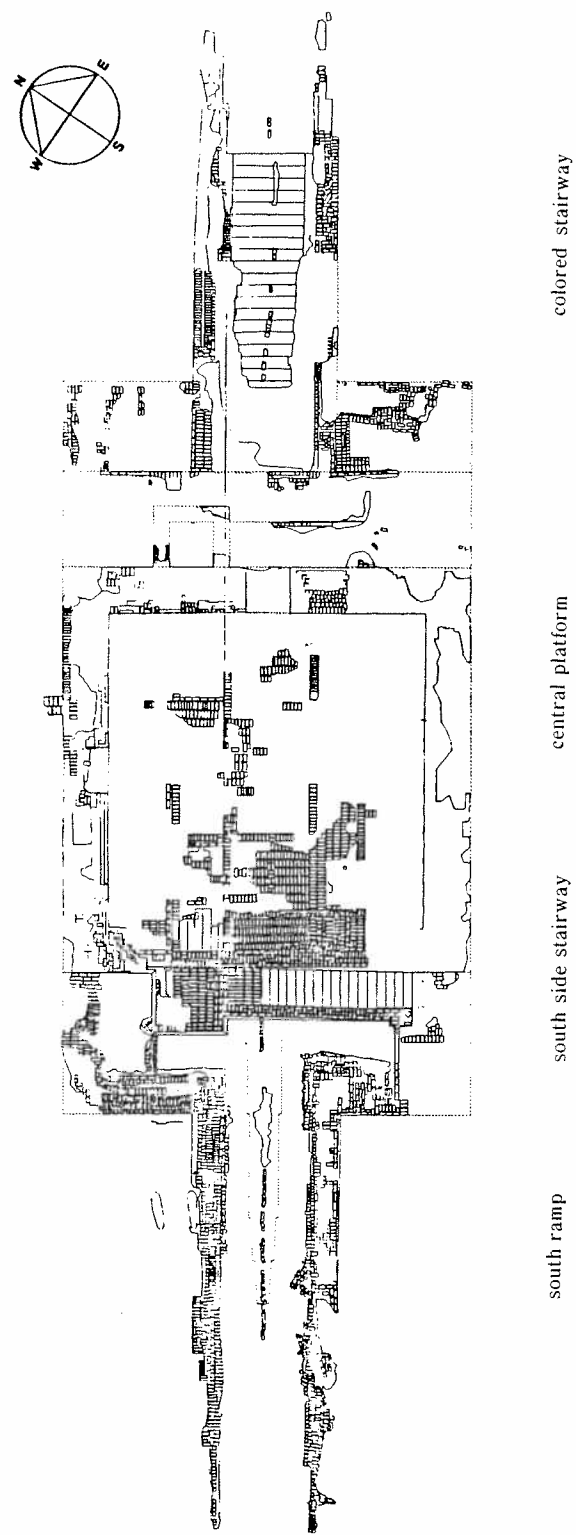


Fig. 3 Plan of the ruin of "Kom el Samak" .

#### 1-4 STRATA

Referring to the level of proto-dynastic stratum discovered at the test pits near the ruin, at Malkata-south, the ground level is growing higher 17cm per a century on an average.

At "Kom el Samak", the difference of the levels between the present surface and ancient ground is, on the west side of the ruin, 84.5cm, and on the east side, 59.5cm.

The ruin works as a mole against the pebbles and sand blown by the west wind, thus the accumulation on the west side of the ruin is considered extraordinarily thick, and that on the east side of the ruin is supposed to be closer to the normal accumulation.

According to this quantity of the increase of strata by the accumulation, the calculation shows that the ruin is about 3,500 years old. So, the ruin is supposed to be built during the 18th dynasty, New Kingdom.

#### 1-5 DATE

The ruin was inferred to have been built during the 18th dynasty from the motifs and techniques of the paintings on the colored stairway. It also was inferred that this ruin had some connection with Amenhetep III who was the master of the Malkata Palace viewed from the site. The depth of the strata does not oppose to this presumption. After a zealous effort to discover archaeological evidence which prove the presumption, three bricks with cartouche were found. All the stamps on the bricks were of Amenhetep III. This discovery confirmed that this ruin had been constructed by Amenhetep III (ca. 1417-1379 B.C.), the master of Malkata Palace, who enjoyed the highest prosperity during the New Kingdom.

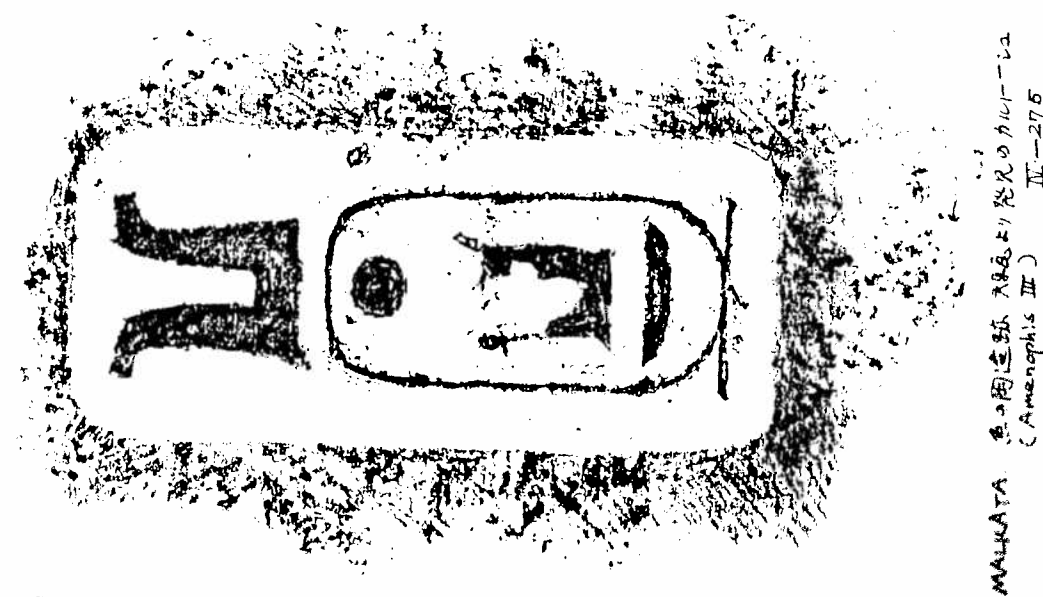


Fig. 4 Cartouche of Amenhetep III (Neb-Maat-Ra) impressed on the brick discovered from the ruin of "Kom el Samak" .



## 1 - 6 TYPES OF BRICK

The excavated structure was made with sun-dried bricks.

There are three types of brick used in this building.

Their sizes and features are as follows:

- Type A     350 L × 170 W × 100H,  
              black mud, containing a large amount of chopped straw.
- Type B     310 L × 150 W × 90 H,  
              black mud, containing a large amount of chopped straw.
- Type C     300 L × 150 W × 90 H,  
              gray mud with sand, a little amount of chopped straw.
- ( L: length, W: width, H: height, in m/m )

Cartouches were found on two type B and one type C bricks.

Type A bricks are the dominant material of the first building and are the largest of the three. They are also used for the second building, especially for important parts, and the treads of the colored stairway are made of them. Type B bricks are of the same quality with type A, but a little bit smaller than Type A in size. It applied to adjust the measurements of Type A.

Type C bricks are not used in the first building. They are used only in the second building.

## 1 - 7 ANCIENT EGYPTIAN SCALE

In the investigation and analysis of the building of "Kom el Samak", we want to acquire the same measurement and scale system as the architect of this ancient Egyptian building used.

However, we could not make sure what ancient Egyptian scale the royal architect had adopted. Thus we referred to the measurement and scale calculated from the data of the 20th dynasty by Howard Carter.\*

It was assumed that, as this measurement was adopted by the close dynasty of the same Kingdom, the scale had been originated from the 18th dynasty, the beginner of the period of New Kingdom.

1 cubit=52.31cm

1 palm=7.472cm

1 digit=1.868cm

( 1 cubit=7 palms=28 digits, 1 palm=4 digits )

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\* CARTER, H. & GARDINER, A. H. The Tomb of Ramesses IV and the Turin Plan of a Royal Tomb, J.E.A. Vol. IV (1917), PP. 130~158.

## 1 - 8 COMPLEXITY OF THE RUIN

In the center of the ruin, there is a 19.2m square platform, and adds the extensions of the platform to which extends a colored stairway on north and a ramp on south. This arrangement forms a long north-south axis of about 72m. The existing plan and arrangement excavated, however, is not original. There had been a compact building with a square central platform 19.2m each side, which was extended later. This conclusion is reduced from the analysis of the position of the structure and type of brick adopted and of the bond of the walls, confirmation of the junctions of the added walls, and the layer of the old and new walls.

This ruin is decided as a complex of the first original building and the second building after the extension.

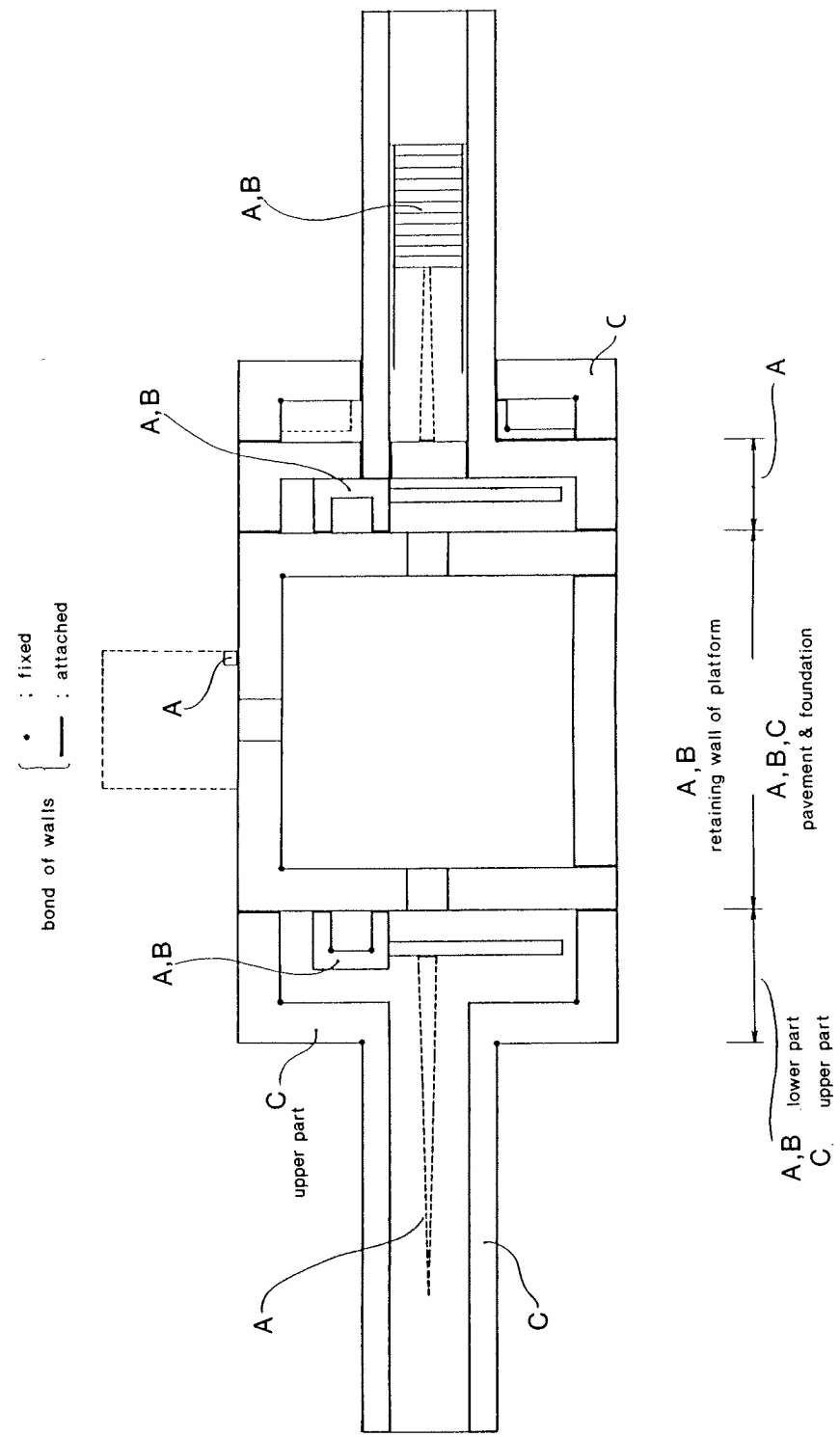


Fig. 5 Connection of the masonry and type of bricks.

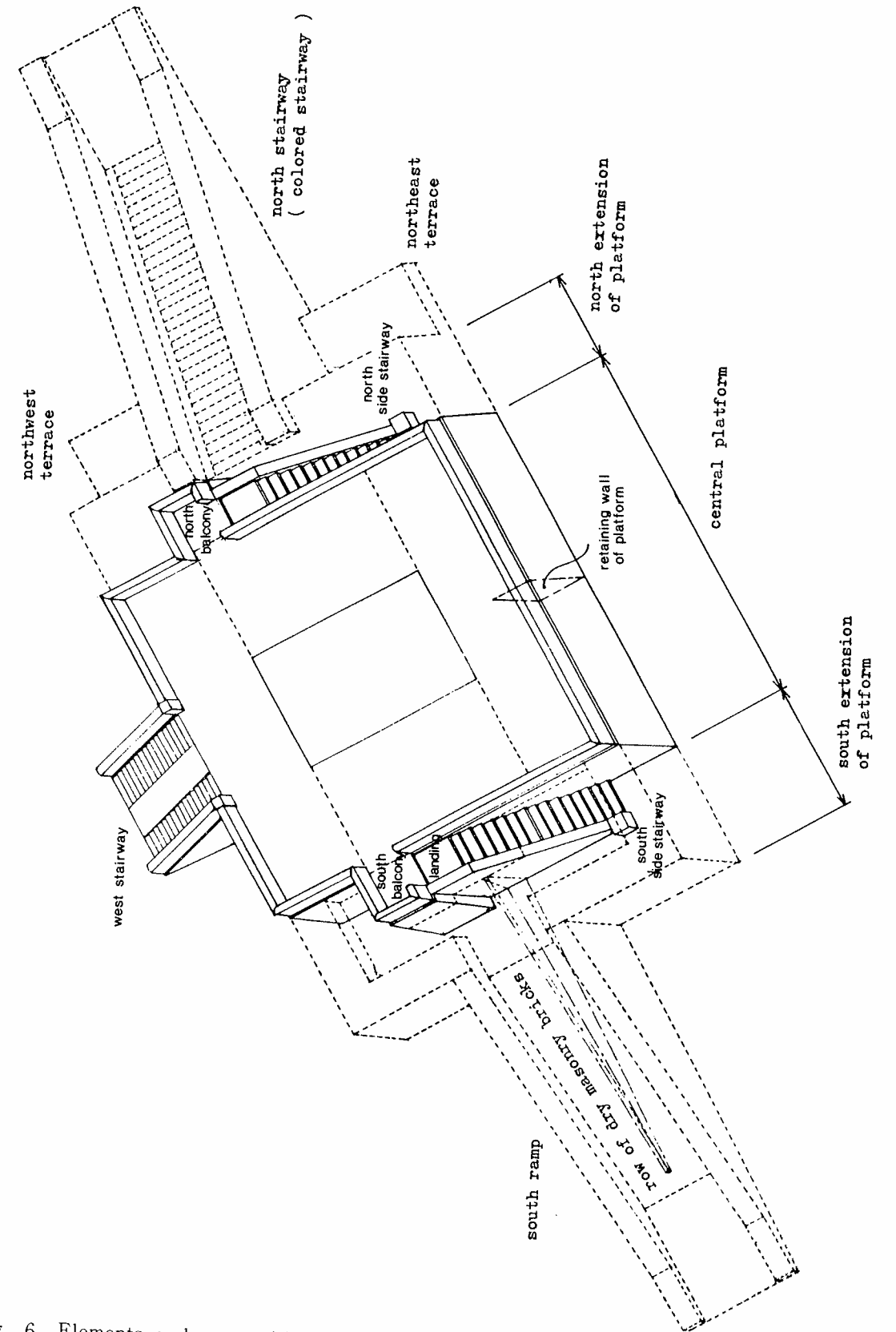


Fig. 6 Elements and composition of the architecture of "Kom el Samak"

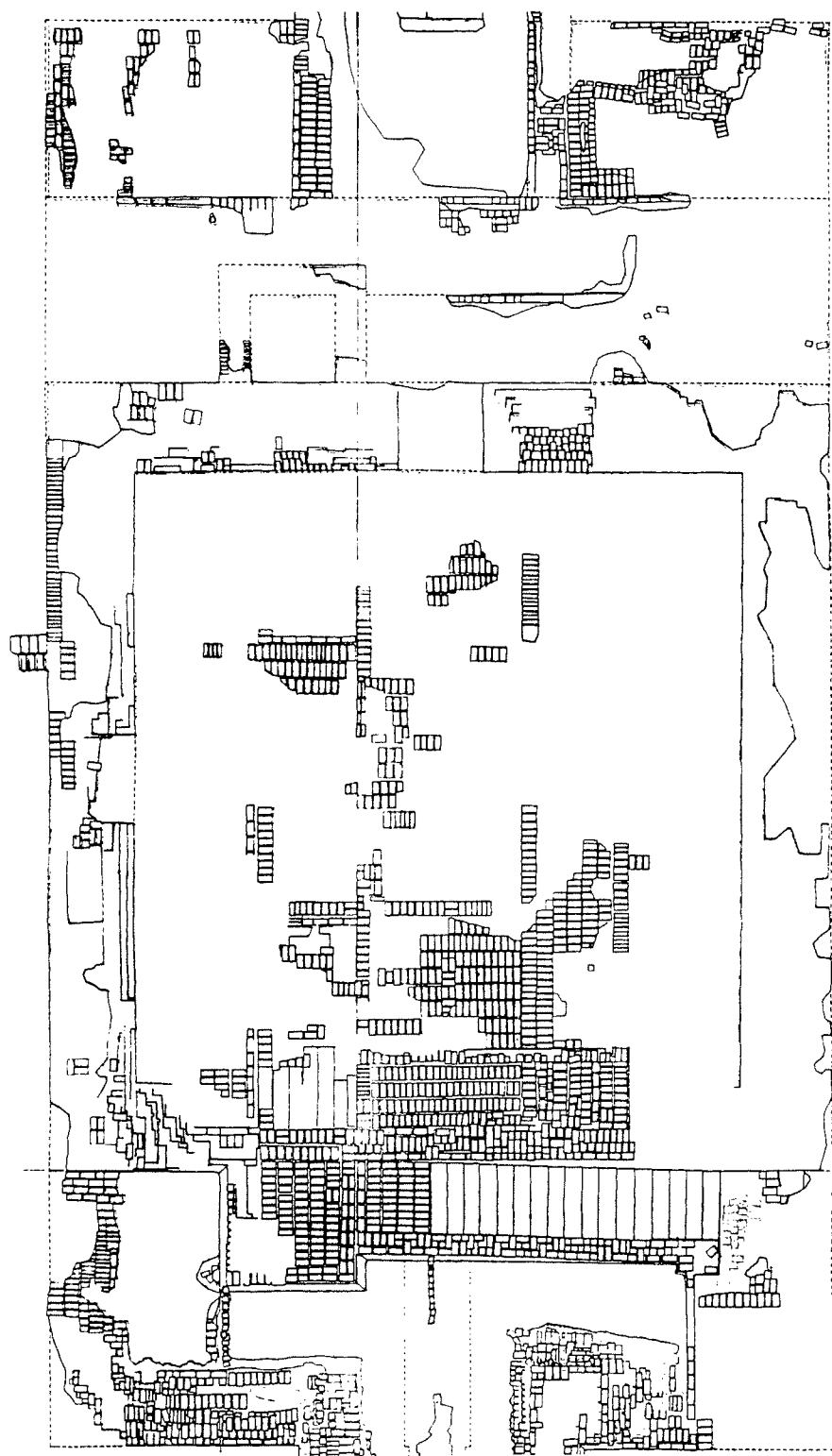


Fig. 7 Central platform.

## 2. THE FIRST BUILDING

### 2-1 ELEMENTS AND COMPOSITION

The first building is composed of a "mastaba" shaped central platform of 19.2m square and 2.4m high, the upper building and west stairway, north and south side stairways and balconies.

The central platform faces to the Nile correctly according to the ancient Egyptian orientation. Ascent and descent from both east and west are possible. Extending to the desert, the west stairway is as wide as 1/3 of the width of the central platform and directly reaches the center of the western side of the platform, rising from west to east.

The way toward the Nile is two, north and south through symmetrically projecting balconies and side stairways arranged along the north and south side walls of the platform.

On the platform, in the center is an upper structure, rectangular in plan which covered 1/6 of the entire area, occupying 1/3 of north-south length and 1/2 of east-west, surrounded by the terrace in each side.

The terrace on the platform rounds the building and provides a panorama view of the landscape around.

#### 2-1-1 CENTRAL PLATFORM

The upper part of the three retaining walls (west, north and east) of the central platform of the first building were much destroyed and only south wall remains with minor destruction. The dimension restored from the measurement of the remaining platform base and south wall is as follows:

upper edge	18,832mm=1,008	digits=36 cubits
lower base	19,237mm=1,030	digits
height	2,405mm=	128.75digits
batter of the retaining wall	205mm=	11 digits

As excavated walls had lost their finish of the surface, they measured 19,200 mm at bottom.

The figures of the measurements above were calculated with the addition of finish as it originally had been.

The figures indicate : the central platform was designed with a batter of 205mm against the height of 2,405mm in order to keep a stable balance. The upper size of the platform is smaller than the lower, and it shapes like a "mastaba".

## 2-1-2 SIDE STAIRWAYS AND BALCONIES

The measurements of the side stairways and balconies are decided from the length of the bottom of the platform. The length of 15 steps of a side stairway is  $1/3$  of the lower base length, newel post stand  $1/6$  apart from the eastern end of the platform, the distance of the newel and the first step is 11 digits (equals to the batter of the wall), and the total makes  $1/2$  of the whole length of the lower base and a batter (11 digits). Thus the landing comes 11 digits west from the center of the platform.

The depth of a step (tread) is  $1/45$  ( $1/3 \times 1/15$ ) of the lower base, and omitting fractions, arranged round number; 23 digits (429mm). The width of a step is 92 digits, 4 times a tread, and the landing are 92 digits square. A balcony is based on 184 digits (92 digits  $\times$  2), with its upper edge 173 digits (184 digits - 11 digits : a batter), lower base 195 digits (184 digits + 11 digits : a batter).

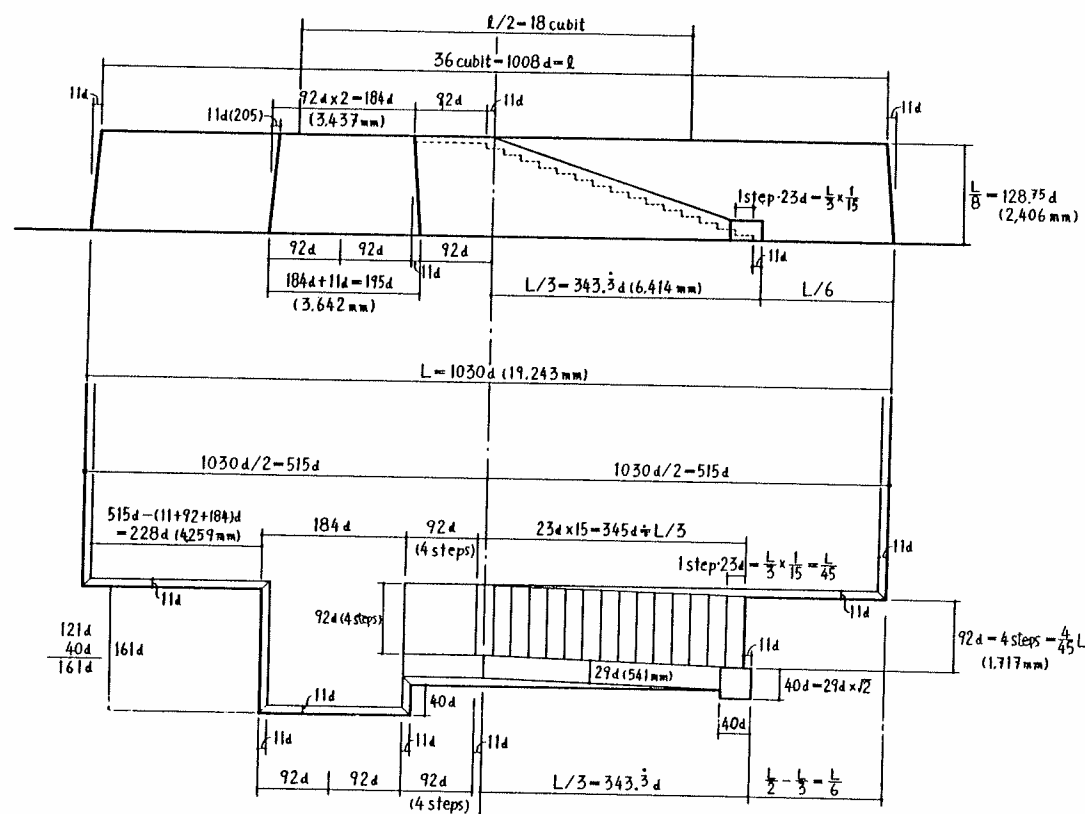


Fig. 8 Original measurements of the side stairway and balcony.

## 2-1-3 WEST STAIRWAY

The restored west stairway is a straight stairway that rises to the central platform, from west to east. Its width is  $1/3$  of the upper edge length of the platform, and is equal to the width of the upper building on the platform. It is wide enough to leave a certain space in its center when the sum of the width of two side stairways (north and south) is subtracted. This center part of the west stairway is supposed to have been designed a ramp, not a stair.

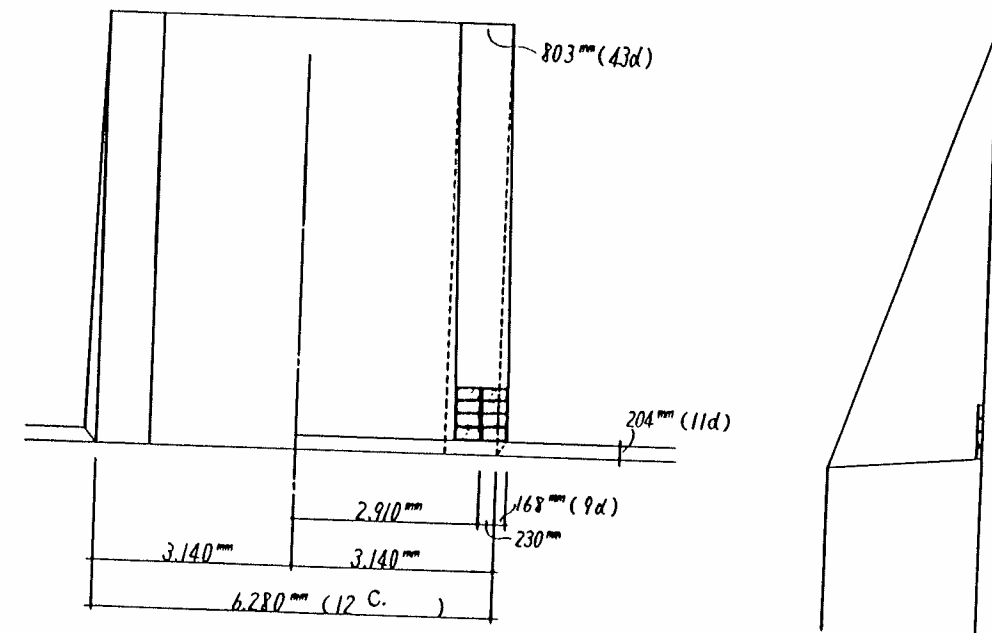


Fig. 9 Remains of the west stairway.

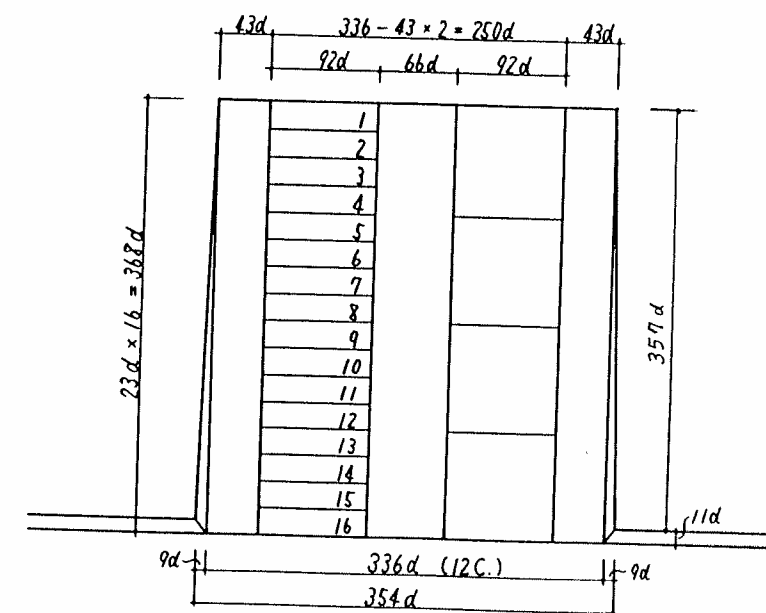


Fig. 10 West stairway.

## 2-2 STRUCTURAL DESIGN

### 2-2-1 MASONRY SYSTEM FOR THE RETAINING WALL OF THE CENTRAL PLATFORM

The retaining wall of the central platform is 2,185mm of thickness of the bottom, with a batter outside, and a height 2,405mm of 21 courses. The lowest course is a foundation to adjust the instability of the sandy ground, and the top of the courses is the pavement of the terrace. Subtracting these two courses leaves 2,185mm. The architect adopted the height of supporting part of the wall for the thickness of the wall.

Up till a half of the height, the bricks are laid tightly and produce batter by adjusting the width of lateral bond joint of bricks. Until  $\frac{2}{3}$  of the height hollow masonry system is adopted, and at the upper part from  $\frac{2}{3}$  height, the width is recessed to a half gradually. This masonry system is adopted to reinforce the lower part of the wall. It proves that the architect had already had the knowledge of the structural dynamics that the soil pressure produced by the stuffed sand works larger at the lower part of the wall.

In this structural design it is also recognized that the architect had chosen the sophisticated proportion of  $\frac{1}{2}$  and  $\frac{2}{3}$  in deciding the articulated points in the section of retaining wall.

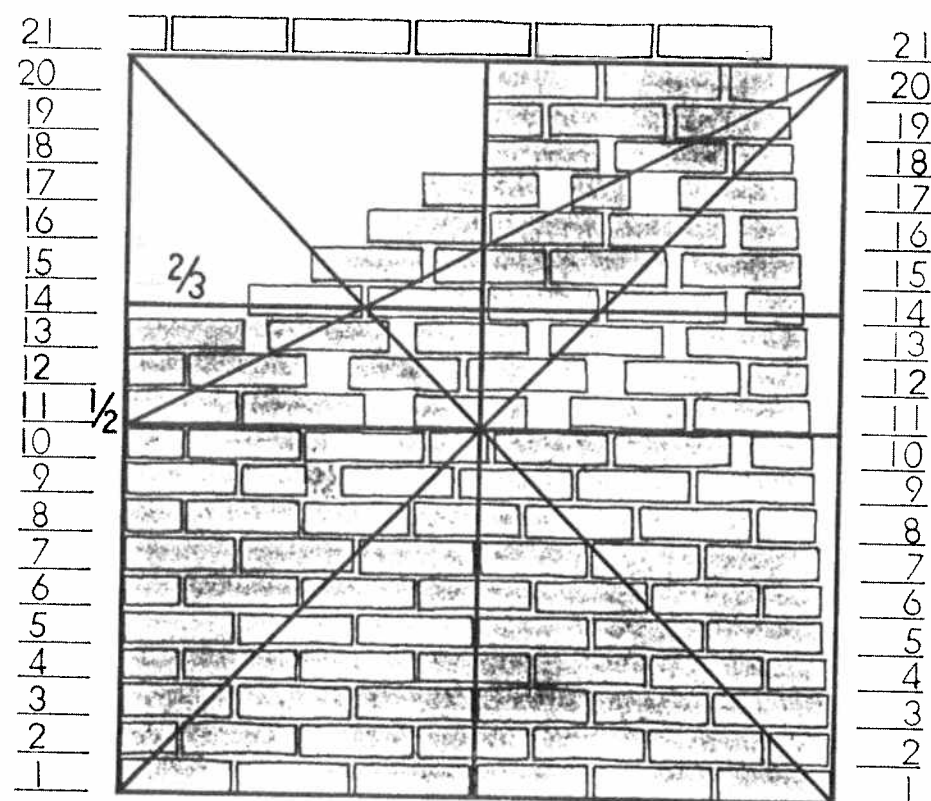


Fig.11 Masonry system of the retaining wall of the central platform.

### 2-2-2 METHOD FOR THE BATTER OF THE WALLS

The ratio of the batter of the retaining wall is about  $\frac{1}{12}$ . The retaining wall of the central platform is an example of an authentic battering method. It is a very stable masonry system which provides a sufficient width for the base of the same measurement of height, and laying the interior bricks perpendicularly and adjusting the width of lateral bond joint, produces an recessed exterior batter.

As to the simplified method, on the other hand, the base width is narrower, the section is invariable and the exterior batter is constructed by setting back system. Though the latter method, compared with the former, can shorten the time of construction, but needs some interior reinforcement. The simplified method is adopted only in the attached parts such as stairways and balconies in the first building, where as the second building is completely built by the simplified method. This fact tells that the first building is much higher in quality and that the second building had to be built by the simplified method to shorten the time of construction.

### 2-2-3 OPENINGS OF THE RETAINING WALL AND THE STAIRWAYS

There are openings in the center of the three walls—north, south and west—. The width of these openings is decided by the same measurement as the width of the wall, and single tier which might not be able to support the soil pressure works as a partition wall. For south and north walls, however, stairways are arranged outside the openings. As to the south side stairway, which had been well remained, solid mud-brick concrete (mixture of mud and broken bricks) was filled instead of sand and pebbles for the central platform, and the whole stairway worked as a strong structure to close and conceal the existence of the opening.

The west wall opening must have been closed and concealed by the stairway in the similar manner. The brick masonry remains at the west edge near the northwest corner of the platform are inferred to be remains of the west stairway.

### 2-3 CONSTRUCTION PROCESS

Very thick wall of more than 2 meters is designed for the central platform so that it could resist an enormous pressure made by sand which was stuffed inside. The openings, which could have turned to be a weak point, are inferred to have been designed from the necessity of construction. The retaining wall of the platform must have had openings for the workmen to enter inside and to be able to work from both inside and outside, although the plan of the wall was closed and wall was too thick to reach from one side to another side. It is very subtle, as a planning of the construction to cut the openings where the stairs to be attached, to have the stairs conceal the openings, and to let them function as a resisting object for stable structure.

This fact tells that the architect of this architecture was excellent technological as well as artistically.

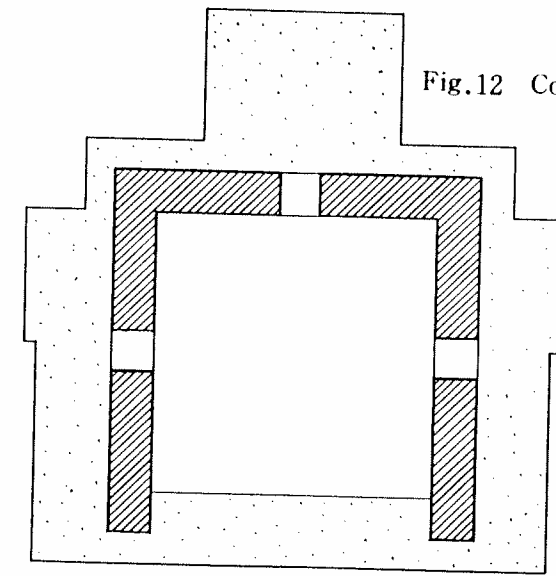


Fig.12 Construction process (1).

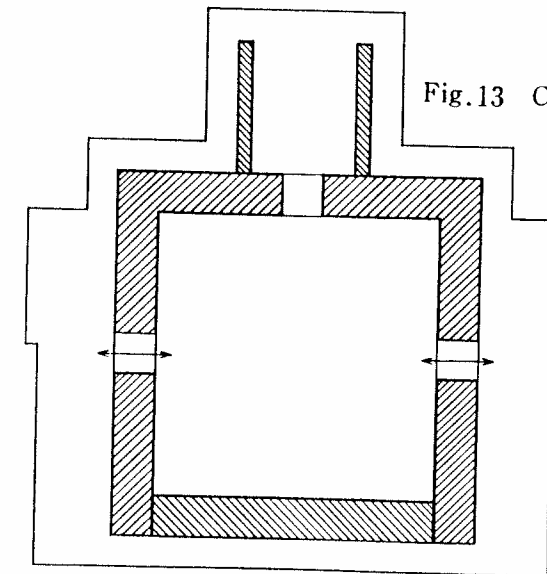


Fig.13 Construction process (2).

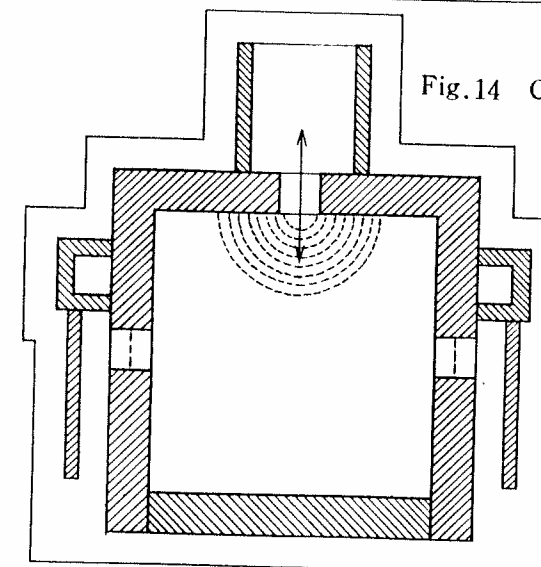


Fig.14 Construction process (3).

## 2-4 SPATIAL CHARACTER

### 2-4-1 LANDSCAPE FROM THE PLATFORM

The magnificent scene of the landscape was able to be seen from the upper terrace on the platform.

The central platform, though only 2.4m high, provides a wide view of the low desert. Facing the west, one can see the cliffs of the Libyan Desert like mountain outline several kilometers to a distance. The desert extending to the foot of the cliffs is waste and any artificial object is not seen.

To the left is the direction of south Nubia, and the plateau of the Nile Valley disappear into the horizon.

To the right, there is the Malkata Palace 2km ahead and on the right of the Palace, 1km ahead, the mounds of heaps made of the soil removed from Birket Habu, an artificial lake which Amenhetep III presented to his queen Tiy for her boating, is seen.

The 180-degree-wide landscape of the west provides a grand view of the waste that overwhelms any spectator, and the view of the east, on the contrary, is a pastoral scene graced by the Nile.

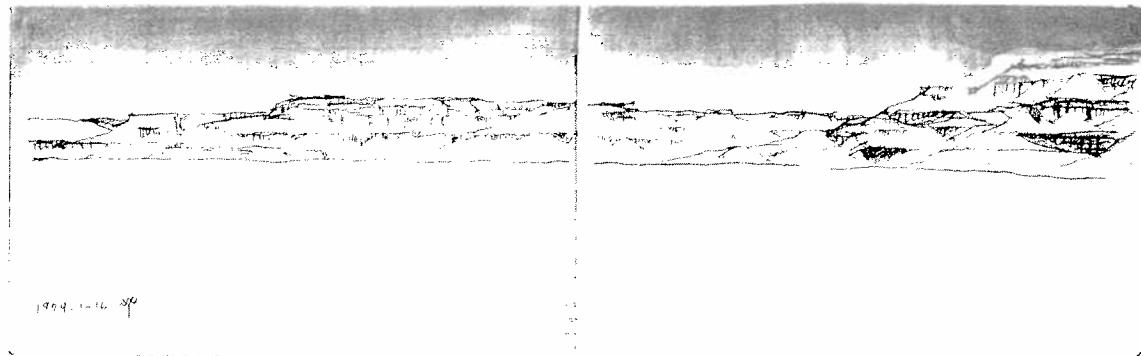


Fig.15 Landscape from the central platform.

### 2-4-2 AXIS AND FRONTALITY

It is one of the typical composition in ancient Egyptian architecture to set the climbing approach way of east and west so that ascent and descent were achieved from both east and west, because east and west were the symbolical directions of birth and death.

In this type the two approach ways were constructed symmetrically and similarly in quality.

The architecture of "Kom el Samak", however, divides its climbing way from east into two (north and south) side stairways, and one large stairway was arranged in the west. This represents that the main axis of the first building ran from west to east, and its front faced to the west.

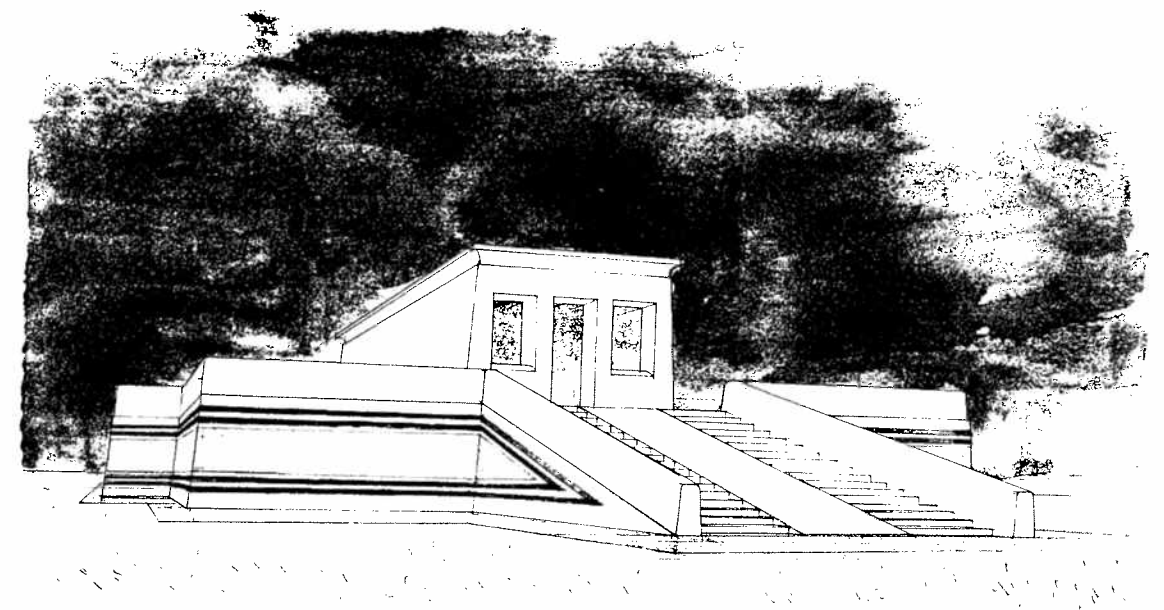


Fig.16 West façade of the first building.

### 2-4-3 CENTRALIZED SPACE

The dominant characteristic of the first building at Malkata is its centralized composition.

The square plan of the platform are concentric. The upper building emphasizes concentricity.

The surrounding terrace space on the platform induces the movement to walk around, disperse and center again.

This characteristic shows that the building was attempted to create an all-round spread of space toward the surrounding view, and suggests that it was intended to play the role of a view point.

The first building had a centralized space.

### 2-5 PURPOSE AND FUNCTION

It is supposed that this building was used as a belvedere, a rest place and a kind of a "kiosk" when some hunting or pleasure were made in the vast royal garden.

And there is no other place in the palace suitable for an inspection of very big troops. The building, presumably, was constructed with its front toward west in order that the building and the terrace on the platform were used as a podium when such formal ceremonies were held.

Thus, the first building might be used by the King for a "kiosk" to rest during hunting or cruising on the lake, and sometimes for a ceremonial pavilion in the military review parade.

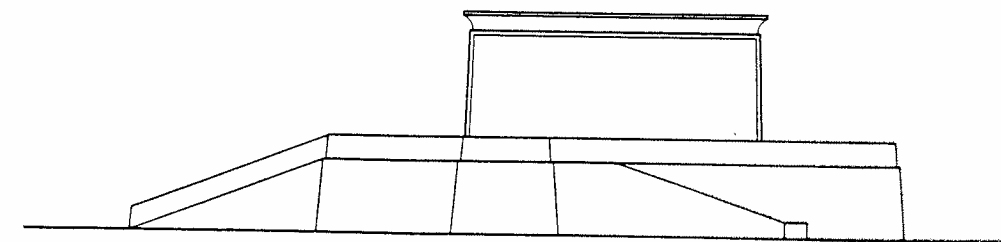
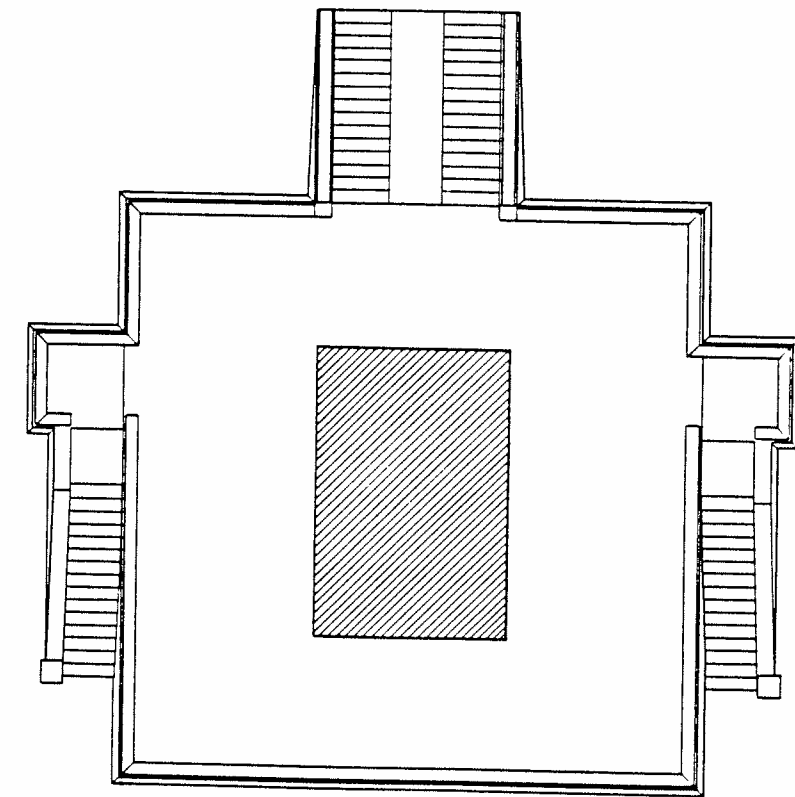
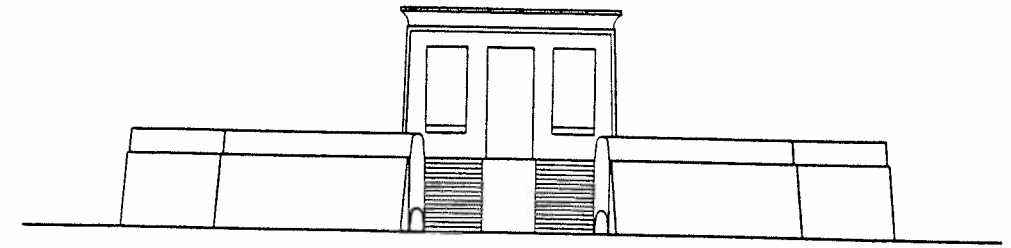


Fig.17 The first building of "Kom el Samak"



## 2-6 MODULE AND PROPORTION

The upper structure of the central platform was designed to cover  $1/3$  of the north-south length of the platform,  $1/4$  of the east-west, and on the whole  $1/6$  of the platform surface area. It is supposed that 36 cubits had been chosen for the length of upper edge, because 36 is an integer that can be divided by 2,3,4,6. The lower base, on the other hand, does not show an integral figure at cubit scale.

It is inferred that the upper length had been decided first, 11 digits were set for the batter of the walls, and two batters were added to the upper length, then made the length of the lower base as a result.

It should be noticed, however, that the height of the platform is  $1/8$  of the length of the lower base. The upper building has a proportion based on the upper length of the platform, and the height of the platform has a proportion based on the lower base of the platform. It is supposed that each length has been decided by each module and a clear proportion system.

In deciding the measurements concerning the side stairways and balconies, the length of the lower base of the platform was settled as the basic module. And the measurement of some specific part decided from the basic module became the secondary module for other measurement. The batter of 11 digits were utilized to co-ordinate a minute arrangement of proportion.

The proportion of each parts are all integral fractions, i.e.  $1/2$ ,  $1/3$ ,  $1/4$ ,  $1/6$  and  $1/8$ . The sub module, on the other hand, are integral multiples,  $\times 2$  and  $\times 4$ , and method of the repetitive same measurement was frequently adopted.

The proportion between the thickness of the retaining wall of the side stairway and the width of the newel is  $1 : \sqrt{2}$

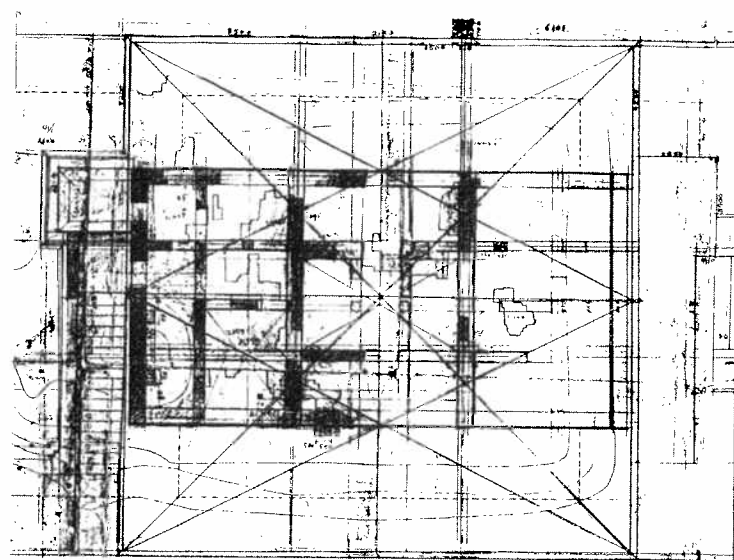


Fig.18 Geometrical analysis in the central platform.

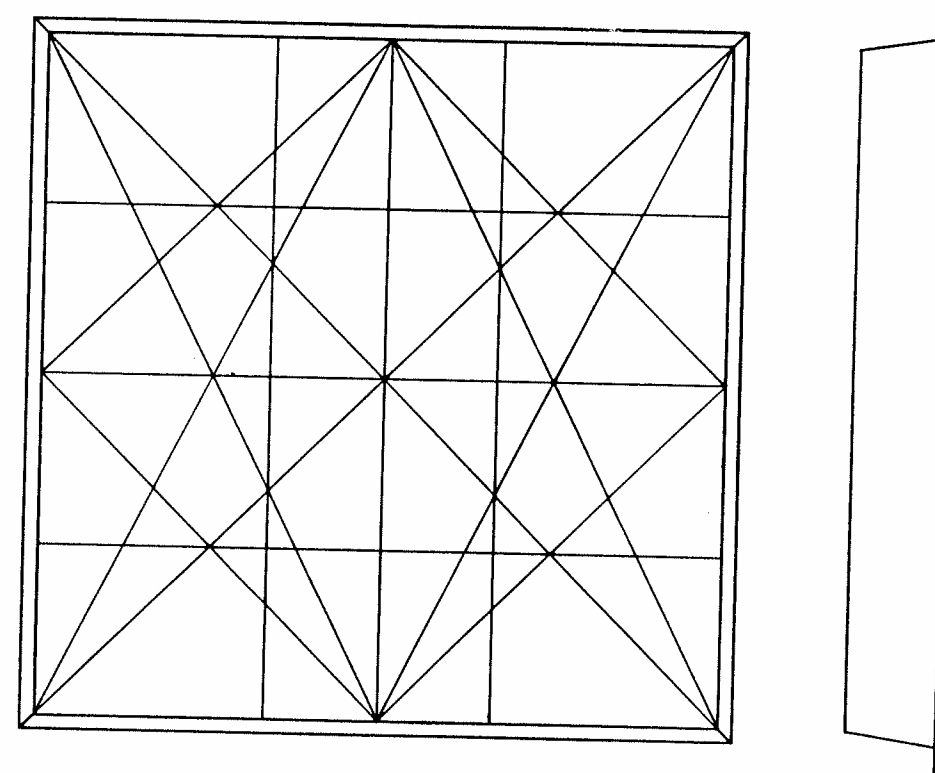


Fig.19  $1/2, 1/3, 1/4$  division of the central platform.

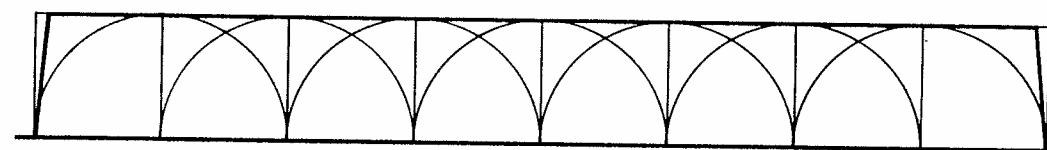


Fig.20 The height of platform is decided as  $1/8$  of the length of base.

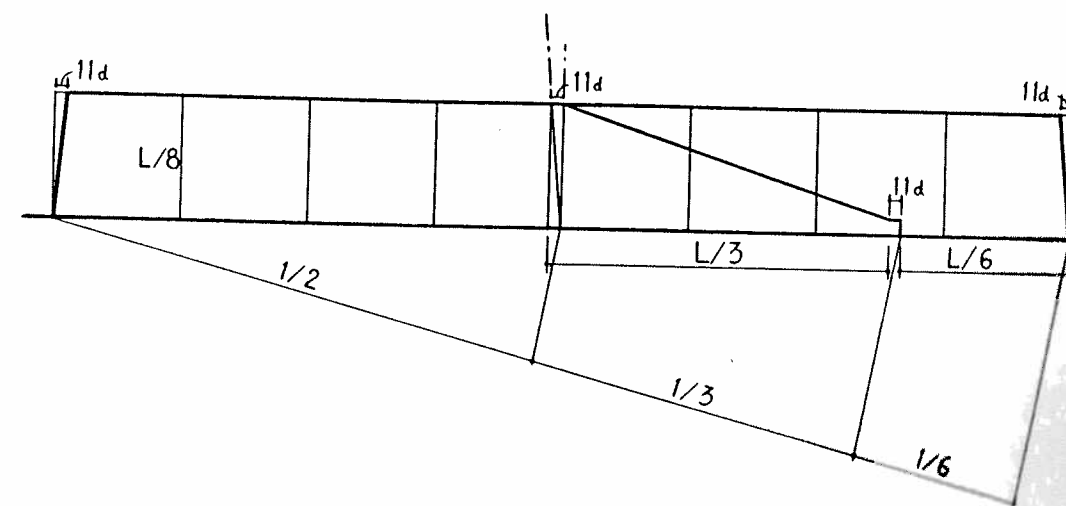


Fig.21 Proportional system in the central platform and side stairway.

## 2-7 METHOD OF ARCHITECTURAL DESIGN

All the factors — the setting of module, proportional relation of integral fraction and multiplication, application of co-ordinating measurement (using the batter), repetitive use of the same measurement without the spatial relation in the building, a various adoption of the secondary module and its use under control — characterize the intentional method of architectural design for the building of "Kom el Samak".

These characteristics, at the same time, are similar to those of Japanese "kiwari" which is the proportional design system for Japanese traditional architecture and completed in medieval ages.

In comparison with those two architectural design method, we can recognize that the ancient Egyptian architectural design had already reached the level of methodological technique in the dawn of the Ancient Days, more than three thousand years before the Japanese medieval age.

## 2-8 RENOVATION TO THE SECOND BUILDING

The wear of the surface of south side stairway suggests that the first building was used at least 15 to 20 years. On the other hand, the analysis of the paintings on the treads of the colored stairway suggests that the extension and renovation of the building into its second stage has something to do with the 30 year's jubilee celebration of Amenhetep III. Counting backward, it is reasoned that the first building was built at around the 10th year of his reign.

It is assumed that, since the construction and move of the Malkata Palace by Amenhetep III was carried out after the 8th year of his reign, the first building of "Kom el Samak" had a relation with the construction of the Palace.

The first building which forms a concentric composition around the central platform, must have been utilized as a kiosk for the base camp when the young and then middle-aged Pharaoh enjoyed the pleasure and hunting trips. It must also have been used as a stand for military review, and have been closely connected with the Pharaoh's active memories. In his later years the building was considerably renovated and remade to the second building.

## 3. THE SECOND BUILDING

### 3-1 TOTAL RENOVATION

Considerable changes were made when the first building was renovated and extended to the second building.

The second building was not a mere partial reconstruction but a total renovation of the building. While the superiority of centralized space composition on the platform though the east-west axis had determined the ascent and descent, was the spatial characteristic of the first building, space with center, the renovation changed the axis to north-south, and also stressed its spatial feature of the second building, space with axis.

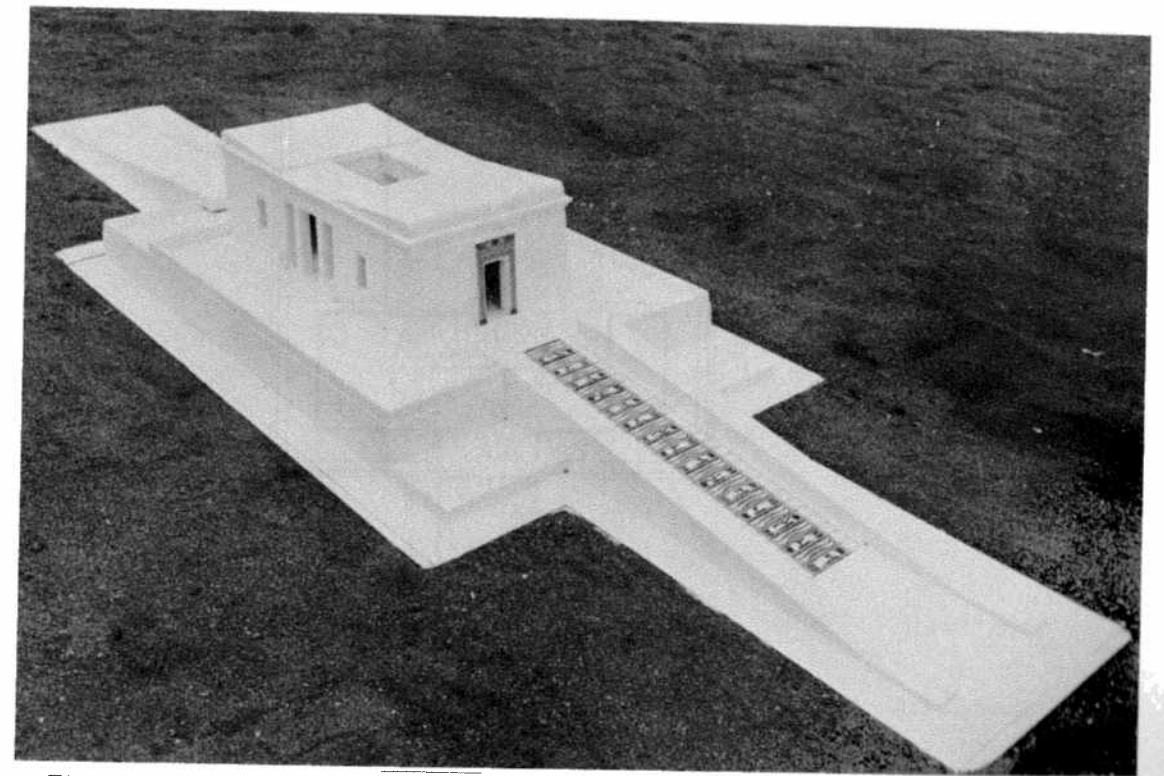


Fig.22 The second building, restoration model.

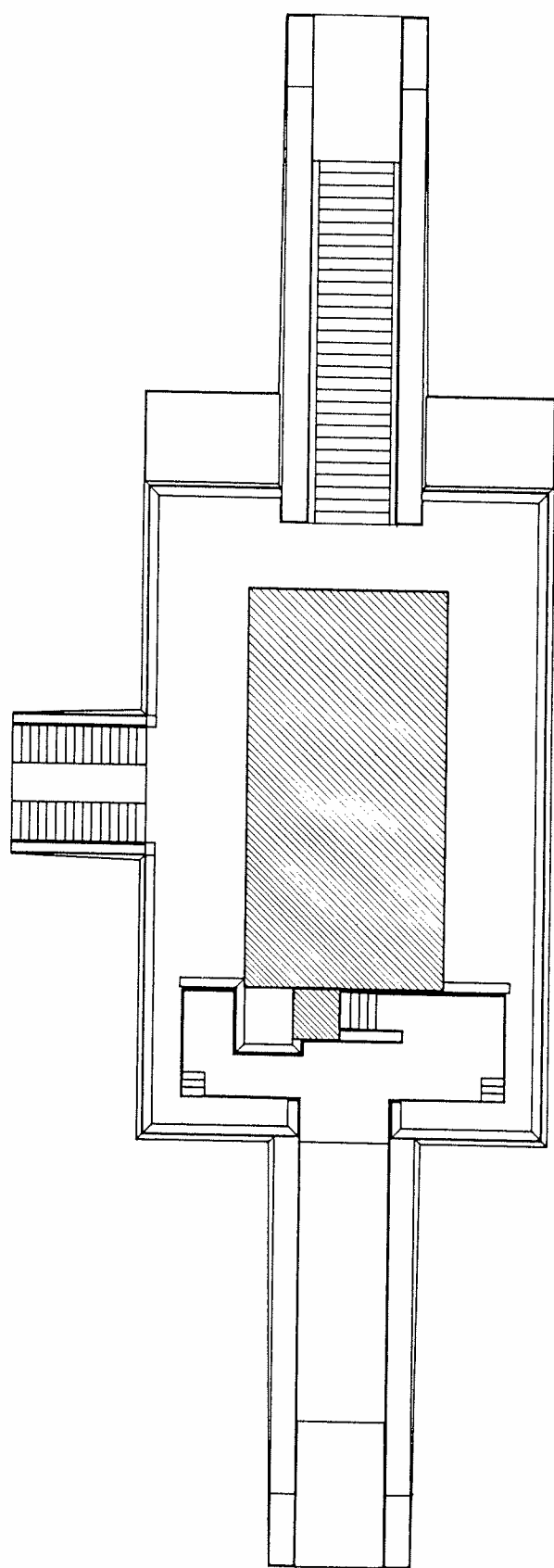


Fig.23 Plan of the second building.

### 3-2 THE CHANGE OF AXIS

Only in north and south side was the extension and renovation put forward, and no change was made for east and west side. The former north and south side stairways were abolished and replaced by long approach ways. They begin at the point of 16.81m north or south from the balconies. The retaining walls of the approach ways stretch farther from the start point to from fore-court, and the whole length of the second building extend nearly as long as 72m, which is three times longer than before.

Though the west stairway still remained and the number of the approach ways were the same, three, the new north-south axis became the major one, and the building changed its spatial characteristic.

The colored stairway, the first discovery at "Kom el Samak" which makes the ruin famous, was of the approach way from north, or the element represents the axis, of the second building.

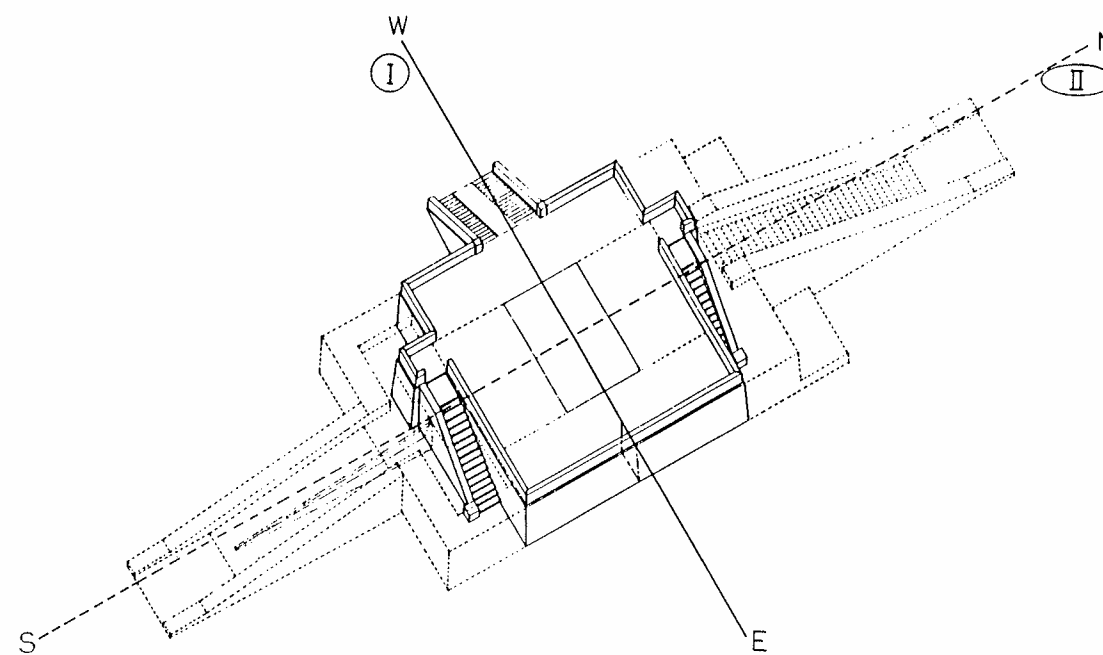


Fig.24 Change of axis, the first building : west-east, the second : north-south.

### 3 - 3 EXTENSION OF THE PLATFORM

The building on the platform was once removed, and its north-south length was fully extended and reconstructed three times bigger than the first one. To rebuild the north and south terrace on the platform, platform was extended to north and south, and the new terrace had the function as a porch for the two new north and south approach way.

The length of the platform extension is 4.54m in north, and 6.71m in south. A low terrace was attached only to the north extension.

As the result the design of the new platform was asymmetry, though the first building had kept a strict symmetry and the newly-designed north and south approach way and climbing angle of the retaining walls were symmetrically arranged.

Contrary to the expectations of the excavators to find a splendid colored stairway from the south, as it looked the same as the northern one, no colored stairway was discovered, and it had to be concluded that this approach way was a ramp. The asymmetry was already found in the difference of the length of the north and south extension of the platform.

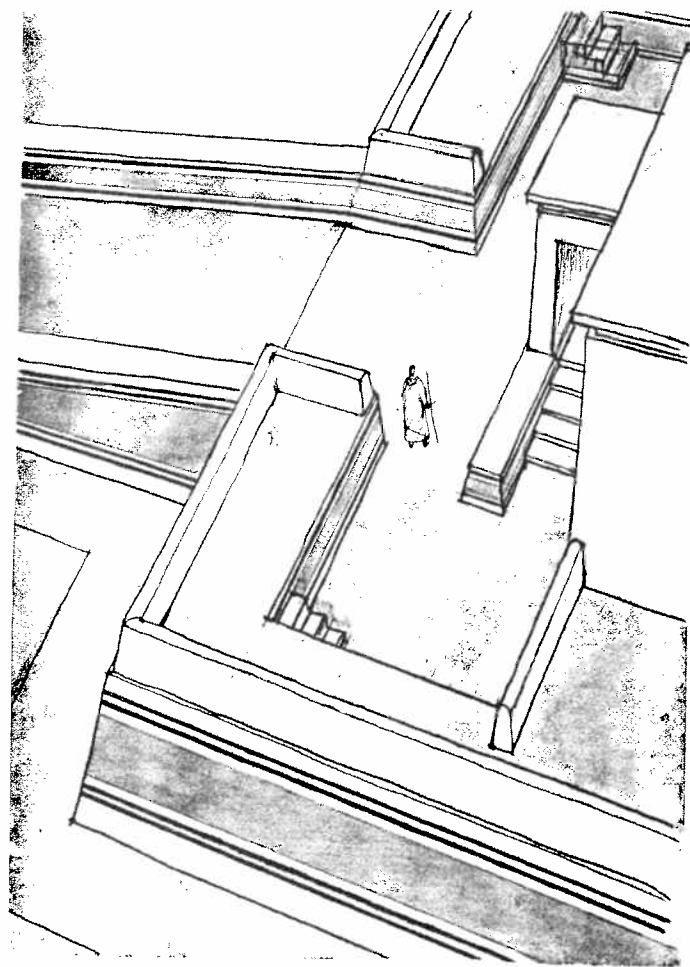


Fig.25 South extension of the platform and south ramp.

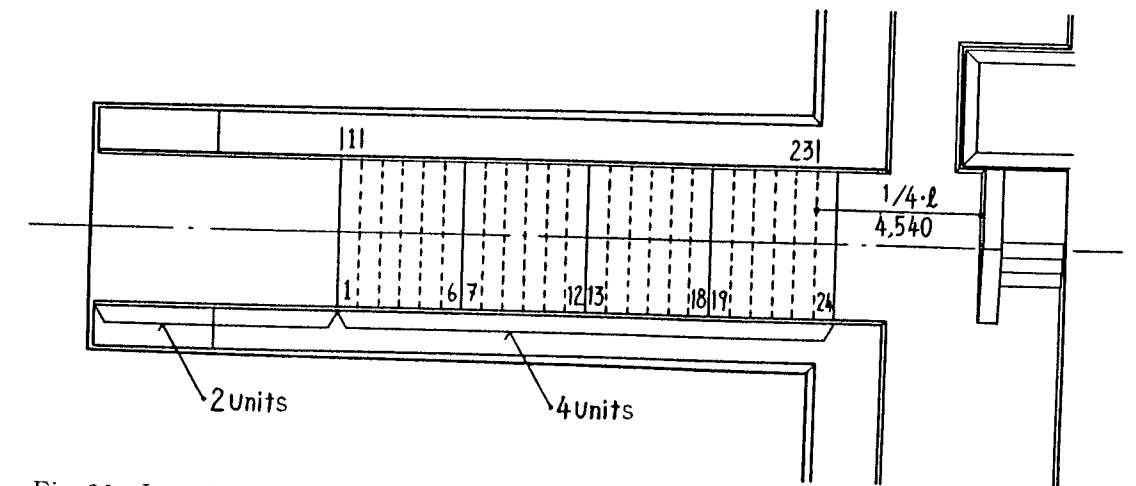


Fig.26 Length of south ramp is 4 units (24 steps) of colored stairway.

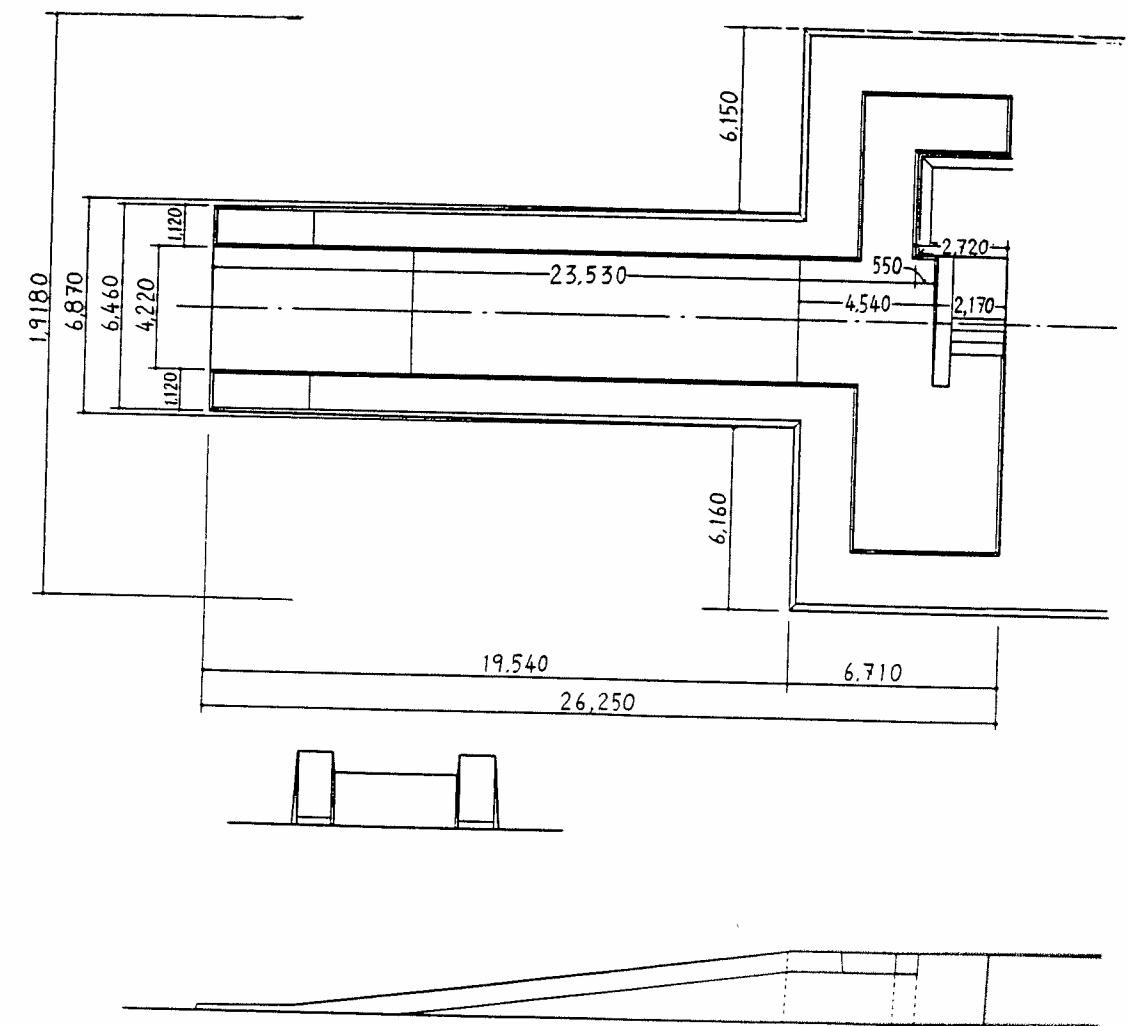


Fig.27 South ramp.

### 3-4 SYMMETRY AND ASYMMETRY

It is reasonable that space of the terrace of the east and west in the first building (an approximate 1/4 of the upper length of the platform) is repeated on the north extension of the platform. The repetition of the same measurement is also found at the width of low terrace, 4.25m, which was the distance between the corner of the platform and the balcony in the former building. It seems to have been the architect's favorite method. The width of 6.71m on the south extension of the platform equals to the sum of 4.54m of the north extension and 2.17m of the width of south side stairway, and means that the space of the terrace is repeated outside the retaining wall of the south stairway.

North balcony and side stairway were buried under the extension of the platform on which the terrace was arranged and the north stairway reaches the top of the platform.

On the south side, however, the balcony and side stairway were surrounded but not completely buried by the extended terrace and lower platform was formed inside the retaining wall. The new south ramp stretches to this lower platform, which links the remaining upper part of the side stairway.

Thus the south extension consists of two parts, a narrow terrace of the platform level and a lower platform inside the retaining wall. The lower platform is assumed to be 1.72m high, and the south side stairway leaves upper 4 steps.

Compared with the straight approach of the colored stairway on the north, the approach from the south is complexed, giving an impression that it is the back side. The difference between front and back, however, is hidden inside the retaining wall and unnoticeable unless one gets very close to examine.

The building, on the whole, looks as if symmetrically composed.

To sum up the first building had a completely symmetrical composition and the second building, however, had some asymmetrical features and elements:

Approaching way; North : stairway

South : ramp (but the incline of them were the same)

Length of the extension of the platform;

North : 4.54m

South : 6.71m

Levels of the extension of the platform were also different.

There were low terraces only on the north side.

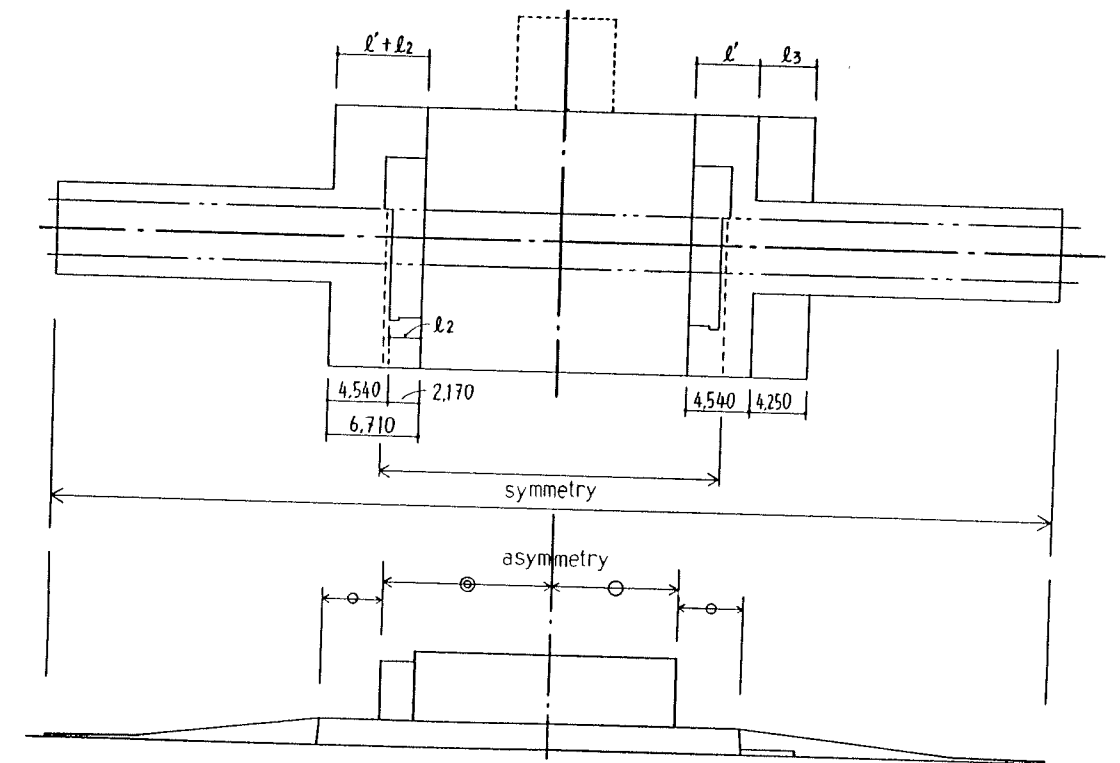


Fig.28 Symmetry and asymmetry.

### 3-5 BASE LINE AND THE SYSTEM OF MEASUREMENT

It is surprising that the retaining walls of the colored stairway in north and those of the south ramp are quite equal in measurements and interior length, and a survey from the top of the platform tells that they are composed exactly symmetrical against the same axis with little error.

The reason is that, when the building was renovated, two rows of bricks were laid on the platform surface as base line, and these approach ways were measured according to these base line. The west row of the line runs exactly parallel to the north-south axis that goes through one of the corner of the south balcony which is nearer to the central platform axis. This corner is also the point where the last step of the colored stairway reaches. Thus the setting of this corner point had another importance, and it was the starting point of design and construction of the renovation plan. The interior width between the retaining walls of approach way of 4.06m (217 digits) was calculated from the twice of the distance between the corner point and the platform axis. This means that the system of measurement of the first building was related to that of the second building.

### 3-6 COLORED STAIRWAY

#### 3-6-1 THE NUMBER OF THE STEPS

Though the stairway was partially destroyed, the steps from the first to the twentieth were remained. As it is possible to measure the distance between the first step and the central platform, as well as the difference of the height, the adequate number of the steps can be assumed by the exact measuring of the tread and rise of a step. Thus it is important to measure the steps accounting the slight inclination of tread and rise of a step. Taking into account this detail feature of a step, the tread is measured 30 digits (560.4mm), rise is 4 digits (74.7mm). Adapting these measures for the relation of distance and height, it is estimated that 30 steps (31 rises) complete the ascent to the projecting part of the balcony.

It is remarkable that the ground surface inside the retaining walls of the colored stairway is a little hightened than natural ground level by an artificial adjustment. Without this adjustment it needs 32 steps to reach the platform, while the actual sufficiency is 30. Consequently, 30 is a number which was produced by an intentional manipulation.

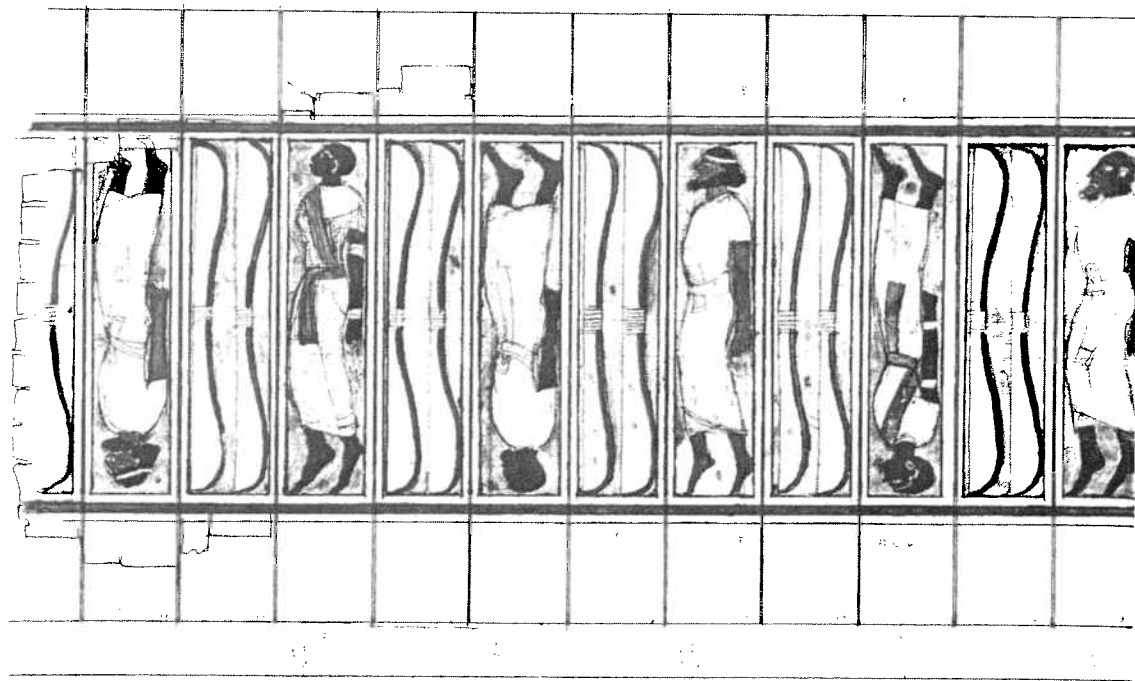


Fig.29 Colored stairway from 9th step (right end) to 20th step.

#### 3-6-2 THE COMPOSITION OF THE FIGURES

The human figures of the two types of northern enemies and one type of southern one were depicted on the colored stairway. And figures of these three types of enemies and figure of bows appear alternately. 6 figures on 6 steps (enemy A, bows, enemy B; bows, enemy C, bows) is a set of the composition.

Then, total number of the steps of the colored stairway must be decided so as to be a multiple number of 6.

Namely, 30 is the number of steps selected as such a number.

In designing the colored stairway, 180 digits of the 6 steps is the module which control the total length of the stair, 5 units, and of the forecourt, 2 units.

#### 3-6-3 TREAD AND RISE

A stairway with a tread 30 digits (560.5mm), rise 4 digits (74mm) is not suitable for an every-day walking stride and speed. The south side stairway of the first building, compared with the colored stairway, is very apt to an ordinary stride and speed because its tread is 23 digits (432mm), rise is 7.22 digits (135mm). Since the first building was constructed in the youth of Amenhetep III, it must have been an ideal design for his active walking. In this sense, it is possible to assume that the second building with the colored stairway was designed for the old aged King as it was built in his later days. But this assumption does not explain everything.

Treading on the pictures of barbarian prisoners of the conquered tribes and of bows is not an secular performance. It must have been a majestic ritual to symbolize the reign of the Egyptian Pharaoh.

The stairs in shrine and mortuary temple are often designed with a ritualistic and monumental characteristic, to which the colored stairway in the architecture of "Kom el Samak" resembles. These stairway with a gentle inclination and deep tread represents ceremonial space of the ancient Egypt.

3 - 6 - 4 THE MEANING OF THE MOTIFS

The Pharaohs of ancient Egypt were the rulers of both Upper (South) and Lower (North) Egypt, and in visual representation of the reign, the southern and northern barbarians bound as prisoners are found. It is the symbol of the united kingdom. The number of prisoners from south and north should be equal in this case, because they are supposed to make a contrast. In the architecture of "Kom el Samak", however, the composition of the figures of the colored stairway break this rule and is composed of two northern and one southern barbarians. The reason why the architect dared to break the rule of ballance is the number of the steps which makes a round of the pictures of prisoners and bows. 2 northern and 1 southern leads to a round of 6 steps, while the most classic arrangement of 1 northern and 1 southern needs 4 steps. 2 northern and 2 southern need 8 steps, 3 northern and 3 southern 12 steps and 4 northern and 4 southern need 16 steps. Consequently, only the composition of 2 northern and 1 southern completes the round with 30 steps. The pictures of 2 northern and 1 southern symbolize that there exists a special meaning in the number 30. That must have had something to do with the 30 years' jubilee which meant a great significance to the ancient Egyptian Pharaohs. The change of axis into north-south also is a iconological representation of the orientation. The renovation of the building is seemed to be for a celebration of the 30 years' jubilee of Amenhetep III, and a construction of the pavillion for jubilee Festival (Hb-Sd).

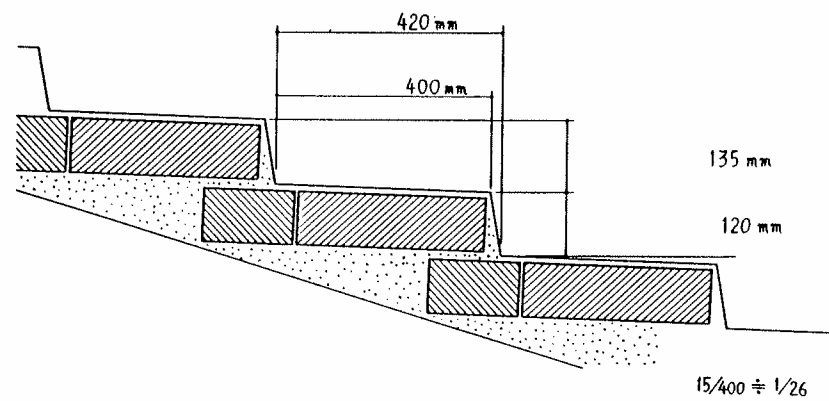


Fig.30 Tread and rise of side stairway.

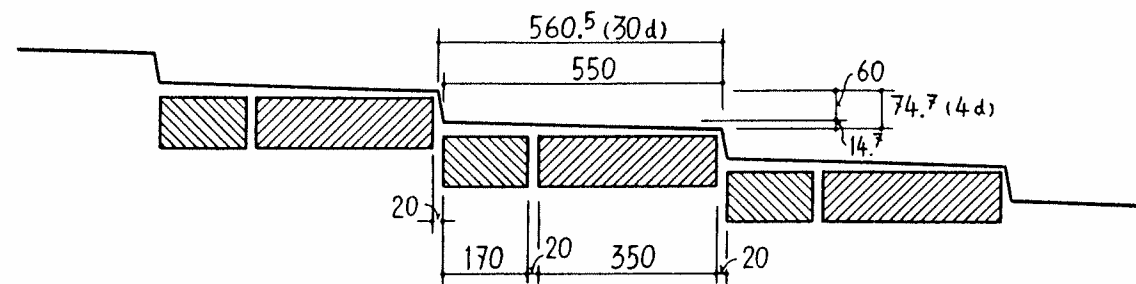


Fig.31 Tread and rise of colored stairway.

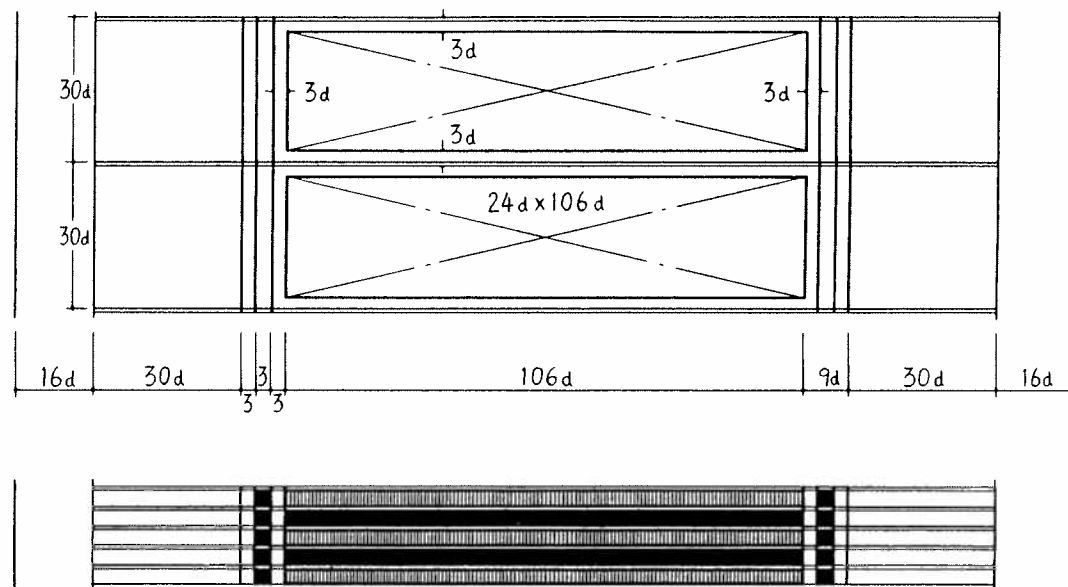


Fig.32 Original measurements of colored stairway.

### 3-7 MURAL PAINTINGS

#### 3-7-1 RESTORATION OF THE ROSETTE-BORDER

Both the former building and the latter building were beautifully decorated and ornamented by colorful mural paintings.

They enriched this royal architecture made of sun-dried bricks.

Some part of the architectural ornaments as rosette-border and torus pattern on the frame of opening could be restored from the fragments which were buried mainly inside the south ramp.

#### 3-7-2 STYLE AND TECHNIQUE

The stuffing structure of inside the south ramp was pebbles and black mud piled in turn on each other, and the latter worked to stop the pebbles from sliding. As the material which had been removed from the first building was utilized for stuffing of the second building, many painted fragments were mixed to be discovered on excavation and became the major materials for restoration.

The mural painting fragments of the renovated upper building on the second platform are discovered from layer of debris, just below the peak of the bigger hill and south ramp structure. A similar style is adopted for the paintings of the two different stages and makes it difficult to find the difference in technique.

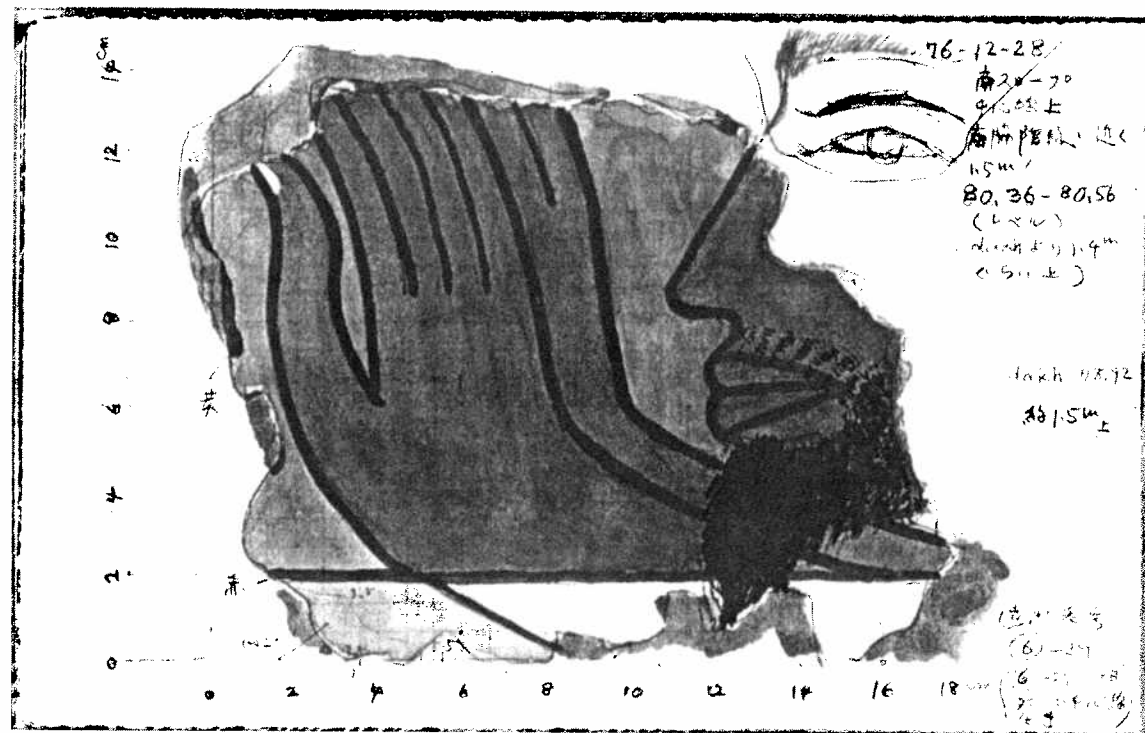


Fig.33 Fragment of the mural paintings excavated from south ramp.

### 3-8 ROW OF DRY MASONRY OF BRICKS IN THE CENTER OF SOUTH RAMP

A row of the bricks was found on the central axis of the south ramp, and its pyramidal section of hollow dry masonry functioned to drive the movement of the soil inside the ramp structure towards the center. A similar row of the dry masonry was found inside the structure of the colored stairways in the north. But, there is a mystery in the row of the south ramp.

It extends above the structural strata, changing into a strange single-course, and kept on growing until about 1,000 years ago with the growth of covering soil that accumulated on the surface of this ruin. It was beyond imagination that a brick row, excavated from only 20cm deep after the surface soil was removed from the peak on the south side of the hill, was piled with its root far so deep. It was a mysterious masonry which linked to the building of the structural stratum of 3,400 years ago, and piled up as far as the surface of 2,400 years after.

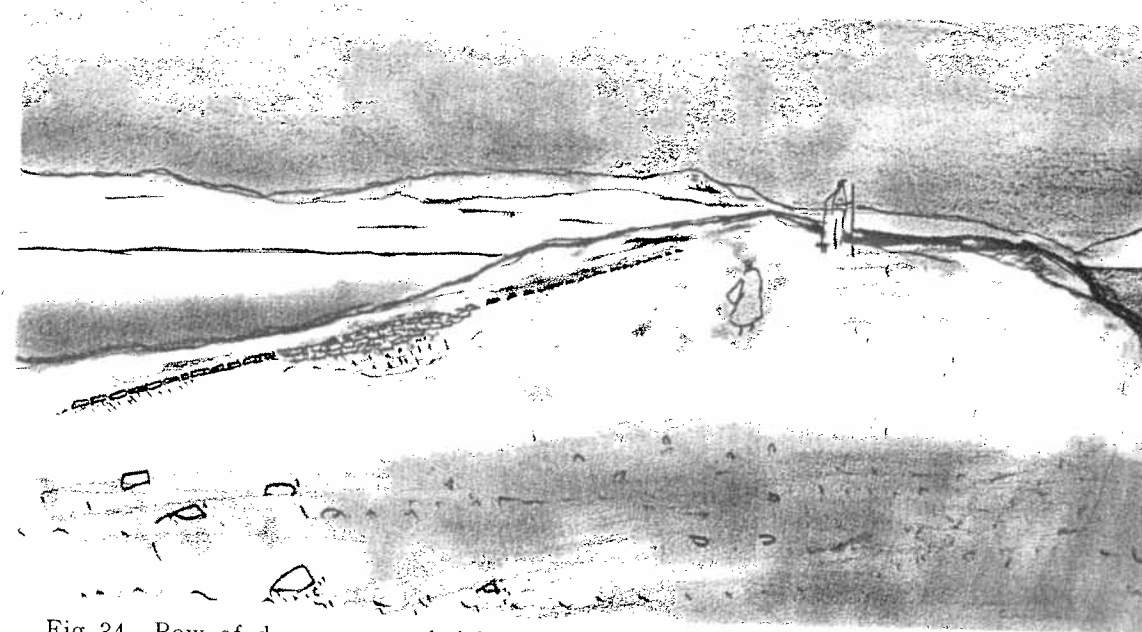


Fig.34 Row of dry masonry bricks in the center of south ramp.



## 4. EPILOGUE

### 4-1 BURIAL OF THE BUILDING

An artificial soil stratum, which is inexplicable to be made by the natural accumulation of 3,400 years, is found in the surface soil that covers the ruin of "Kom el Samak". It is a evidence that the structure was carefully buried after the death of Amenhetep III. In the process of burial, the upper structure was carefully, destroyed and even a scaffolding was set in order not to tread the surface of the colored stairway. It is supposed that the building of "Kom el Samak", being so strongly characterized as a festival pavillion to celebrate the life of Amenhetep III, was forbidden to reuse for another purpose and ceremonially buried to prepare the revival of the King's life.

The ruin was neither dilapidated nor destroyed by robbing, but demolished and removed intensionally and buried whereon the natural accumulation added the depth. There is a trace of a work that implies a careful burial. It is only on this occasion of the burial that the row of bricks in the center of south ramp was made above the structure. The mysterious addition of the row of bricks is a landmark to indicate the direction of sacred colored stairway on the opposite side of the hill.

When the burial of the building had been done, a hill was formed and a row of bricks was barely seen on the sandy ground. This is the only one hypothesis that explain the condition before our excavation.

### 4-2 AFTER THE BURIAL TO OUR DISCOVERY

The ruin of "Kom el Samak" had already been dug by thieves before the Roman period. This is confirmed by the discovery of Roman human bones from the groove which was formed by thievish diggings.

It must have been done during the disorderly era at the end of New Kingdom. This thievish digging destroyed the 21st to the 30th steps of the colored stairway, and north extension of the platform. It also broke the north balcoly and north side stairway which were buried under the renovated platform.

When the long row of bricks, which runs from the south side of the hill to the top, was nearly buried by the natural accumulation of soil, some additional masonry was built and so it grew. In the Roman days, the dwellers nearby preferred to use the hill as their cemetery, especially the west side. They, however, did not dare to touch the brick row perhaps because they took it something as a taboo, and rather preserve it.

### 4-3 HIDDEN HISTORY IN THE NAME OF THE HILL

In the Coptic age, the early Christian age of Egypt, the brick row in the south side of the hill had a different meaning and symbolism. Now the geographical concept of orientation common among the Mediterranean world, which was united with the Christianity, took the place of ancient Egyptian concept of orientation. Then the brick row runs from southwest to northeast, the direction to Jerusalem, the holy place of Christ. The mysterious brick row carried the symbolism as a mark to point the holy place, and the hill itself became a holy place. The hill became the hill of Christ, and was named "Hill of Fish" when the "fish", an anagram of Christ for the early Christians, was mummified and buried on the top of the hill as a representation of holy object. During the several hundred years that followed the brick row on the hill was added and kept growing.

When the Muslims conquered this district about 1,000 years ago, the Coptic ceased to preserve the hill, buried the mysterious symbol under the sand and spoke nothing of it as a hidden secret. It remained secret though the name of the hill was left as Hill of Fish. Nobody knows the hidden history of the hill when the Waseda Mission came to excavate it.

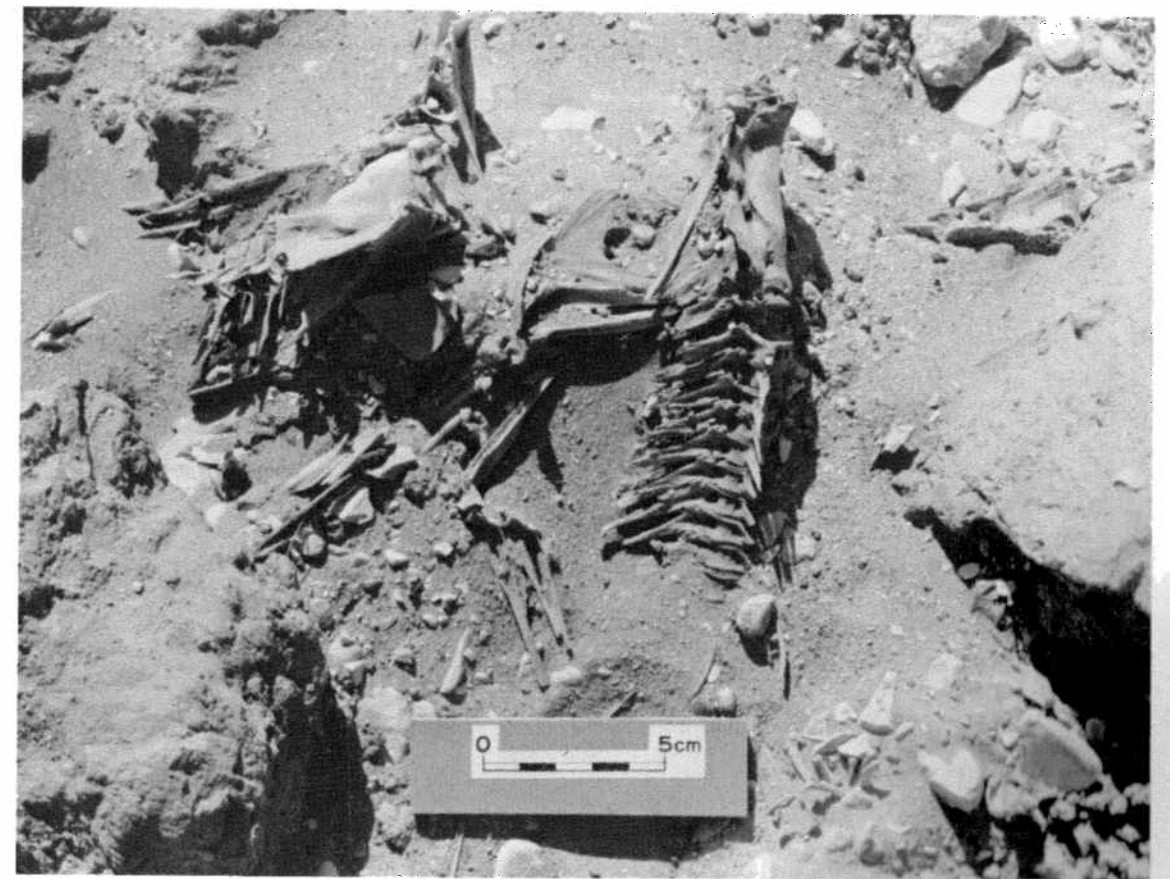


Fig.35 Mummified fishes buried on the top of the hill.

#### 4 — 4 THE HISTORICAL SIGNIFICANCE OF THE ARCHITECTURE OF “KOM EL SAMAK”

The sun-dried mud bricks were used to build the architecture of “Kom el Samak” though it was a royal building. In ancient Egypt, stone was used only in monumental buildings for the Gods or deceased, and was never used in building for daily life even in the royal palace. It is not because the ancient Egyptians neglected the life of this world, but because sun-dried brick buildings were far more comfortable and with more merits than stone ones in Egyptian climate.

Furthermore the bricks were also easy to acquire and build, and adoptable to both typical housing and royal palace. In this material and construction method, rich experiences and devices of architecture based on the ancient Egyptian culture was crystalized.

In ancient Egypt, royal architecture constructed by sun-dried bricks represents essential significance in its design and technology.

It is different from other great monuments for the Gods and deceased which disclosed their monumentality by using the eternal material, i.e. stone.

Further, it is assumed that the nobility of the sun-dried brick royal architecture must be heightened by the superb level of the designing method and architectural art, and its architectural ornament of colored paintings.

The royal architecture of “Kom el Samak” was designed and built by the royal architect in ancient Egypt who always belonged to the highest and noble class and had the most productive and creative talents.



Fig.36 Amenhetep, son of Hapu : the royal architect in the reign of Amenhetep III.  
(From VARILLE, A : Inscriptions concernant l'Architecte AMENHOTEP FIS DE  
HAPOU, 1968, PL. XII).