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REPLICATION OF NEOLITHIC PLASTER STATUES: INSIGHTS INTO CONSTRUCTION AND FORM

Carol A. Grissom

Abstract

Large Neolithic lime plaster statues excavated in 1985 at 'Ain Ghazal (Jordan) were replicated to more correctly interpret evidence of construction. The process, including a failure that illuminated the minimal structural role of the armature, also enhanced understanding of the behavior of materials during statue fabrication. The most valuable contribution, however, may be that replication provided insights into artistic choice and original appearance, which are of particular importance because of the statues' rarity and early date.

1. Introduction

Neolithic plaster statues found at 'Ain Ghazal (Jordan) were replicated at the completion of a long-term conservation project (Grissom 1996, 1997, 2000a) in order to improve interpretation of construction evidence. The statues had been buried in a cache during the 8th millennium B.C., and they were block-lifted in 1985 shortly after discovery (Rollefson and Simmons 1987). The block was transported for laboratory conservation to the Conservation Analytical Laboratory (now the Smithsonian Center for Materials Research and Education), just outside Washington, D.C. Five statues were ultimately reassembled, including two standing figures and three two-headed busts (Fig. 1). The tallest statue measured over one meter in height, and the heaviest is estimated to have weighed 28 kg. when intact.

The extraordinary survival of the plaster for more than 9000 years may be attributed to its water-resistance, apparently provided by incorporation of lime in the plaster. Analysis indicated that the lime content was about 10% and that remaining plaster consisted mainly of powdered calcium carbonate; in addition, clay was present at about 10% by weight as were smaller amounts of quartz and feldspar. The plaster is chemically identical to marl found on the site, and the lime must have been made from the marl by heating it to temperatures in excess of 600°C (Boulton 1988, Grissom 1997). The plaster had suffered fragmentation during burial, but this offered one advantage: it gave access to statue interiors left hollow by complete disintegration of armatures. Impressions on interior surfaces revealed that the armatures had been made of reed bundles tied together with cordage.

This is not the first or only cache of "monumental" Neolithic plaster statues found in the ancient Near East, but these statues are among the largest and best preserved, and the two-headed busts are unique within the genre. Plaster statues were first found at Jericho by Garstang (1935) and later by Kenyon (1960), although survival in both instances was limited because modern conservation methods, notably blocklifting, were not employed. The largest cache of such statues

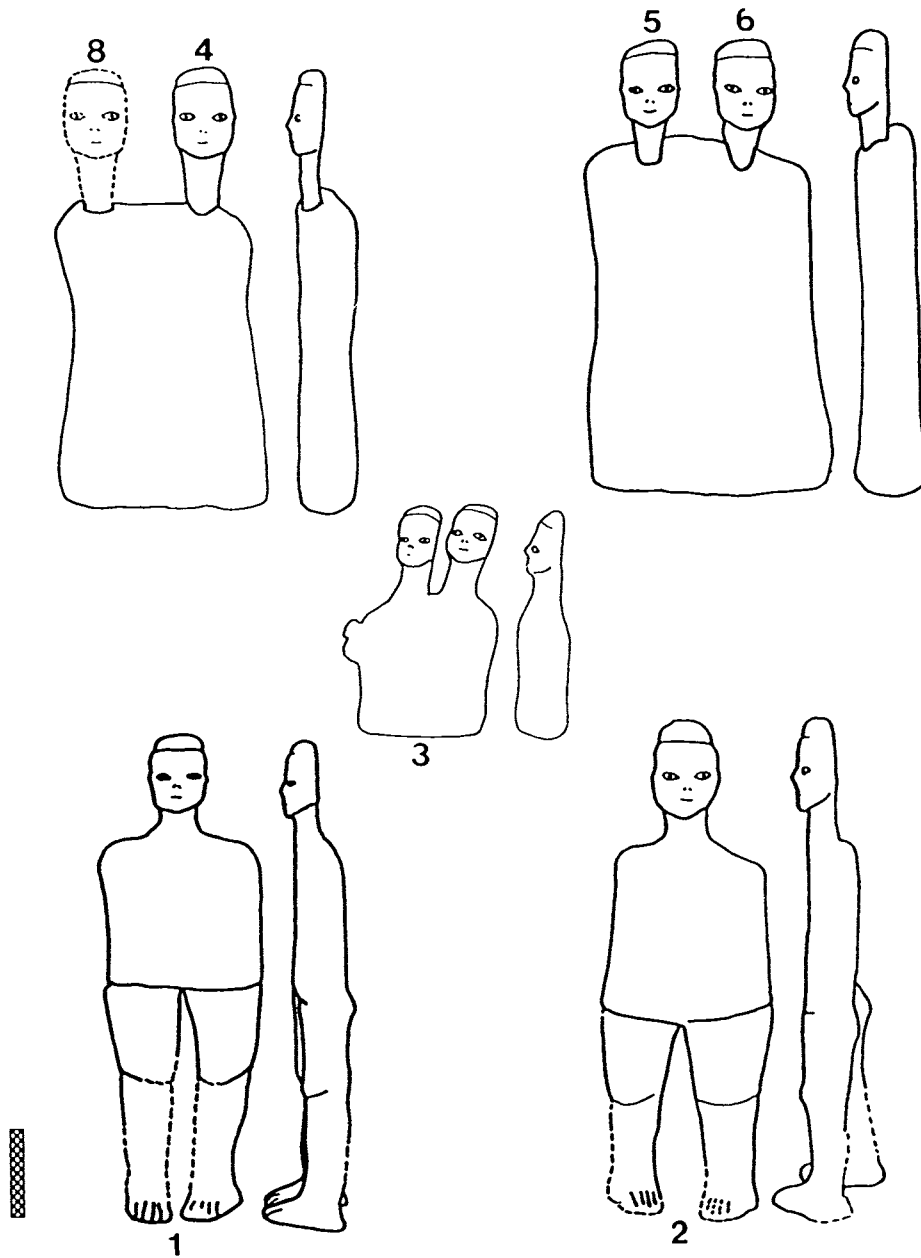


Figure 1. Drawing of 'Ain Ghazal statues excavated conserved at the Smithsonian, identified by numerical designations. Dashed lines indicate modern compensation at perimeters. Scale measures 20cm.

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found to date (about 28) was discovered at 'Ain Ghazal two years before the cache conserved near Washington; conservation of this large cache of statues is being done in London (Tubb 1985). Although they are the property of the Hashemite Kingdom of Jordan, the two 'Ain Ghazal groups will subsequently be referred to as the Washington and London caches for the sake of simplicity. As would be expected for artifacts from the same site, these statues have many similarities (Tubb & Grissom 1995), especially in comparison to statues found at Jericho. They have similar plaster composition, were made on reed armatures, and have prominent eyes decorated with bitumen. There are differences, however, probably because fabrication occurred at different times. Limited C-14 analyses of associated charcoal suggest dates for the Washington statues several centuries later than for the London statues. The Washington statues are significantly larger and simpler in form: without the waists, arms, hands, body paint, or sexual features found on some London statues. In accordance with their size, armatures for the Washington statues are also larger and more complex. For example, while London busts are made on a single reed bundle, the comparable small Washington bust (statue 3) was constructed on an armature made of at least 8 bundles. While London figures were constructed on armatures made of five reed bundles, armatures for the two Washington figures were composed of 26 and 27.

Archaeologists and art historians have suggested that these large Neolithic plaster statues represented deities, ghosts, ancestors, or revered community members (Schmandt-Besserat 1998), but evidence of their usage and meaning is limited. The period is prehistoric, which by definition means that there is no written record to inform about these matters. Flat bottom surfaces and other evidence indicate that the statues were displayed upright, but all statues have been found in pits, apparently buried when no longer used; thus, burial context provides no clues about usage. Later tradition also provides no assistance because the practice of making large-scale plaster statues disappeared after the Neolithic period. The two-headed busts are particularly uninformative, as the faces and adjacent torso areas of each pair are undifferentiated. Because of this dearth of information, any evidence that sheds light upon artistic intent and original appearance is potentially valuable, especially given the statues' rarity and early date.

My original goal of more assuredly interpreting evidence of construction was not only met but exceeded through making replicas, and this paper is intended to provide an example of what can be learned by replication. Detailed descriptions of construction evidence referred to in this paper and a more complete synthesis of such evidence and replication-derived information are found in another publication (Grissom 2000b).

2. Experimental approach

Reeds (*Phragmites* sp.) were obtained from a nearby estuary to make replica armatures, and they were bound together with commercial jute twine of approximately the same dimension as the original. Plaster was formulated to simulate the original composition. Small-scale experiments were done using raw material (marl) obtained from the site, powdered and mixed with about 10%

lime made by slaking laboratory-grade calcium oxide. These tested hypotheses about plaster application, mainly related to modeling of the heads. Because raw material from the site was limited, however, full-scale replicas of a large two-headed bust and a figure were made using ground limestone and hydrated lime purchased from a local hardware store. Clay was obtained from several sources, thus accounting for variations in coloration of replica plaster, notably the “whiter” appearance of plaster used to model the heads.

3. Results

Replication proved useful in several ways that may well apply to other projects. First of all, it was unmatched in providing visceral insights into original fabrication through the experience of handling similar materials. Replication, for instance, made manifest the difficulty of manipulating heavy plaster statues during construction. The weight of the original statues had been observed during their reassembly, but replication palpably demonstrated how much heavier they were when wet. Furthermore, the difficulty of handling plaster and reed statues that are heavy, wet, and easily damaged when flexed became clear.

Secondly, replication made manifest rationales underlying fabrication choices. Evidence indicated that the original statues were largely plastered in horizontal position and placed upright only at the final stage of fabrication, but the reason for this procedure was unclear. Before replication was done, it seemed that modeling the statues in vertical position would have been easier because it would allow working in the round. Fabricating statues while horizontal seemed more difficult as it would require reversal to complete the other side and would necessitate manipulation while statues were wet. Replication, however, showed that the statues could only be made while horizontal on account of their large size, as will be detailed below in the section on general plaster application.

Thirdly, even a replica failure proved instructive. When a large amount of plaster was applied to reed bundles, it failed to adhere to the armature if the object was moved shortly thereafter; only after the plaster was left over night and had noticeably stiffened could the item be safely reversed or stood up. Plaster was usually covered to retard drying so that it would not crack, but in one case a two-headed bust replica was inadvertently left uncovered and found cracked the next day. A plaster repair was made, but when the next step was attempted -- placement of the replica upright -- the newly applied plaster fell off near the repair since it had not yet stiffened. Where this occurred, the reeds bent like cooked spaghetti and revealed that they were saturated by moisture, apparently absorbed from the plaster. Attempts to keep the bust upright were unsuccessful, and it slumped dramatically to one side (Fig. 2), then fell over. This demonstrated not only how little strength the plaster had before it set but also how wet and unsupportive the reeds were until the statue had dried out. It was concluded that, in addition to diminishing statue weight and plaster



Figure 2. Replica of a large 'Ain Ghazal bust, shortly after it was placed upright and just before it fell over.

shrinkage, the armature did not serve as the primary support for the statues but only as a passive support on which plaster rested until it had set.

Specific information gained from replication follows.

3.1 General plaster application

Practical experimentation showed that plaster had to be applied to the upper surface of reed bundles placed flat on a horizontal surface in order to make statues of a size comparable to the ancient statues. When attempts were made to apply the same quantities of plaster as used for the ancient statues to armatures standing upright, regardless of consistency the plaster either fell off or slumped uncontrollably downwards. The pyramidal shape of a bust excavated by Kenyon at Jericho illustrates the sagging of plaster as a result of upright modeling, which the smaller size of the bust probably allowed (Kenyon 1960: Plate 12).

Horizontal surfaces were found to flatten during replication, resulting in the flat front and back surfaces characteristic of the ancient statues, most pronounced for thighs, torsos, and backs of heads (Fig. 3). Such surfaces facilitated manipulation during replication because they matched flat auxiliary supports used to aid in reversal and upright placement.

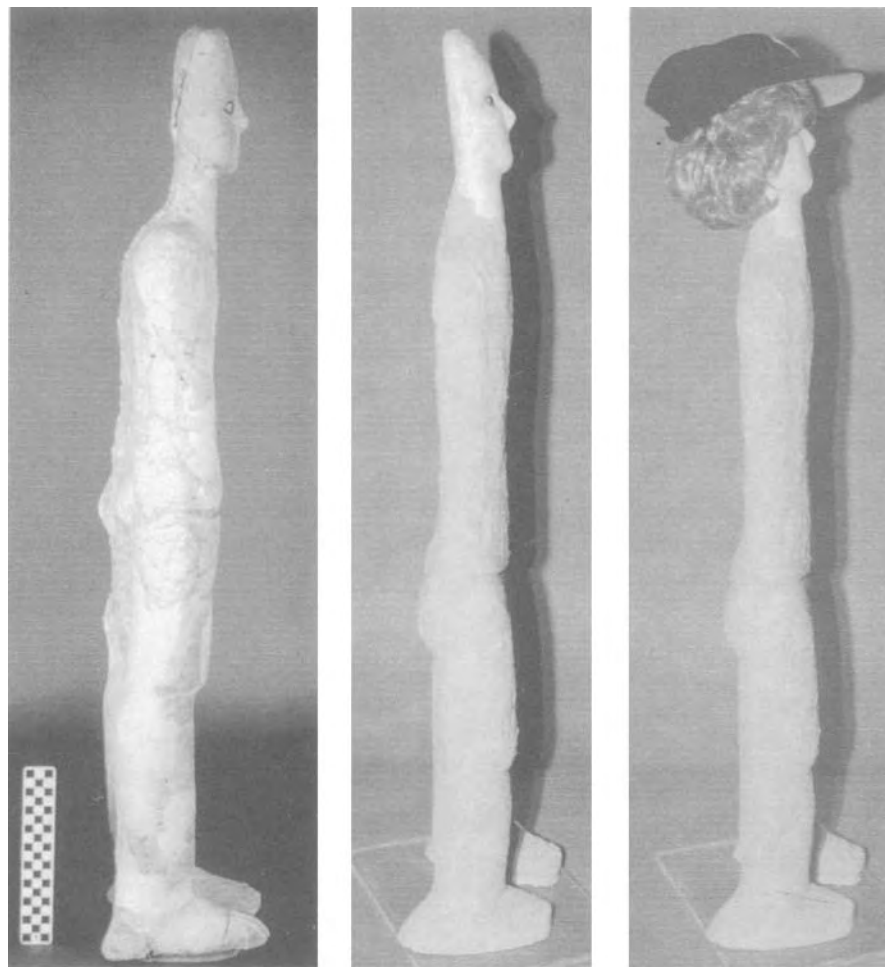


Figure 3. Profile views of a figure: (a) 'Ain Ghazal statue 1, (b) its replica, and (c) the replica with wig and baseball hat.

3.2 Heads

Replication of statue heads not only confirmed ideas about construction based on impressions in the plaster but also provided evidence of original appearance. Impressions on interior surfaces indicated that each original statue head had been plastered on one end of a long reed bundle, which was then incorporated in the torso armature. Before replication, I had presumed that each head had been modeled by applying plaster to the bundle on what would become the back of the head and that then the bundle was turned over and laid on a horizontal surface to model the features of the face. Replication confirmed that this was the only way in which the statue heads could have been modeled. Attempts to model a head on a long reed bundle in vertical position, for instance, showed that proposition to be preposterous. Replication also showed that, in contrast to the case for the larger partially plastered legs or torsos, the relatively small size of the heads allowed them to be turned over immediately after the back was plastered. As a result, the

damp plaster on the back took the impression of the surface upon which it lay, reflecting in detail the flat table surface in the case of the replica (Fig. 4a). Thus, the replica demonstrated how readily wet plaster of an original head might have become impressed by a mat or a similar man-made material upon which it lay, as apparently occurred for the heads of statues 1 (Fig. 4b) and 2. Later on during the finishing phase, the ease of smoothing away impressions from damp plaster showed that any “mat” impressions could have been removed without difficulty, had the original fabricators chosen to do so. It seems likely that statue makers intentionally did not remove the marks because they knew in advance that the areas normally covered by hair would be covered with wigs or headgear. Additional evidence of anticipated use of wigs or headgear is provided by modeling of recessed brows upon which such items would conveniently fit.



Figure 4. Backs of statue heads: (a) replica and (b) ‘Ain Ghazal statue 1, showing “mat” impressions.

3.3 Two-headed busts

Replication of the large two-headed busts illustrated how the process provided information about a particular limitation on statue shape. In addition to flat front and back surfaces, the ancient

busts are shallow and regular in depth. I had questioned why the statues had not been made more three dimensional, and the probable answer arose during replication. As the busts lay flat on a table during plaster application, plaster slumped at the statues sides. Unacceptable slumping would occur with increased depth, thereby preventing greater three-dimensionality.

3.4 Figures

For the two-legged standing figures, a major purpose in making a replica was to assure myself that such statues could be fabricated in pieces (head-and-torso and separate legs) while horizontal and then joined in upright position. Plaster impressions indicated that this was the case, but some doubt remained because of damage in the hip regions of the ancient figures. This question was of further interest because there was clear evidence that the smaller London figures had been made differently: plastered on armatures which were single units. Moreover, I had assumed that making the figures in pieces would defeat the purpose of an armature, which I had thought was to provide structural unity for the large figures with their appended legs. I thought, too, that it would be difficult to place each leg upright, as their large thighs make the legs top heavy; and then to assemble the head-and-torso upon them, given that the individual pieces have to be reasonably damp so that they adhere properly.

Full-scale replication of the two-legged statue showed that pieces fabricated separately were more easily assembled than anticipated. The head and torso were plastered sequentially (Fig. 5a, b, c), while at the same time each leg was modeled separately by applying multiple layers of plaster to leg-length bundles (Fig. 5d, e). After the legs were placed upright, the torso-and-head section was joined to them with plaster (Fig. 5f, h, i). Interestingly, depressions in the torso-and-head section of one ancient figure (statue 1) reflect natural hand positions during placement of the torso on the legs, as captured by photographs made during similar reassembly of the ancient statue 2 (Fig. 5g). As a result of replication, it became clear that such a large plaster statue had to be made in pieces because, although still somewhat difficult to accomplish, it would be easier to reverse the individual pieces. Probably to build up sufficient thickness to support the large torso, layering of the plaster showed that the legs were reversed three times. Reversing a large, heavy figure without damaging it seemed inconceivable. Fabrication of the statues in London on single armatures was presumably possible because of their smaller size, although much of their fabrication methodology remains as yet unclear.

4. Implications for original presentation and artistic intent

Because of replication, it became clear that the original statue makers must have been limited by their materials in choosing to create large-scale statues. Forms were simplified, and human features such as waists and arms were omitted. It seems almost certain that the statues were displayed with wigs, clothing, or other materials to compensate. Thus, the statue makers did not waste time in smoothing away “mat” impressions on the backs of heads or polishing rough

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surfaces on bust torsos because those surfaces would be covered. Direct evidence of accessories has not been found, but it is not implausible that such items were removed before the statues were buried or that they disintegrated during burial.

The original appearance of the statues when “dressed” was likely quite different from the present appearance of the statues and was probably much more realistic. Such accessories would eliminate the space alien or ghostly appearance often accorded the statues by modern observers (Schwartz 1996) (cf. Figs. 6a and 6b). A wig could compensate for a flat head and make a statue appear more three-dimensional when viewed from the side (cf. Fig. 6c with 3c & 6d). Display of the statues in the round also becomes plausible, whereas the flatness of the statues would otherwise only indicate display against a wall or in a niche.

Accessories or clothing might have rendered the twins distinguishable. A beard might have distinguished a man and long hair a woman, for example, as it did for an elderly heterosexual couple depicted on a third millennium B.C. two-headed statuette found at Nippur (Hamblin 1973: 103). The most likely alternative representation is illustrated by relatively common Neolithic pairs of women, identified by breasts; e.g., a two-headed stone statuette found at Çatal Hüyük (Mellaart 1967: Figs. 70-71) and a two-headed ceramic vessel found at Hacilar (Aitken *et al.* 1971: Plates 4,5).

While the plain unsmoothed bust torsos indicate that they were probably covered in entirety, modeling of the buttocks and knees suggests that the bodies of the figures were partially clothed. The figures’ lack of arms could have been disguised by a shawl or similar item, as it is by the beach towel around the shoulders of the replica (Fig. 7a). Wearing a bikini is not so far fetched when compared to the costume of a figurine from Neolithic Hacilar (Fig. 7b in Mellaart 1970: Fig. 195).

5. Conclusion

In summary, replication can be a useful adjunct to evidence provided by in-depth examination of artifacts. It is particularly worthwhile in providing other valuable insights when unusual materials or puzzling construction are found, as was the case for statues found at ‘Ain Ghazal.

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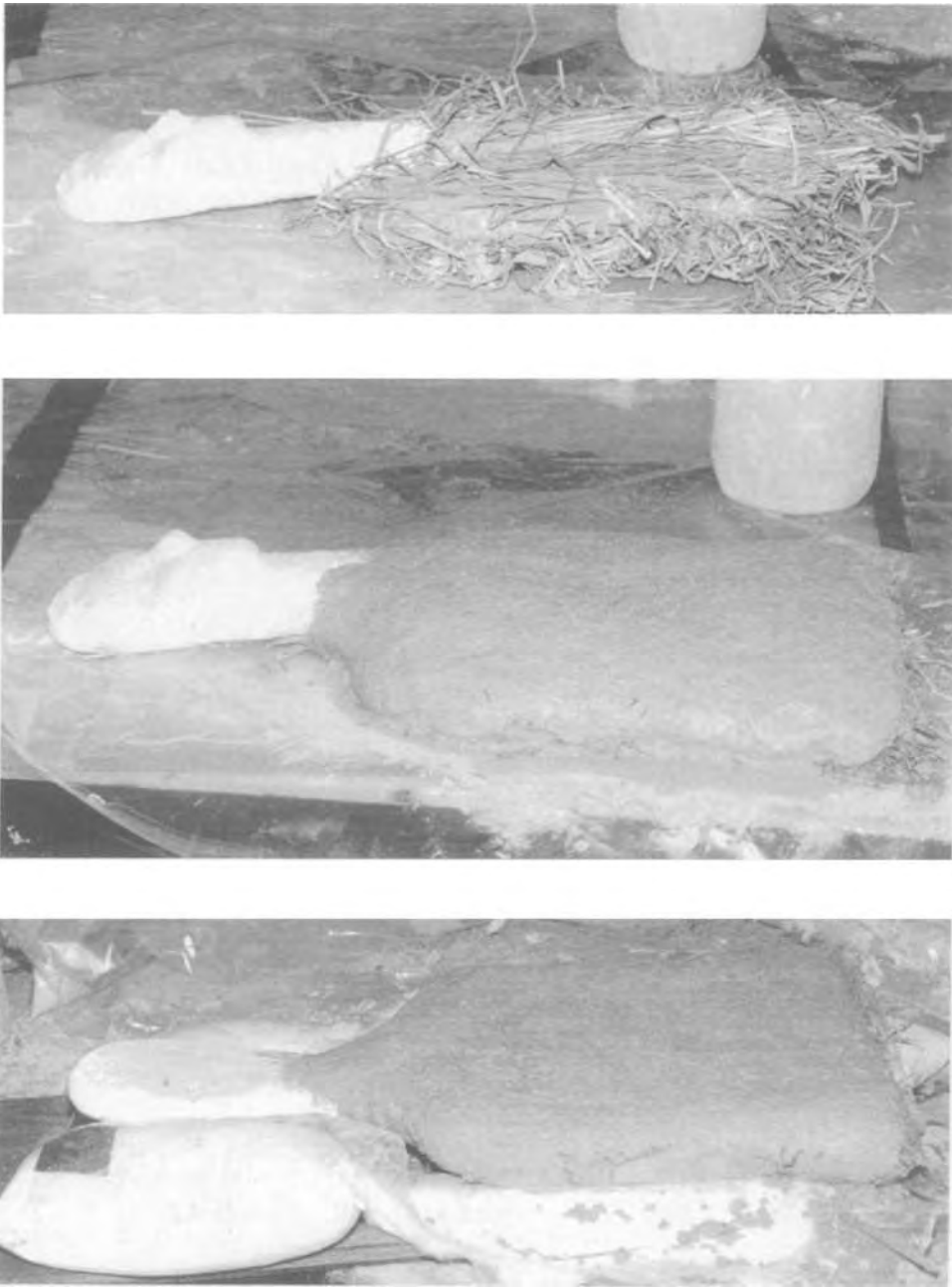


Figure 5. Fabrication of replica head-and-torso section, including (top) torso armature constructed around the plastered head, (center) front of torso plastered, and (bottom) back of torso plastered.

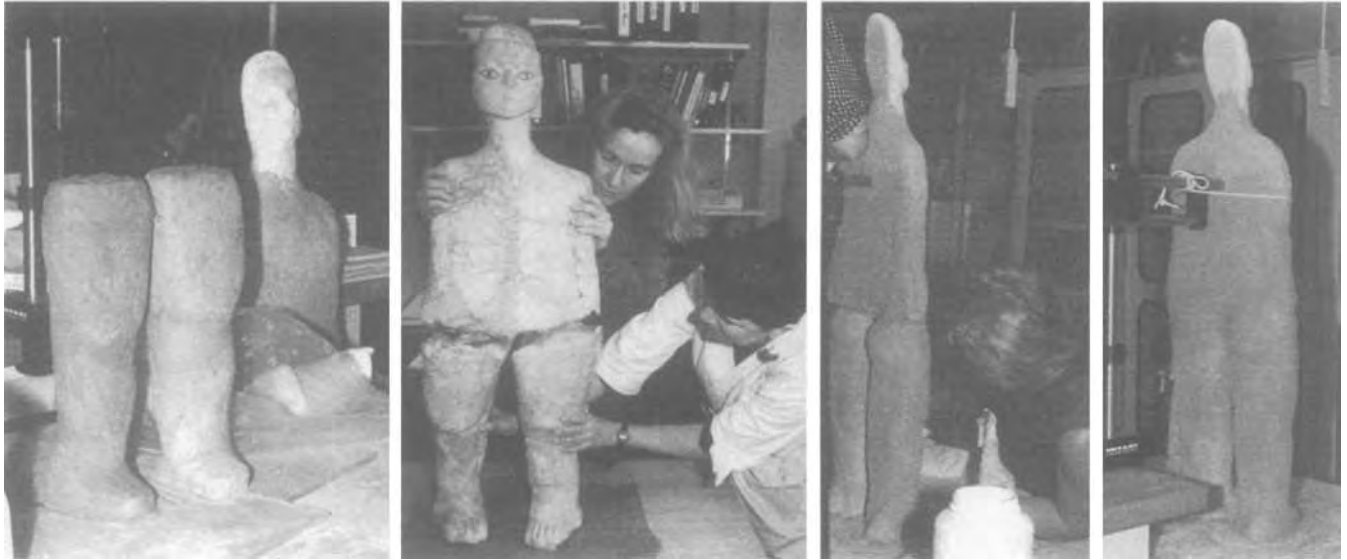


Figure 5. Top row: Fabrication of replica legs, including (left) reed bundles partially plastered and tied together with a spiral of twine and (right) after horizontal plastering was complete but before placement upright. Bottom row, left to right: (1) Joining of figure pieces, including replica legs placed upright, (2) 'Ain Ghazal statue 2 torso being placed on legs in the same manner as for the replica statue, (3) joint between legs and torso of replica being plastered, and (4) replica secured after plastering was complete.

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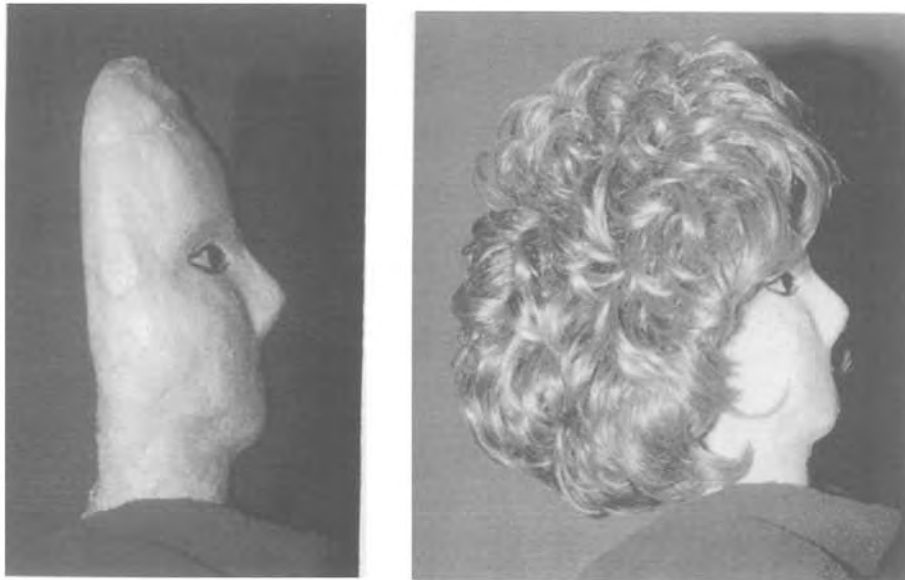
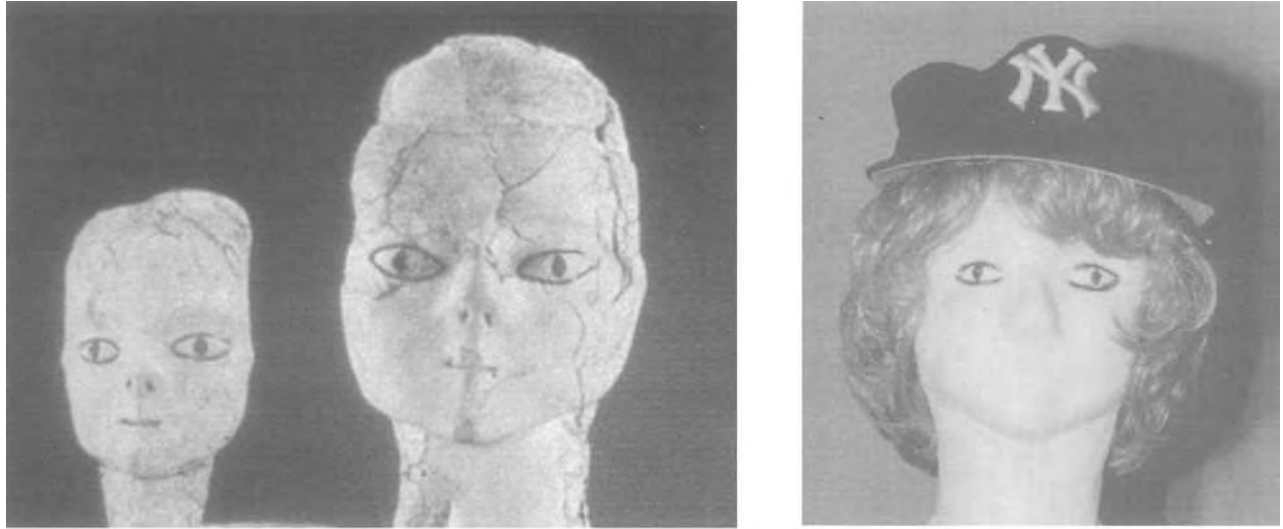


Figure 6. Front view of (a) 'Ain Ghazal heads for statues 5 and 2 and (b) replica head with wig and baseball hat; profile view of (c) replica head and (d) replica head with wig.

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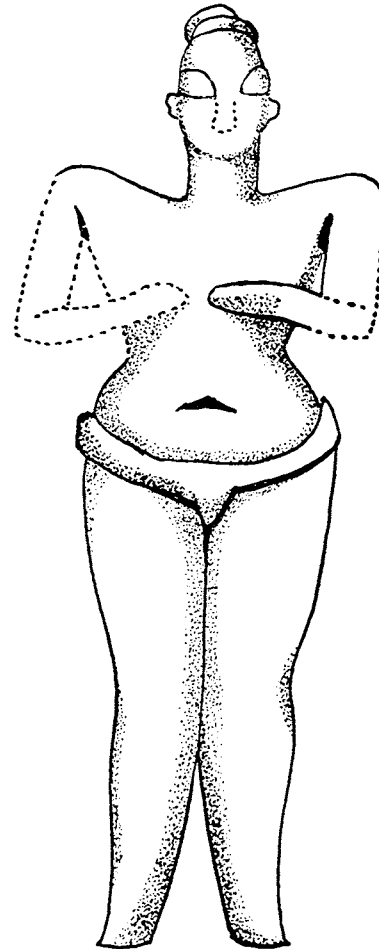


Figure 7. (a) Replica figure wearing bikini, beach towel, wig, and sun glasses; and (b) figurine from Hacilar (courtesy University Press, Edinburgh).

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