Badarian Burials: Possible Indicators of Social Inequality in Middle Egypt During the Fifth Millennium B.C.

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Abstract

During the third decade of the twentieth century, excavations by Guy Brunton and Gertrude Caton Thompson revealed the existence of the Badarian, the earliest known food producing culture in Upper Egypt. All knowledge of this culture is derived from their publications and from the artefacts they collected in cemeteries and village deposits near Badari. Some archaeologists have suggested that socially significant differences in wealth existed within Badarian communities, while others have argued that economic distinctions between members of Badarian populations were probably not very great. Such conflicting interpretations of the Badarian social system are inevitable, since no systematic analysis of the data resulting from Brunton's excavations of Badarian cemeteries has ever been undertaken. In an attempt to resolve the issue of possible Badarian inequality, a quantitative analysis of the excavated mortuary remains from Badarian cemeteries at Badari, Mostagedda and Matmar was used to test the hypothesis that Badarian society was basically egalitarian, and as a consequence, grave goods should be randomly distributed (along other than possibly age and sex lines) in Badarian graves. The results indicate that the burials of some Badarian adults and children involved greater energy expenditure than did those of others. Since the burials of such individuals constitute a distinct minority of all burials and contain more lavish grave offerings as well as objects that are not shared by other members of the society, it can be inferred that these were the interments of individuals who held a different and probably higher status in relation to the majority of individuals in Badarian society. These findings appear to be inconsistent with the portrayal of Badarian society as lacking in social complexity. Furthermore, since there is much evidence that grave goods were used as status markers not only throughout the Egyptian Dynastic era but also during the preceding Gerzean and Amratian periods, it can be concluded that the unequal placement of offerings in Badarian graves in a fashion cutting across lines of age and sex is an indication of socially significant economic inequality between members of the same community. As a result, their social system must be considered to have been stratified.

Résumé

Durant la troisième décennie du 20e siècle, les excavations par Guy Brunton et Gertrude Caton Thompson ont révélé l'existence des Badariens, la plus ancienne culture agricole connue de la Haute Égypte. Toutes nos connaissances de cette culture proviennent soit de leurs publications soit des artefactes qu'ils ont ramassés dans les cimetières et restes de villages près de Badari. Certains archéologues ont suggéré que des différences économiques existaient à l'intérieur de ces communautés, tandis que d'autres concluent qu' il n' y avait pas de grande distinction économique entre les membres du peuple badarien. Des conclusions si contradictoires sur le système social badarien étaient inévitables étant donné qu' il n' y a eu aucune analyse systématique des données provenant des excavations de Brunton. Pour essayer de résoudre la question d'inégalité sociale chez les Badariens, une analyse quantitative des restes mortuaires excavés des cimetières à Badari, Mostagedda et Matmar fut utilisée pour éprouver l'hypothèse que leur société était fondamentalement égalitaire et, en conséquence, les biens funéraires devraient être distribués au hasard (sauf possiblement en fonction d'âge ou de sexe) dans les tombes des Badariens. Les résultats de l'analyse semblent indiquer que les enterrements de certains adultes et enfants badariens démontrent une plus grande dépense d'énergie que d'autres. Étant donné que l'enterrement de ces individus constitue une minorité de tous les enterrements, avec des offrandes plus somptueuses ainsi que la présence d'objects qui ne sont pas partagés par le reste de la société, on peut déduire que ce sont des enterrements d'individus d'un statut social plus élevé que la majorité des individus dans la société badarienne. Ces résultats ne concordent pas avec l'opinion que la société badarienne manque de complexité. De plus, puisque les biens funéraires marquaient le statut social non seulement à travers la periode dynastique mais aussi dans les autres périodes prédynastiques, il semblerait que la distribution inégale des offrandes dans les tombes badariennes, sans rapport à l'âge ou le sexe, indique une inégalité économique significative entre les membres d'une même communauté. Il en résulte que le système social badarien doit être considéré comme étant distingué par la stratification.

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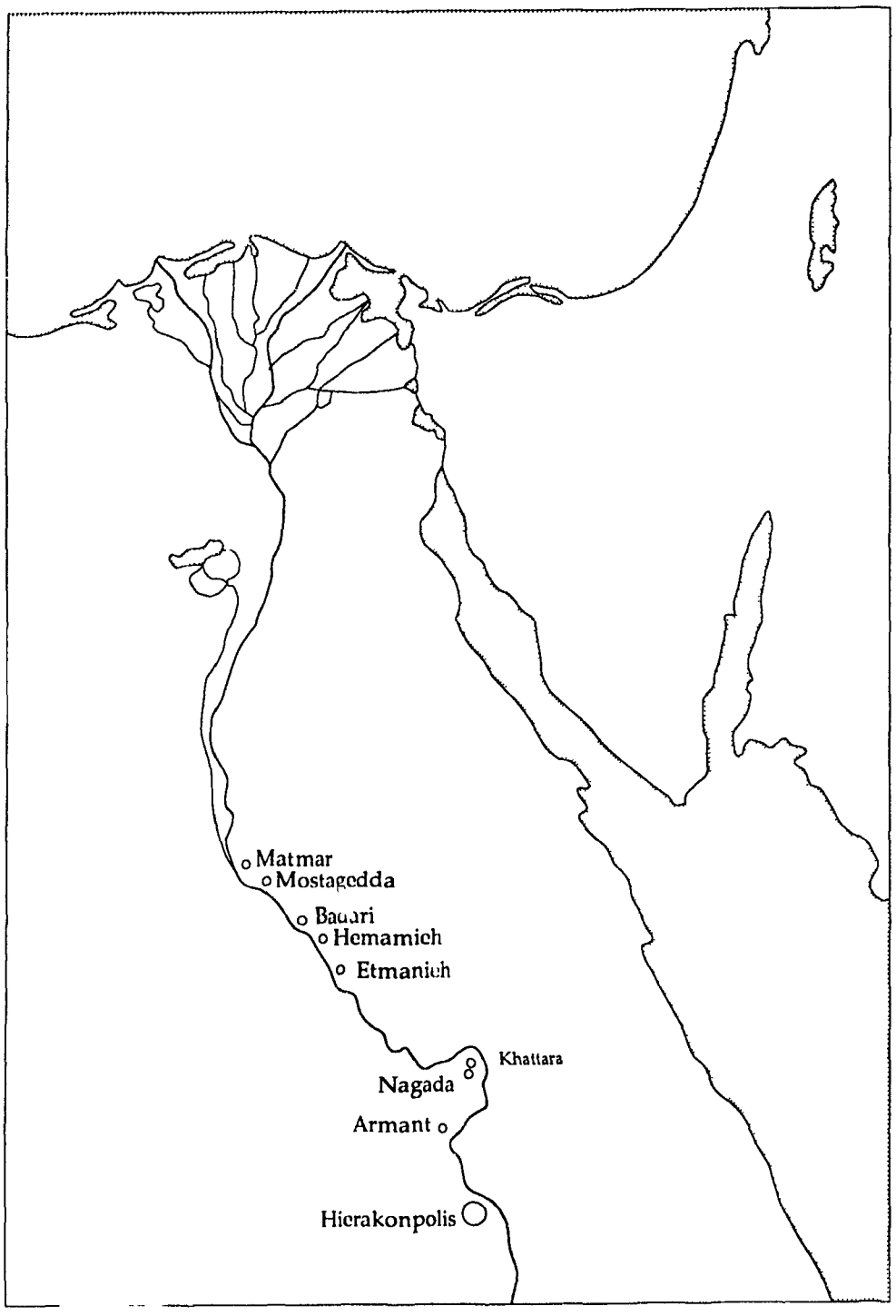

Figure 1. Location of Prehistoric Sites in Middle and Upper Egypt

Chapter 1

Introduction

1.1 The Badarian culture period

Previously unknown and distinctive potsherds, still believed to be the fine ' produced in predynastic times, were first encountered at Etmanieh in 1922 by British archaeologists, who later unearthed them from plundered graves and shallow deposits at Badari and Hemamieh in Middle Egypt. Like other predynastic pottery, the new sherds were of black-topped, brown ware, but unlike other predynastic types, the surfaces of the ware were "rippled" or "combed" (Brunton 1929: 458). Subsequent excavations by Guy Brunton and Gertrude Caton Thompson near Badari revealed that these sherds were one product of what they called the Badarian, a predynastic culture which seemingly antedates both Nagada periods (Baumgartel 1955: 21).

One of the most puzzling aspects of the material assigned to the Badarian era is its limited distribution. Brunton located Badarian villages and cemeteries on desert spurs along the east bank of the Nile from Matmar south to Etmanieh (Trigger 1983: 27); Caton Thompson excavated a stratified site at Hemamieh in which Badarian flint implements and potsherds were recovered from the lowest levels of the deposits; and at Mostagedda, Brunton cleared Amratian graves that had been dug into deposits from which "characteristically Badarian" lithic material and pottery was excavated (1929: 460). Badarian-style potsherds have been found in the pre-Amratian horizons at Hierakonpolis and rippled pottery has been reported from Khattara (Hays 1984:

72), El Kab, Armant, and Nagada (Holmes 1988: 81). However, Diane Holmes, who has recently re-analyzed the predynastic stone artefacts collected from the Badari region by Brunton and Caton Thompson, has grouped the lithic material into an early "Badarian" and a later "Mostagedda" industry (1988: 73-74, 78-81). Unfortunately, there is little stratigraphic evidence for this distinction, which appears to be elaborated from Caton Thompson's suggestion that regional lithic traditions had coexisted in the Nile Valley from late Pleistocene times (Smith 1965: 163). The limited distribution of Holmes' two industries appears to restrict the Badarian occupation of the Nile Valley to the region between Matmar and Badari (1988: 83), a distance of about forty kilometers.

An earlier phase of the Badarian period, labelled Tasian, and distinguished by the presence of beaker pots, grey ceramic jars, stone axes, limestone or alabaster palettes, and "characteristic" Tasian skulls, was first recognized by Brunton at Mostagedda (1929: 465-467) and later at Matmar. It has since been shown the Tasian was separated from the Badarian on the basis of inconclusive evidence (Baumgartel 1955: 21).

Brunton reported that oval or circular graves were practically always used by Badarian communities. In them, loosely contracted bodies were placed with their heads positioned south and facing west. The corpses were usually covered in skins and wrapped in matting. Some were interred with grave ornaments that included black-topped pottery from which pot-marks were *always* absent (Brunton and Caton Thompson 1928: 24). Other grave offerings that characterized the Badarian period included pottery that was usually rippled or combed and normally restricted to a bowl shape, glazed steatite beads, notched palettes, and coarsely made lithic material, as well as finely wrought tanged and winged arrow-heads (Brunton and Caton Thompson 1928: 39). Since the presence of rippled surface bowls was considered particularly diagnostic of the Badarian era, this class of pottery was used to distinguish Badarian tombs from Amratian or "Predynastic" burials (Brunton and Caton Thompson 1928: 1). Graves containing white cross-lined pottery were assigned to the Amratian period.

Badarian cemeteries were distinguished both culturally and spatially from those of other groups by Brunton and Caton Thompson. In most cases, *Badarian*

and Amratian cemetery pottery tended to be restricted to specific locations, for the two types of cemetery appeared to be found on *different* desert spurs (Brunton and Caton Thompson 1928: 40), which suggests *use by completely different communities*.

Estimated dates for the Badarian culture period are from *ca* 4,800 B.C. to 4,200 B.C. (O'Connor 1987: 27). The early date of 5,500 B.C., obtained by the thermo-luminescence method on potsherds from Hemamieh (Hoffman 1984: 112) is now believed to be inaccurate, and a date somewhat greater than 3,850 B.C. is considered more acceptable (Holmes 1988: 70). Hays has reported 3,715 B.C. as a calibrated radiocarbon date for the Badarian-like remains at El-Khattara (1984: 72).

In addition to the conflicting chronological estimates associated with Badarian remains, some archaeologists have noted that the true relationship between the Badarian and other predynastic cultures is yet to be established. Some have argued that the claim for Badarian priority over the Amratian may not be applicable to all localities (Arkell and Ucko 1965: 156); some have suggested that the Badarian and Amratian cultures may have been "partly contemporary . . . for some typical Naqada I wares were found sealed off in Badarian levels at Hemamieh where pure Naqada I was very poorly represented" (Arkell and Ucko 1965: 152; Caton Thompson 1975: 94-95), others have maintained that there may be a temporal overlap with the Gerzean (Hays 1984: 73), while others have insisted that wherever it was encountered, the Badarian predated the Amratian period (Brunton and Caton Thompson 1928: 1). Thus, although it is possible that the Badarian may be (in whole or part) a subdivision of the Amratian or even the Gerzean, since no definitive chronology of early predynastic cultures can be presently advanced, it will be assumed that *the Badarian represents a separate cultural period that preceded the Amratian in time*. It was decided that the chronological issue need not be addressed in this thesis, which is primarily concerned with assessing the degree of social inequality characteristic of Badarian communities.

1.2 Possible social complexity in Badarian communities

Following Brunton's excavations of the Badarian cemeteries near Badari and Caton Thompson's discovery of the Badarian deposits at Hemamieh, Badarian populations were usually depicted as semi-sedentary agriculturists who inhabited flimsy dwellings, herded goats and cattle, relied upon hunting to supplement their protein requirements, stored grain in deep clay bins, made superb pottery, and fashioned crude stone implements. In addition, grave goods were entombed with the dead, although Badarian interments were decidedly simple in comparison with later Upper Egyptian Predynastic burials.

Some archaeologists portray Badarian groups as having egalitarian social systems in which status is determined solely by personal achievement or by the age or sex of the individual (as defined by Binford 1972: 230; Rothschild 1979: 658). Others describe Badarian communities as possessing inegalitarian social systems, as defined by Service (1962: 54), in which status is not derived wholly through personal achievement. In such societies differences in social status usually correlate with economic differences. An alternative terminology, adopted by some researchers who strive to avoid a "typological" approach (Brown 1981: 28) to the study of social complexity, uses Blau's concept of "dimensions of differentiation" which are defined as criteria "...on the basis of which the members of an organization are formally divided into positions... or into ranks..." Two major dimensions, horizontal and vertical, are postulated, and it is suggested that the extent of these dimensions can be accurately assessed through a study of mortuary data (Tainter *et al.* 1977: 96). Since the purpose of this study is to identify the existence or nonexistence of hierarchical social ranking and thus the degree of social complexity that characterized Badarian groups, the division into "egalitarian" or "inegalitarian" seems adequate and will be maintained. However, in the multidimensional approach to the study of mortuary data that will be adopted, these concepts will be treated as "variables" rather than "categories" (McGuire 1983: 100). It will be suggested that the variable "inegalitarian"

is composed of both horizontal and vertical dimensions that are in turn dependent on the degree of inequality present in a society. An estimate of the latter is possible since the components of both dimensions are measurable and serve as predictor or independent variables on which the degree of egalitarianism or inegalitarianism is dependent.

Brunton suggested that the distinction between wealthy and poor Badarians was quite apparent. He stated that only the poorer members of the Badarian community were buried in Cemetery 5300-5400 near Badari, whereas the plundered tombs at Cemetery 5100 were those "of the more important people.. " (1928: 4-10). At Mostagedda, he noted that oval graves were restricted to the "rank and file"; only the large tombs at Cemetery 1200 were truly comparable to the "fine graves" at Badari's Cemetery 5100 (Brunton 1937: 43). His excavations at Matmar revealed the existence of a population that lacked valuable material goods and suffered "general poverty" (Brunton 1948: 9). In recent years Hoffman has also argued that during "the Badarian period [there] is the beginning of marked differences in wealth" between members of the same population (1984: 143). Other researchers are of the opinion that such distinctions were probably not very great (Trigger 1983. 27)

Conflicting opinions about the existence or absence of ascribed status differences among members of Badarian groups are inevitable, since no systematic analysis of the data resulting from Brunton's excavations of Badarian cemeteries has ever been performed. In an effort to resolve this issue, my thesis research seeks to determine the degree to which social inequality may have been present in Badarian populations. Through a quantitative analysis of the excavated mortuary remains from several Badarian cemeteries, an attempt will be made to test the hypothesis that Badarian society was basically egalitarian and as a consequence that grave goods were distributed at random among Badarian graves. Grave sizes, the types of pottery discovered in tombs, the presence or absence of luxury goods, and the degree of grave disturbance encountered will be among the categories examined in order to determine whether significant differences in access to material goods existed amongst these Nile Valley communities during the fourth and fifth millennia B.C.

The results of the data analysis will be interpreted within the context of

mortuary ritual in simple societies as well as in terms of current knowledge about the importance of the burial cult throughout the Amratian, Gerzean and Dynastic periods in Egypt. Kathryn Bard's recent quantitative analysis of cemetery data from Armant and Nagada indicates that a certain amount of social differentiation was present by the Amratian period (1987: 119-128). It is therefore reasonable to believe that it may be possible to infer the nature of still earlier Badarian socioeconomic conditions from an analysis of their burial remains.

1.3 The reconstruction of Badarian society

Like other predynastic Egyptian cultures, the Badarian has been reconstructed largely on the basis of mortuary data. The reason for this total reliance on cemetery data is simple: no other evidence is available. Badarian graves, located in perhaps two dozen extremely small cemeteries on the low desert spurs that stretch the forty-two kilometers from Matmar to Etmanieh, were cleared in the seasons between 1923 and 1925 by Guy Brunton and a team of 300 Egyptian workmen (Caton Thompson 1975: 90). Caton Thompson's counsel that "whenever an early cemetery is found, the habitation area furnishing that cemetery should be sought as well" (1928: 80) was generally disregarded. Although Brunton claims to have unearthed numerous "town" or "village" sites (Brunton 1937: 7-25), the majority of these consist of "holes" and widely dispersed organic deposits that were discovered near the major Badarian cemeteries. An exception to this pattern occurred in Area 1800, where relatively deep deposits of goat-dung suggested a long-term (Brunton 1937: 21) or repeated occupation of this spur just south of Mostagedda. Nevertheless, even when considerable numbers of artefacts were located in "village" deposits, their context remains unknown, since Brunton made no attempt to record the spatial coordinates of the objects he encountered. The importance of Caton Thompson's excavation at Hemamieh is due to her success in providing stratigraphic evidence that the Badarian was chronologically earlier than the Amratian (Trigger 1983: 5). Otherwise, her discoveries there appear to offer even less insight into Badarian socioeconomic activities than that provided by Brunton's work at Badari and elsewhere.

Except for 106 sherds of fine Badarian ware and a "few worked flints, nothing ... was found – [in the Badarian horizon at Hemamieh] neither habitation, nor ... objects of their daily life and art [that are] so well represented in their cemetery at Badari" (Brunton and Caton Thompson 1928: 72-79). No sickles, no copper (Brunton and Caton Thompson 1928: 76), no steatite beads, no slate palettes, no bone needles (Firth 1929: 244), and no ivory artefacts were discovered at Hemamieh. However, the lack of small luxury items may be related to differences in the field techniques employed by the excavators. In contrast to Brunton's practice of sieving the entire filling from each grave, Caton Thompson, who worked alone with a crew of three or four local men and a number of basket-boys, was unable to sieve any of the Hemamieh deposits, apart from the contents of the hearths (Brunton and Caton Thompson 1928: 70-71).

Immediately below the Amratian occupation at this habitation site, Caton Thompson identified Badarian materials in a sealed context. It was this discovery that established Badarian priority over the Amratian (Brunton and Caton Thompson 1928: 79-116) and led to the claim that the Badarian was the earliest food-producing culture known in Upper Egypt.

Brunton's portrayal of Badarian society is similar to that envisaged by Caton Thompson: "We do not know what kind of house or shelter the Badarian made for himself..." (Brunton and Caton Thompson 1928: 40). "Their clothing was of woven material, probably a coarse linen ... [although further examination of the early fabrics proved that] the yarn used in the fragments of cloth from Badari ... is not made from flax" (Brunton and Caton Thompson 1928: 67). "Cereals were known, but what species is uncertain ... the grain was perhaps pulled up, as the usual Predynastic sickle-flints are not found, and the saw-edged knives would not be very suitable for reaping. The grain was stored in clay bins; and made into bread, apparent remains of which are found in graves... Porridge no doubt was a common form of food, and was ladled out of the pots with large dippers or spoons, which could be carried hung from the belt... Apart from herds of oxen, sheep, and goats which we may suppose to have been domesticated, game abounded..." (Brunton and Caton Thompson 1928: 41).

Although fragments of querns and grinding stones were found in many of the Badarian "village" deposits (Brunton 1937: 31, 54-55), Brunton reported that the most complete of these specimens had been used for grinding red ochre (1937: 55). There is evidence neither of porridge nor of bread or grain storage at any Badarian site. Although pots containing husks of apparently unidentified grain were discovered in a mixed Badarian Roman-Ptolemaic cemetery near Badari (Brunton and Caton Thompson 1928: 13), the only direct evidence for Badarian agriculture is derived from a child's burial [2522] at Matmar, where unidentified grain was stored in a pot (Brunton 1948: 10), and from five Mostagedda tombs: Burials 159, 467, 1247, 1215 and 2224.

Grain was first discovered in an all black rippled pot that had been placed in the grave of an old male [Burial 459] at Mostagedda. At Kew, the grain was identified as a species of *Triticum*, but the material was too fragmentary to allow a more specific determination to be made (Brunton 1937: 58).

Fritz Netolitsky's analysis of the stomach contents of an old female in Burial 467 at Mostagedda revealed "husks of *Hordeum*" and Sir Rowland Biffen suggested that "barley flour" was indicated by the presence of "the paleae of barley" in the contents of a village pot from Area 200. Unfortunately, burials at this location spanned the entire time period from Badarian to Roman. The "small cooking-pot", of unknown description and context, was reported only as "standing on the old *gebel* surface"; no other information was provided (Brunton 1937: 18-19, 35, 58). Besides, the extremely decayed black-topped, brown pot that accompanied the elderly Mostagedda woman in Burial 467 showed no sign of rippling (Brunton 1937: 35), and the published 'Plan of Cemeteries 300 and 400' shows that on this particular spur north of Mostagedda, Amratian deposits were discovered in close proximity to the five main clusters of Badarian graves. Burial 459 was situated on this same desert spur.

In addition, an atypical emmer wheat was identified from Burial 1247 (Brunton 1937: 59), and a disturbed grave, Burial 1215, also at Mostagedda, yielded grain which was identified by Percival R. Lowe of the British Museum as "typical pieces of an ear and spikelets of Emmer, with fragments of straw" (Brunton 1937: 38, 59). The grain from 2221 was not identified (Brunton 1937: 40). Organic discoveries from

Matmar proved to be equally uninformative. The "bread" from Burial 2517 was never identified, and L. A. Boodle, a Kew Gardens botanist, suggested that the grain from Burial 3083 may not have been extremely old (Brunton 1948: 11).

Deep pits and small, circular holes, occasionally lined with basketry or clay (Brunton 1948: 5), encountered in the settlement areas, were interpreted as granaries of Badarian date. Badarian artefacts were apparently always found in the vicinity, and pits of this type were never present "in areas which are solely Predynastic [Amratian] or Tasian". Although unidentified grain was allegedly found in village debris at Mostagedda (Brunton 1937: 31, 58), grain was never discovered in any of the granaries, which in later ages were sometimes re-used as burial places for the poor (Brunton 1937: 68-69).

Apart from a turtle scute, an ostrich shell and possible calf bones that were discovered in some Mostagedda graves (Brunton 1937: 30-31), the only other organic identifications that could be used to infer the nature of the Badarian economy came from burials near Badari. These are limited to castor seeds *[Ricinus communis]*, feathers from a bird of the "ostrich family", a "quadruped" from Burial 5431 that was "plainly an ox" or perhaps a "cow-buffalo" and a skull from Burial 5423 that is "probably a sheep" (Brunton and Caton Thompson 1928: 38). Both of these latter burials were assumed to be of Badarian date because of their location adjoining a Badarian cemetery. Brunton also remarked that the animals were covered with matting in the Badarian fashion (Brunton and Caton Thompson 1928: 12).

Given such inconclusive information, archaeologists have presented conflicting interpretations of the socioeconomic organization of Badarian communities. Nomadism as well as the establishment of the first sedentary societies, hunting and gathering as well as the adoption of agriculture, and egalitarian as well as inegalitarian social systems have all been conceived as characteristic of Badarian groups. O'Connor suggested that the Badarians were nomadic hunter-gatherers whose settlements and cemeteries were restricted to the low desert because they were technologically incapable of exploiting the rich agricultural resources of the floodplain region between Matmar and Etmanieh (1972: 92-93). Smith had also postulated previously that the Badarian remains, including the Hemamieh settlement, might be those of a

semi-nomadic, marginal, pastoral, "hill-country" community (1965: 163-164).

Another interpretation of the Badarian economy suggests agriculture, together with pastoralism, fishing and hunting, which involved a seasonal occupation of the floodplain combined with a retreat to the edge of the Nile Valley (Trigger 1983: 9-30). This explanation would account for the ubiquitous animal bones, fish bones, mussel shells *[Spatha]*, hunting technology and lack of agricultural implements at the Badarian desert-village sites, which would have been occupied during the inundation. Hence the location of cemeteries and settlements on the desert plateau, and the disappearance of Badarian remains north of Matmar, where high spurs on which sites could be preserved were absent and the desert area reached the level of the fields (Brunton 1948: 2-3). An alternative proposal is that some Badarian communities may have been permanent floodplain inhabitants. They may have possessed copper working skills and co-existed with the technologically less advanced, more egalitarian, marginal pastoral groups who frequented the low desert (Trigger 1983: 30).

In the absence of any systematic analysis of the Badarian burial data, it is hardly surprising to find that reconstructions of Badarian socioeconomic systems are in complete disagreement. However, the practice of employing mortuary evidence to infer the degree of social complexity achieved by an archaeological society is itself a thorny issue which will be discussed in the next chapter.

Chapter 2

Mortuary data as an indicator of social complexity

Although the approaches advocated by most researchers in the field of mortuary studies are developed from both ethnographic and archaeological accounts of a plethora of burial programmes whose recorders recognized no regularities beyond those of the particular context being investigated, O'Shea has asserted that certain *regularities do exist in the realm of mortuary practice*. He argued that all societies dispose of their dead in some fashion; that the disposal practices adopted by all societies are culturally patterned; that the demographic and physiological components of the mortuary population will reflect those of the living population from which it is derived; and that the disposal treatment of the deceased will be consistent with the social position held by that individual in life (1984: 33-38).

Societies that are highly egalitarian or characterized by well-developed hierarchical systems can usually be clearly identified in the archaeological record. It is far more difficult to recognize those that are characterized by incipient inegalitarianism, especially when this condition is inferred from mortuary data alone. In a small-scale society in which duty-status relationships are few, all aspects of the mortuary system will tend to be simple. Little effort will be expended on preparatory *ante-mortem* tasks such as grave good manufacture and accumulation; variations in body treatment of the deceased will be minimal; graves will be simple in construction

and formal disposal areas will usually tend to be lacking. Conversely, an elaboration of *ante-mortem* activities and the existence of formal disposal areas will be indicative of a more complex society. (The manufacture of burial artefacts that are *specifically intended for placement within a particular tomb* is one manifestation of *mortuary planning or ante-mortem* activity). Saxe maintained that sex, age, and deviant versus normal distinctions governed the "burial mode" in egalitarian contexts, whereas in ranked societies mortuary practice was determined by social status and kinship position (Goldstein 1981: 54).

Binford has suggested that there should be a strong correlation between the structural complexity of the burial practices and the status system within a particular society since the "form and structure which characterize the mortuary practices of any society are conditioned by the form and complexity of the organizational characteristics of the society itself" (1972: 236). He also claimed that neither the idea nor the mere knowledge of a particular burial form will lead to its adoption by a given society: "In no way can ideational innovations or communicated knowledge or ideas be cited as a sufficient cause for change, variability or stability" in burial patterns (1972: 235).

He has also stressed the existence of a direct relationship between the mode of subsistence and the number of duty-status relationships recognized by various social groups. The considerable difference between the amount of status differentiation recognized by settled agriculturists and the members of the other subsistence categories reviewed by Binford (1972: 230) also suggested that in addition to the *mode of inheritance* (Goody 1962: 36), the *degree of mobility and consequently the relationship to particular tracts of land* characteristic of a given society may be an important constraint on the structure of the burial programme adopted by that society.

The use of formal disposal areas [such as cemeteries] by corporate descent groups appears to be linked to control over area resources (Chapman and Randsborg 1981: 19) *by those corporate groups who have acquired authority in those areas* (Jacobsen and Cullen 1981: 90). Saxe has established the interconnection that exists between resources, formal disposal areas and corporate groups (1970: 139-154). Other researchers have also noted that "clear relationships [exist] between resources, social

groups and mortuary practices" (Chapman 1981: 73-74). Amongst the Aré 'Aré, who dwell in the Solomon Islands, "land was...covered by an extensive genealogical network of graves, each controlling the nearby land, and marking the land rights of all descendants, male as well as female" (De Coppet 1981: 176-177).

Tainter has also asserted that ethnographic tests have shown that "(a) the presence of formal disposal areas is consistently associated with corporate groups practising lineal descent and (b) that most, though not all, such groups use formal disposal areas. Thus the presence of formal disposal areas will strongly indicate that the archaeologist has isolated individual corporate groups, and the absence of formal cemeteries will suggest...the absence of social groups of this sort" (1978: 124). The discovery of two equal groupings of spatially separate Pawnee burials at Barcal led O'Shea to suggest that "kin or corporate group membership" was symbolized (1984: 105) in these Plains Indian burials. More recently, James Brown has claimed that emerging power groups tend to attach themselves to specific burial locations that serve as symbols of their power base (1981: 29). In other words, *formal disposal areas may be associated with both horizontal and vertical social differentiation.*

In those situations where horizontal differentiation alone was expressed among some Plains Indian groups, differences between burials were confined to variations in body position and treatment of the corpse. O'Shea observed that "funerary treatment and grave assemblage tended to perform complementary tasks in mortuary differentiation. Treatment tended to symbolize horizontal and special status distinctions, whereas the composition of the grave assemblage [expressed]...vertical differentiation" (1984: 107). The Barcal grave offerings "tended to reflect the achieved personal status of each individual. Although achieved wealth is expressed, marked mortuary elaboration is not really observed at Barcal, even among the individuals holding elevated social positions. This suggests that the ranking system was probably quite weak, with little absolute difference between the individuals within it" (O'Shea 1984: 108). Also, the decrease in elaboration of the "funerary complex" monitored by O'Shea (1984: 273) appears to be associated with a corresponding devolution in social organization. O'Shea suggested that "several of the observed changes in mortuary symbolism may be indicative of adaptations to merged villages [and] ..despite vil

lage merger, autonomous social units continued to maintain discrete burial locations" (1984: 280). O'Shea found that Arikara and Pawnee mortuary practices changed rapidly over a sixty year period. Status markers as well as the use of grave offerings were subject to change. Nevertheless, he concluded that "changes in funerary behavior are integrally related to the overall configuration of the living society" (1984: 283-284).

O'Shea's conclusions regarding the Amerindian burials at Barcal therefore support Tainter's assertion that the "ethnographic literature seems to indicate clearly ...that energy expenditure in mortuary ritual is directly related to rank grading " (1978: 127-128). On the other hand, Liversage has insisted that ideology alone is reflected in the grave record (1983: 148), and Häusler has maintained that differences in burial customs need not always have a social basis (1983: 405). Hodder has also argued that "if age, sex and status are not differentiated in grave content, this does not mean they were not differentiated in life. Rather...less differentiation in burial may relate to changes in attitudes to death. [Therefore]...the study of burial must be primarily concerned with attitudes to death and life, and...as part of these attitudes we must expect distortions, partial expressions and even inversions of what happens in social life. [Hodder also warns that] studies of burial must not expect simple correlations between social organization and burial..." (1982: 144-145), since many elements of burial, including the existence of wealthy tombs, "may mean very different things in different societies" (1982: 19). Similar observations were made by Ucko and reiterated by Humphreys: "a...cemetery site may well not contain a representative sample of the population using it from the point of view of sex, age [or] social status...[and] burial practices are not necessarily stable or closely correlated with other aspects of social structure or beliefs..." (Humphreys 1981: 4; Ucko 1969: 273-274). O'Shea has insisted that personal possessions should not be treated as burial offerings (1984: 24), and Jacobsen and Cullen have observed that not only were grave offerings not necessarily the deceased's personal belongings, but the presence of luxurious objects in graves may not be directly correlated with a society's true "level of affluence" (1981: 93-94).

Some burial practices may indeed manifest themselves as variations in energy

expenditure that could be interpreted as expressions of differences in rank whereas they are not. Huron ossuary burials provide an example of this phenomenon. "Archaeologically, a Huron ossuary would...display both articulated and disarticulated individuals, a contrast that might be mistakenly interpreted as a variation in energy expenditure" (Tainter 1978: 127-128). In fact, the articulated bodies are those of recently deceased individuals (Trigger 1969: 108-111). Hodder has maintained that Tainter's interpretation of mortuary practice may be inaccurate since "less differentiation in burial" does not necessarily correspond to less differentiation in life (1982: 144-145). Yet, the extent to which the lack of differentiation observed in the archaeological record truly reflects cultural patterning may be difficult to assess. There are many indications that as social organization becomes more elaborate, more effort and attention *may* be directed towards mortuary planning, thus, *ante-mortem* activities *may* be subject to greater elaboration. Unfortunately, except for burial offerings, many planned, rank-correlated *ante-mortem* activities, which may range from childhood tomb selection among the Merina (Huntington and Metcalf 1979: 65) to inheritance transfers among the Roman élite, may not be archaeologically visible.

Parker Pearson's analysis of recent English mortuary practice also appears to contradict Tainter's claim that social rank determines energy expenditure in mortuary ritual. On the basis of mortuary evidence alone, Parker Pearson has suggested that it would be impossible to distinguish the burials of the "upper" from those of the "lower" classes in late twentieth century Cambridge. But, in spite of the established "inversion" in terms of perceived rank, he reported that differentiation *had* taken place *between* status groups. He noted that gypsies, showmen, and some Roman Catholics engaged in more elaborate mortuary rituals than other members of the Cambridge community who occupied positions of high social status (1982: 104-105). However, because Parker Pearson did not investigate differences in ranking *within* these groups that may have correlated with the elaborate grave monuments that he observed, his study does not necessarily invalidate Tainter's hypothesis. We may conclude that if there *is* differentiation in burial remains, this probably *does* mean that there was differentiation in social life. It is unlikely that a society that *lacks* social differences among the living would institute differentiation among its dead.

Humphreys has also cautioned against the assumption that there must be a direct correlation between the status of the deceased and lavish energy and resource expenditure. He points out that in situations involving the "commemoration of saints and martyrs by a religious congregation", the funeral resources are not necessarily derived from either the estate of the deceased or his or her kin (1981: 9). However, Humphreys' observation fails to contradict O'Shea's principle that *disposal treatment is consistent with status in life* (1984: 33-38), since both saints and martyrs command positions of high status in those societies that award them lavish burial treatment.

The linkage between energy expenditure and rank grading was also emphasized by Binford. "Persons who are full participants in the corporal society at the time of their death must be afforded rites which sever their relationship with that society" (Binford 1972: 211). However, "when a child [or other person] dies within a society in which social position is not inherited, very few duty-status relationships outside of the immediate family are severed. The level of corporate involvement in the mortuary rites is thus largely at the familial level; the rites are performed, either within the precincts of the family's 'life space' or outside the life space of the wider society, which therefore remains uninvolved in the mortuary rites" (Binford 1972: 234).

The findings of most of these researchers that 1) regularities exist in the realm of mortuary practice, 2) disposal treatment is consistent with status in life, 3) the use of formal disposal areas, the existence of corporate groups in which authority is vested, and resource control are all interrelated, and 4) emerging power groups attach themselves to specific burial locations, all appear to be consistent with Binford's premise that a strong correlation should exist between the organizational complexity of a society and its mortuary system (1972: 236). Their findings also suggest that, although diachronic variation in the amount of energy expended by a given community on any phase of their burial-related activities is to be expected, the amount of energy expended on mortuary planning and disposal of the dead, as well as on the preparation and upkeep of burial surroundings, will be dependent on the social complexity of a particular society. Moreover, since "ritual is often scale dependent" (Johnson 1982: 106), even if the specifics of a particular burial programme are shared by more than

one society, the *scale* of these operations appears to depend on the degree of social organization present. Consequently, a detailed study of the mortuary practices of any society is likely to provide some information about the degree of inegalitarianism present, since this concept is normally defined in terms of the types of inequalities that exist between members of a society, and which therefore determine the structural complexity of the society. Thus, in order to determine the degree of inegalitarianism that may have existed in a past society, some measure of the "amount" of social complexity present in that society is required

It has been suggested that the structural complexity of a particular society will be expressed by the amount of social differentiation present in the society. Two dimensions of social differentiation, horizontal and vertical, have been conceptualized to account for variations in the degree of social complexity exhibited by different societies. Tainter has suggested that mortuary data is the type most suitable for assessing these variables: "Since individuals acquire their social identities through membership in the structural components of a social system, the representation in mortuary ritual of the deceased's social identities simultaneously conveys information concerning the structural components in which the individual held membership" (1977: 329). If a multidimensional approach is utilized (McGuire 1983: 92-93), a compound, categorical concept such as "inegalitarian" can be useful if regarded as a "*variable*" which encompasses both horizontal and vertical dimensions of social differentiation that are in turn dependent on the level of inequality that exists in a particular society. Most importantly, the variables that constitute the "level of inequality", on which inegalitarianism is dependent, can be "measured" by estimating economic differences between members of the society. "The distribution of material resources represents an important aspect of inequality in all societies. Indeed, anthropologists... normally evaluate inequality by the division of material wealth within a society. Material goods reflect inequality well because they are both the symbols and source of stratification" (McGuire 1983: 104). Thus, an assessment of the economic status of an archaeological society should provide a measure of the degree of inequality represented and thus indicate whether ranking existed and whether the level of complexity present could be considered to be "inegalitarian" or "egalitarian".

I would suggest that these studies indicate that 1) the mortuary practices of all societies possess social, ideological and economic components that structure the form of their mortuary planning and corpse disposal activities; 2) that the structural complexity of any burial programme is expressed in terms of the *elaboration of one or more of these factors;* 3) that elaboration of any of these components is constrained by the same demographic, environmental and technological factors that structure the degree of social organization present in the society and hence its degree of social complexity; and 4) that the *degree of mortuary planning or ante-mortem ritual engaged in by a society tends to increase as social complexity increases.*

If therefore it can be established that 1) Badarian communities made use of formal disposal areas to which inclusion was granted on the basis of economic status, and that 2) some form of resource control was operative and that this control may have been vested in a hereditary authority, it will be suggested that some degree of ranking had already developed in these predynastic Nile Valley populations.

Since there is ample evidence that grave goods were used as status markers throughout the Egyptian Dynastic era as well as during the preceding Gerzean and Amratian periods, and since similar objects such as pottery, ivory objects, statuettes, jewelry, slate palettes, and other toilet articles are found as part of the Nilotic funerary equipment throughout the entire time span from the Badarian to the fourth century A.D. (James 1979: 248), it is also suggested that it would be reasonable to infer something of Badarian socioeconomic conditions from an analysis of their burial remains.

Chapter 3

Methodology and Data Selection

3.1 Methodology

Even among those researchers who acknowledge the possibility of utilizing mortuary data as an indicator of social complexity, there is no consensus regarding the manner in which this goal can best be achieved (O'Shea 1981: 39-40). Thus, Tainter opposes the use of "multivariate statistical techniques" to analyse mortuary data on the charge that different results have been obtained when "different kinds of multivariate procedures are applied to the same set of mortuary data" (1978: 119). There are only two ways to account for such an occurrence. Either an inappropriate statistical test was used, or the test was conducted improperly, since the purpose of hypothesis testing is solely to *reject* the null hypothesis. The alternate hypothesis can only be utilized when this condition is met. An investigator who regards rejecting the alternate hypothesis as equivalent to accepting the null when there are insufficient grounds on which to do so will obviously be committing an error of great magnitude. As a result, his or her conclusions would certainly differ from those of a second investigator (Fabian and Hannan 1985: 273).

In addition to the methodological difficulties associated with the analysis of mortuary remains, it is important to recognize a variety of problems that result from the nature of the data itself. In many cases, small sample sizes constitute the only available burial remains (O'Shea 1984: 57-58), and these may not be at all

representative of the past living population (Binford 1972: 401) due to either natural or cultural postdepositional disturbances or incomplete recovery techniques (O'Shea 1984: 52-53). Tainter also noted that the recovery of a representative sample of an archaeological burial population is a dubious matter since disposal of the dead may be accomplished by more than one method in a single society (1978: 109), or the mode of burial may be conditioned by the circumstances of death (Brown 1981: 28; Binford 1972: 235).

Unlike many mortuary populations, the Badarian skeletal material on which this research is based could have been considered to be quite representative of the past living populations from which it was derived, since it was well preserved and consisted of relatively large numbers of specimens including numerous subadults. Skeletal remains were only scarce in those badly plundered cemeteries from which bodies had presumably been removed by tomb robbers. These cemeteries are identified in the text.

In Brunton's report on the difficulties involved in assigning the age and the sex of skeletal material, he states that Professor Douglas Derry, who visited the camp at Etmanieh, gave "detailed instruction" to Brunton's "assistants" who were thereafter responsible for the sex determinations that appear in the Tomb Registers (Brunton 1927: 5). The preponderance of male burials in the West Section of Cemetery 5300-5400 at Badari may therefore be as much the result of faulty sex determinations as that of cultural patterning. Unfortunately, it was not possible to estimate the level of error involved when Brunton's assistants assigned a skeleton's sex, since the error level is dependent on the *method* used. In this case, the method is unknown. However, since the sex of 134 bodies and the ages of 170 skeletons from Badari are also attributed to apparently independent estimates by Brenda N. Stoessiger of the Biometric Laboratory at University College, London, and G.M. Morant, it is felt that the published determinations are reasonably accurate. The term 'child' was used to indicate immature individuals of either sex (Morant 1937: 63), and the 'ages' assigned were to the categories 'child', 'adult' and 'old'.

In addition to the problems outlined above, the information provided by Brunton tends to be lacking in detail and occasionally inconsistent. The sex of forty-

five percent of the grave occupants is unknown; in some instances this was because the body was missing from the grave; in others, the information was not recorded. In seven percent of the cases, the grave condition is unknown because it was unlisted; no information on grave size was recorded for thirty percent of the graves; and for fourteen percent of the burials, grave locations are impossible to distinguish because the *same grave number* was issued to more than one grave. Some graves were reported as "unregistered" and omitted from the 'Tomb Registers', but reasons for this decision were usually not given. Some grave maps contained graves that were not mentioned either in the text or in the 'Tomb Registers'; grave locations were not always included on the appropriate map, and none was provided for the Matmar graves. The grave "descriptions" provided in the text were often incomplete. thus, Burial 5396 is reported to be that of a "woman with long black wavy hair and bowl at hands". Although the dimensions of this grave are given in the grave register, the "bowl" is not further identified (Brunton and Caton Thompson 1928: 11). Some graves discussed in the text are listed in the 'Tomb Registers' as 'Town Groups'; others are given "grave numbers" and described in the text, but finally dismissed since "none seem to be true graves" (Brunton and Caton Thompson 1928: 7-8).

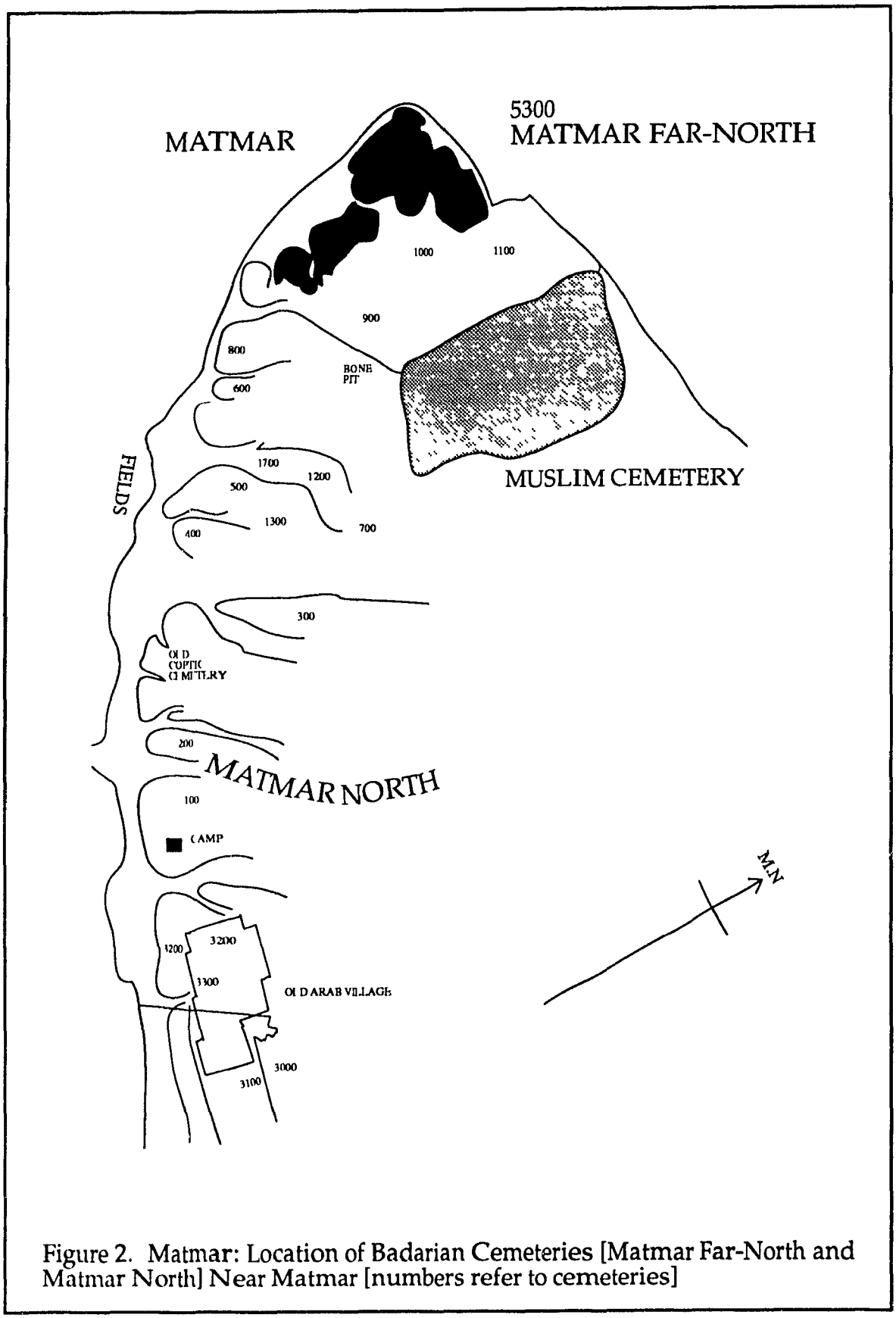

Figure 2. Matmar: Location of Badarian Cemeteries [Matmar Far-North and Matmar North] Near Matmar [numbers refer to cemeteries]

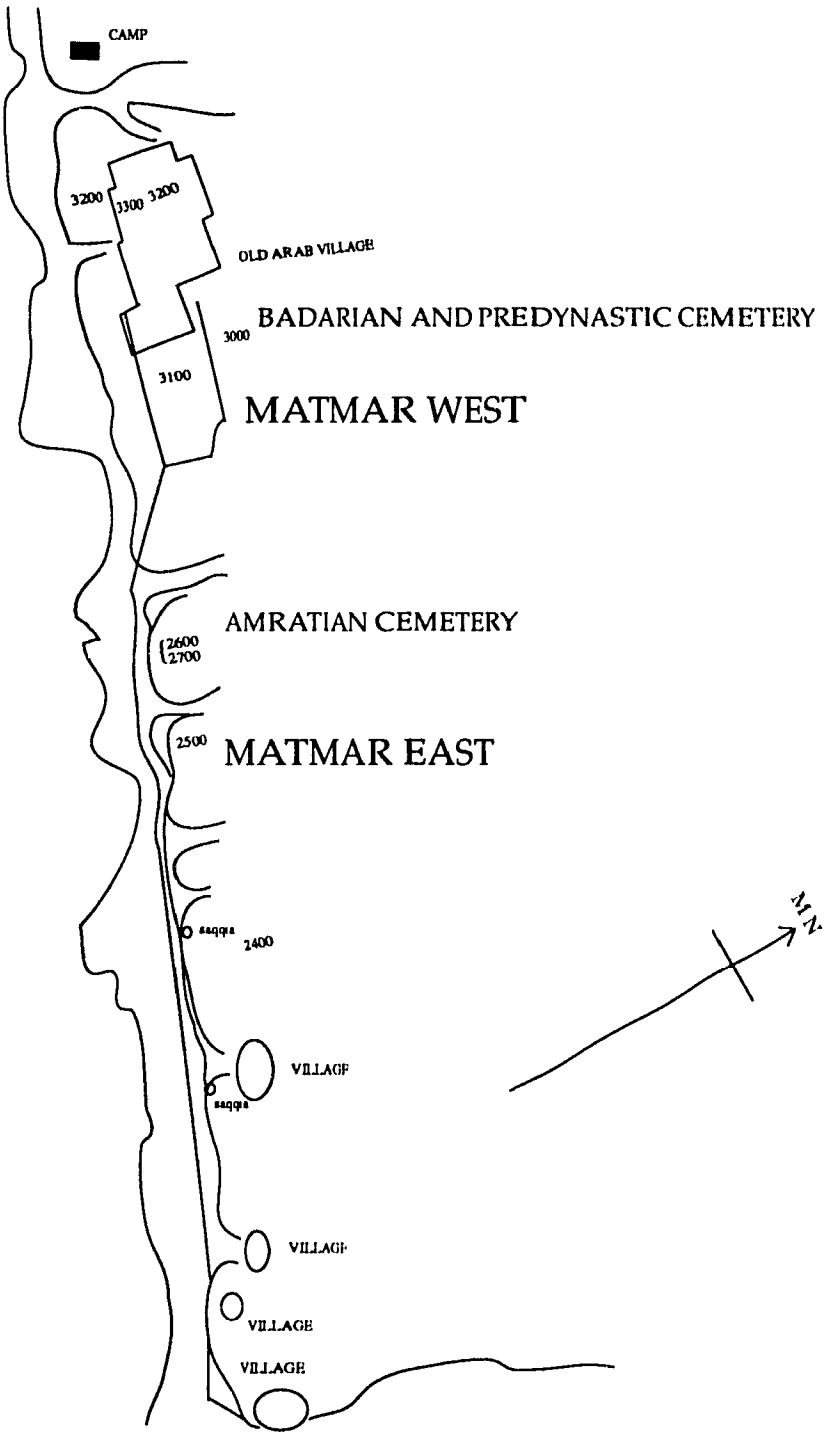

Figure 3. Matmar: Location of Badarian Cemeteries [Matmar West and Matmar East] Near Matmar

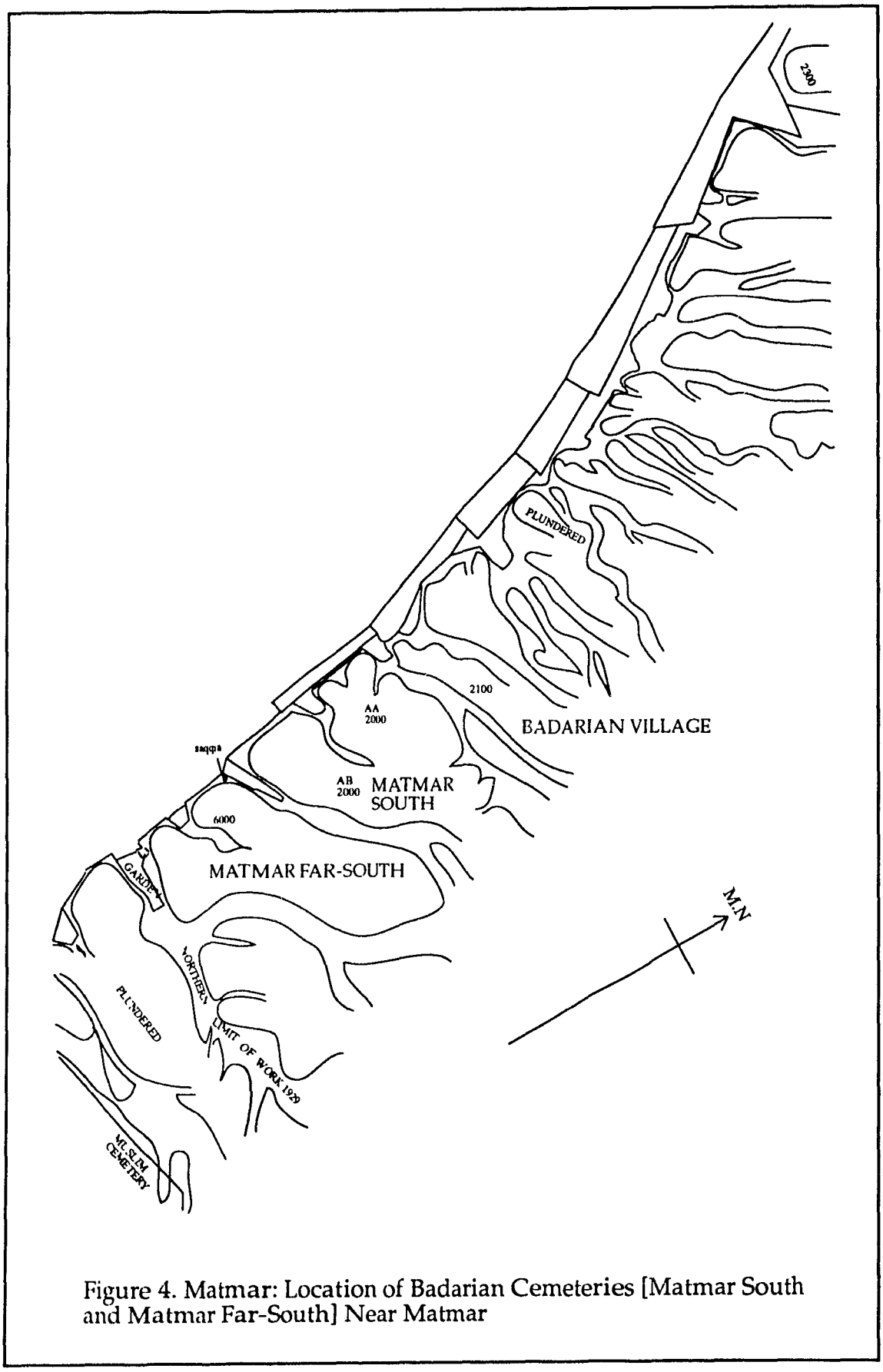

Figure 4. Matmar: Location of Badarian Cemeteries [Matmar South and Matmar Far-South] Near Matmar

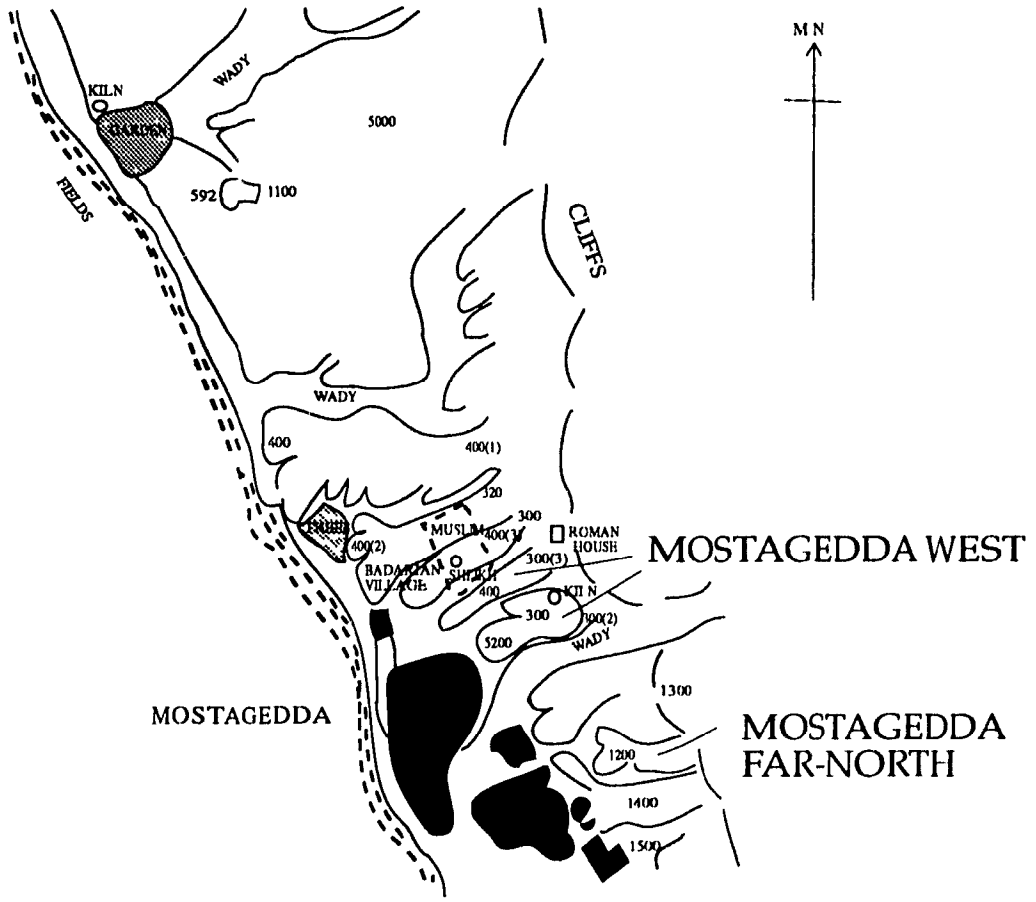

Figure 5. Location of Badarian Cemeteries Near Mostagedda

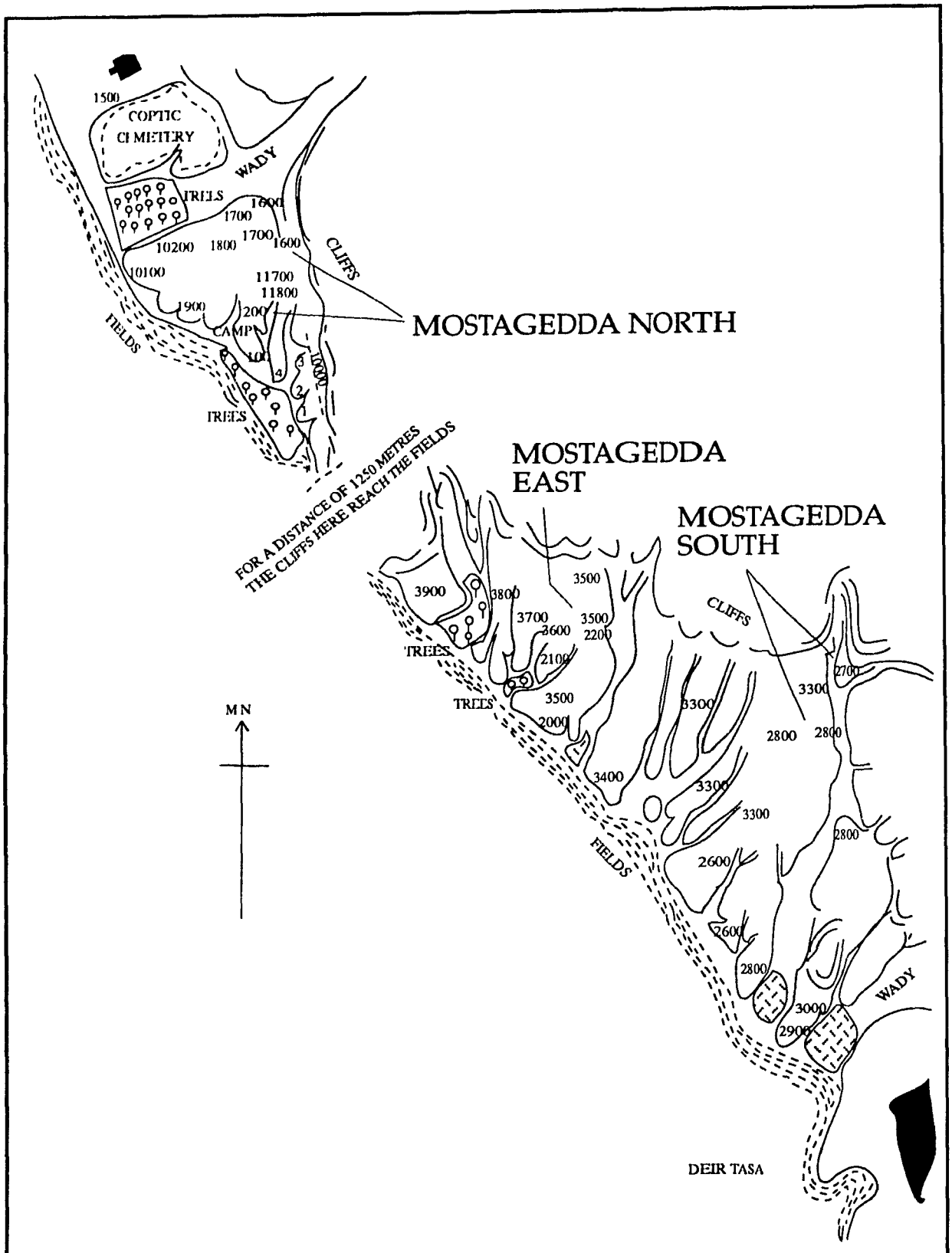

Figure 6. Location of Badarian Cemeteries South of Mostagedda

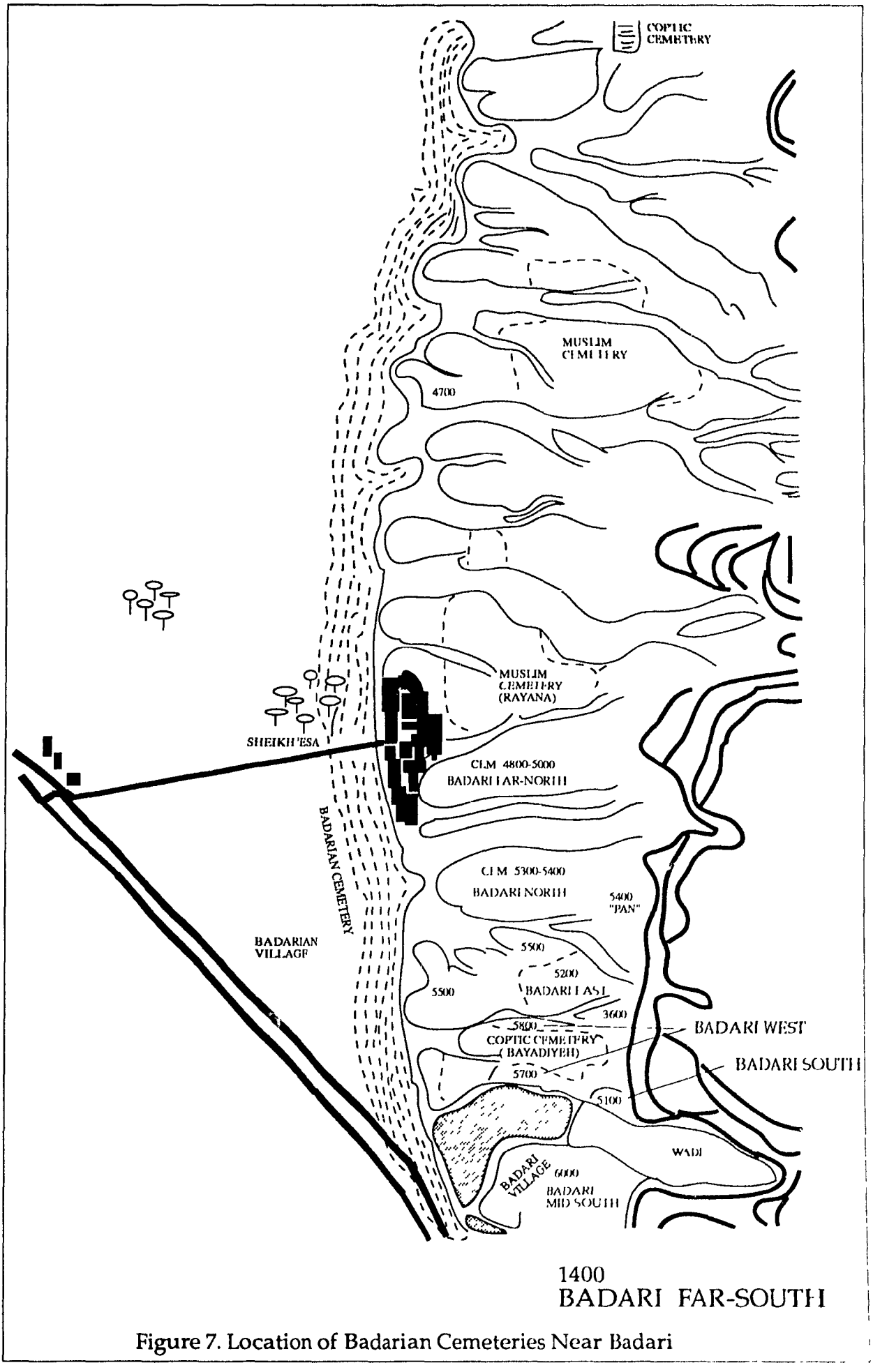

Figure 7. Location of Badarian Cemeteries Near Badari

3.2 Data Selection

All data were compiled from information recorded in three separate publications. Sixty-three of the Badarian graves near Matmar are listed in the 'Register of Badarian Graves and Town Groups' in the publication *Matmar* (1948) by Guy Brunton. Thirty-one additional "unregistered" burials were described in the chapter titled 'The Badarian Graves'.

As stated previously, the aim of this investigation is to identify the possible existence of a random distribution of burial goods amongst the occupants of Badarian tombs. This will be determined through an analysis of the grave sizes as well as the quantity and type of grave goods. Graves included in this analysis are only those which have been classified as "Badarian" by Guy Brunton.

The records of the Badarian graves near Mostagedda are published as the 'Register of Tasian Graves and Town Groups' and the 'Register of Badarian Graves and Town Groups' in *Mostagedda and the Tasian Culture* (1937) by Guy Brunton. During the 1928 and 1929 seasons at Mostagedda, the remains of Badarian villages were discovered at forty-one sites. Graves were also discovered at thirty-nine sites. All graves recorded in the 'Tomb Registers' of the Mostagedda volume are those in which burial goods, or at least matting or skins, were found. An account of the Mostagedda burials that lacked burial offerings is given by Brunton in the chapter on 'The Badarian Graves' in *Mostagedda and the Tasian Culture* (1937).

The records of the Badarian graves near Badari are published as the 'The Cemeteries' and 'The Register of Badarian Graves and Town Groups' in *The Badarian Civilization and Predynastic Remains near Badari* (1928) by Guy Brunton and Gertrude Caton Thompson. Practically all the excavated Badarian graves from this area, including those that lacked grave goods, are listed in this 'Register'. As a result, the burial list from Badari contains a more complete and probably more representative sample of Badarian society than the Mostagedda grave list.

Although the term 'cemetery' was used to identify all burial groupings, in several instances these so-called 'cemeteries' consisted of small clusters of less than six tombs. As these burials were located some distance away from the major ceme-

teries, they were analyzed as separate units. Badari Far-north, Badari Mid-south, Badari East, Badari Far-south, Matmar North, Matmar Far-north, Matmar West and Matmar Far-south all belong in this category.

The eighteen cemeteries chosen for this analysis were all located on the east bank of the Nile in the Badari District of Asyut Province. They contained a total of 725 Badarian burials and were found in three principal regions: Matmar, Mostagedda, and Badari. Remains of Badarian villages were discovered mainly to the west and south of these cemeteries.

Ninety-four Badarian burials were discovered in six Matmar cemeteries [Figs. 2-4]. Two graves were discovered in Cemetery 200 or 'Matmar North', and Cemetery 2000 or 'Matmar South' contained forty-one burials. Sixty-nine graves were found in Cemetery 2500 or 'Matmar East'; however, since Brunton published no information on thirty-eight of these burials, only thirty-one could be included in the dataset (1948: 8). Cemetery 3000-3100, or 'Matmar West', contained thirteen tombs, and Cemetery 5300 or 'Matmar Far-north' had only two Badarian graves. At Cemetery 6000, or 'Matmar Far-south', four burials were found.

At Mostagedda, 369 Badarian graves were located in five cemeteries [Figs. 5 6]. Cemetery 1200, or 'Mostagedda Far-North' contained fifty-three graves, Cemetery 200-1600, or 'Mostagedda North' contained thirty-one burials; and 134 burials were discovered at 'Mostagedda West' or Cemetery 300-400-500. Cemetery 2000-2200-3500 or 'Mostagedda East' contained 108 interments, and forty-three graves were found at 'Mostagedda South' or Cemetery 2700-2800-3200.

In the region near Badari, 262 Badarian burials were discovered in seven cemeteries [Fig. 7]. 'Badari Far-south', or Cemetery 1400, contained five Badarian tombs. Four of these, Burials 428, 569, 1411 and 1414, were located at Qau, Burial 2015 was found at Hemamieh. The remaining burials were located not far from the modern town of Badari. Cemetery 5100, referred to here as 'Badari South', contained fifty-four burials. 'Badari East' or Cemetery 5200 contained nine. There were ninety-three human interments in Cemetery 5300-5400, designated hereafter as 'Badari North'; three in Cemetery 4800 or 'Badari Far-north', and ninety-three at Cemetery 5700-5800 or 'Badari West'. Five burials were found at Cemetery 6000 or

'Badari Mid-south'.

Twelve major variables were utilized in the data analysis: *sex* [male, female, and unknown], *age* [child, adult, old, and unknown], *grave condition* [plundered, disturbed, undisturbed and unknown], *grave size, total grave goods, pottery* [polished, unpolished, rippled, rough and none], *tools, shells,* a residual class of *'other objects'* such as animal bones, and a category of luxury goods including *beads, slate palettes,* and *ivory.*

Since the Badarian graves were all nearly oval in shape, they were assumed to approximate a rectangle when computing grave areas. Data on the use of matting and skins were ignored since matting and skins were present in practically all graves. Similarly, information on the number of grave occupants was not included because there was normally only one occupant per grave. At Mostagedda, however, two other varieties of mortuary treatment included multiple burials and possible symbolic graves. Multiple burials were noted in 2840 and 1243, both of which contained a female and a child (Brunton 1937: 6; 38). In 2704 Brunton found two aged males; in 2224 he found a male and a child (1937: 40), in 2842 he found an adult and a child (1937: 7), and in 470 he discovered two skulls (1937: 35). The following burials also contained more than one body: 448, 471, 473, 474, 487, 493, 496, 1206, 1212, and 3527 contained two bodies each, and there were three bodies in Burial 472. Also at Mostagedda, Brunton reported the occurrence in Area 400 of "three graves without bodies but with pots" (1937: 34). In Area 3500 he encountered nine pierced shells and a rough brown bowl in graves that lacked bodies (Brunton 1937: 41), and in Area 500 he found "two empty graves with traces of bran pillows" (Brunton 1937: 36). Similar graves have been prepared in other cultures when the physical remains of certain community members were unavailable for burial (O'Shea 1984: 132).

Potsherds were considered to be grave offerings rather than material included in the backfilling from grave pits (O'Shea 1984: 24) because Brunton reported that some Badarians were buried with whole pots that were later crushed by the weight of the grave filling. These broken pots tended to be found in rather specific positions in relation to the bodies. For example, in Burial 408, the undisturbed tomb of a Mostagedda infant, Brunton reported that two pots had been placed before the child's

face, and a string of shells had been laid "between the knees and elbows". Similarly, in Burial 426, a string of shells lay "at the hands" while two pots had been placed before the child's face and a bowl had been laid at its feet (1937: 5). However, because intact pots were rarely discovered in any context, practically all the Badarian pottery was reconstructed from sherds. "The thin rims of the black-topped pottery were especially liable to crumble away when attacked by salt... [and] the general thinness of the ware made these pots far too weak to withstand the shock or the pressure of the sand when the graves eventually caved in. Some 230 different forms were drawn ...but this had often to be done from fragments only. .[for] those that were whole were mostly of the thicker wares" (Brunton and Caton Thompson 1928: 21).

Both coarsely and finely rippled pottery were listed as 'rippled'. Sherds used as pot lids were included as 'Other Artefacts'. Potsherds and pottery "scraps" were both listed under 'Pottery Type', although "scraps" were *not* included in 'Grave Goods' totals because it was impossible to determine how many artefacts were represented. Pottery "fragments" were omitted since the 'Pottery Type' could not be identified. Unmodified "flakes" were not included in 'Grave Goods' totals. The seven cores and flakes from Burial 5401 at Badari North [Cemetery 5300-5400] were counted as a single item amongst the 'Total Grave Goods' for that grave. Pebbles and odd teeth were not included in 'Grave Goods Totals'. Animal burials were ignored.

Shells, identified by Wilfred Jackson of the University Museum, Manchester, and Major Tomlin of the Natural History Museum in London include local Nile Valley varieties such as *Mutela dubia* and *Spatha rubens* (Brunton and Caton Thompson 1928: 62) as well as non-indigenous types such as *Ancillaria cinnamomea, Conus quercinus* and *Natica mamilla* from the Red Sea; *Oliva inflata* and *Natica melanostoma* from the Gulf of Suez, and *Nerita polita* from the Gulf of Akaba (Brunton and Caton Thompson 1928: 38). Organic materials were analysed at several institutions including the British Museum (Brunton 1937: 59) and the Royal Botanic Gardens at Kew (Brunton 1948: 11). Although many shells were of foreign origin, the types recovered from some graves, including 4803 and 5112 at Badari, were not reported by Brunton. For this reason, and also because they were not modified in any way, whole shells are not included among the luxury items.

Most of the items listed in the 'bead' category were fashioned from glazed steatite, although other exotic raw materials such as carnelian, jasper, turquoise or copper were occasionally used. Ivory beads were included as 'ivory artefacts'.

A "few" beads were arbitrarily counted as ten; a "string" of beads as fifty and a "belt" as five hundred. This procedure was adopted as a consequence of Brunton's tendency to give ambiguous accounts of the exact number of beads discovered with a particular burial. As a result, bead counts will sometimes be underestimated. An example of this occurs with Burial 5735 at Badari West where a bead belt is described as "...a mass of green glazed steatite beads, forming a long string..." (Brunton and Caton Thompson 1928: 15). It is reported elsewhere to be fashioned from hundreds of beads (Arkell 1975: 30). Likewise, the bead belt in Burial 5705 at Badari West is said to consist of "...masses of green glazed steatite cylinder beads..." (Brunton and Caton Thompson 1928: 14). A similar tomb existed at Mostagedda West where Brunton recovered "...at least five thousand blue glazed steatite beads" (Brunton 1937: 37) from Burial 592.

Of the 725 graves in the dataset, only these three burials contained more than 300 grave goods. Burial 3094 at Matmar West had 213 items, which was the next largest number of burial goods. All other graves contained less than 165 items. The result of such a large discrepancy in burial goods between the three burials in which bead belts occurred and the rest of the burials has inflated mean numbers of burial goods for the cemeteries in which the bead belts were located. In order to rectify this situation, these three burials were treated as "outliers" in some statistical calculations. Whenever this procedure was used, it is noted in the text.

"Town groups" were omitted. Brunton sometimes stated that these were definitely not graves but merely holes where village materials appear to have accumulated. Burials 600, 700, 800 and 1100 at Mostagedda were omitted from the dataset because detailed information on these sites was unavailable. Brunton described Burial 600 as a "[h]ole with a few sherds, probably a grave"; Burial 700 as a "[c]ircular grave, 95 cms. deep, empty"; Burial 800 as "[t]en completely robbed oval graves, probably Badarian"; and Burial 1100 as "[t]wo pieces of rope matting, presumably from a Badarian grave" (Brunton 1937: 37). Burials 818, 819 and 1005

at Mostagedda were also omitted from the dataset. The single pot with the elderly male in Burial 818 was not identified; no other information was given. The only other numbered grave in this series is the unregistered tomb, Burial 819. However, since two locations on the map of 'Khawaled to Mostagedda' were labelled "800", this appears to represent two isolated graves rather than a cemetery. Burial 1005 is another isolated grave, discovered north of the village of Khawaled (Brunton 1937: 37).

Furthermore, because the primary purpose of this statistical analysis is to determine whether individual grave offerings were distributed at random among burials that were categorized by Brunton as Badarian, tombs that he considered of questionable cultural status were not included in the dataset. For this reason, Burials 5421, 5436 and 5437 at Badari North [Cemetery 5300- 5400] were omitted. A "Predynastic" or Amratian pot was the only item found in 5421; a "Predynastic" or Amratian pot was discovered in association with three "Badarian" pots in Burial 5436; and the pot in 5437 was described by Brunton as "hardly...Badarian" (Brunton and Caton Thompson 1928: 12, Plate VII). Other graves excluded for the same reason are Burial 1994 at Hemamieh (Brunton and Caton Thompson 1928: 44, Plate XXXI), and the Burials 3507 and 3920 at Badari (Brunton and Caton Thompson 1928: 50, 52).

In addition to the statistical tests that were performed on raw counts of individual grave goods, cross-tabulations were conducted to determine whether or not significant relationships existed between the presence or absence of certain classes of burial offering and either the age or sex of a grave occupant, or the condition of a particular grave. Lastly, wealth indices were computed for each cemetery. These were determined from averages of the "total goods value" for individual cemeteries. Each wealth index [W], was calculated as:

$$W = \frac{1}{N}\sum_{i=1}^{N} V_i$$

where V_i is the total value of burial goods in the ith grave and N is the number of graves in the particular sample being analysed. For each i, V_i was calculated from the formula

$$V_i = \sum_{k=1}^{m} n_k v_k$$

where m is the number of types or classes of burial objects in a grave, n_k is the number of grave goods of type k, and v_k is the value of a grave good of type k. Because some items were characterized as "luxury goods" in terms of the place of their discovery relative to their source of origin, their relative scarcity, and the amount of effort expended on their manufacture in terms of craftsmanship, they were given higher "values" than pots which were all assigned a value of one. The "values" of individual luxury goods were estimated by weighting the items as follows: thick copper discs [200]; copper cylinders and beads [100]; ivory carvings [150]; ivory bracelets, spoons, combs and vases [100]; palettes [50]; bone carvings [50]; ivory beads, fish hooks, "wands", rings and pins [15]; carnelian [25]; turquoise [10]; jasper [15]; alabaster and malachite [5]. Since the "values" of semi-precious stones were based on the scarcity of the object as well as the relative hardness of the stone and hence on the amount of effort that had to be expended in order to produce a finished product, a "hierarchy" of stones was devised. Thus, hard stones, such as carnelian and jasper, were rated more highly than 'soft' ones, like alabaster or soapstone. Weightings also reflect the known values of different classes of material in Dynastic and later time periods. Although it is possible that hippopotamus ivory was used in the manufacture of some Badarian burial offerings, Brunton stated that objects were fashioned from *elephant ivory* which "may have been local, but was more likely imported from the south" (Brunton and Caton Thompson 1928: 41). When data derived from either cross-tabulations involving the presence or absence of a particular class of burial offering, or from weighted counts of burial goods were used, it is recorded in the text. In all other cases, raw counts of *individual* grave goods were employed in statistical tests.

Information on sequence dating is given in Appendix H [Table H.2]. Petrie arranged the pottery he considered characteristic of the Badarian in accordance with his scheme of sequence dating. The pottery was fitted into the scheme between S.D. 21 and S.D. 30. Those graves that can be "dated" by this method will be examined in order to ascertain whether there was an increase or decrease in grave goods over time.

Chapter 4

The Badari cemeteries: data analysis

4.1 Descriptive statistics

A preliminary analysis of Brunton's observations from Badari revealed that 2955 grave goods were distributed among 262 burials in the seven cemeteries [Table 4.1]. Forty-two of these were children's burials; twenty-one were those of old individuals; sixty were those of women and ninety-three were those of men [Table 4.2]. It was further established that ninety-eight percent of the total burial goods at Badari occurred in three of the seven cemeteries, and the greatest percentage of burial equipment occurred in the graves at Badari West. Sixty-seven percent of the burial offerings occurred there [Table 4.3], whereas twenty-one percent of the burial goods were found at Badari North and ten percent at Badari South. All the burials at Badari Far-north and Badari East contained grave goods, but the percentage of burial goods in these tiny clusters of graves only accounted for 0.54 percent of the total in each case. Likewise, although only one burial at both Badari Mid-South and Badari Far-South lacked grave offerings, the percentage of burial goods at these locations was small. The five burials at Badari Mid-South contained a total of seven grave goods that represented 0.24 percent of the Badari total. At Badari Far-South there were also five burials; the thirteen burial goods in these graves represented 0.44

percent of the Badari total.

At Badari South, eighty-five percent of the graves contained grave goods [Table 4.6]. Eighty-one percent of those at Badari North and seventy-five percent of those at Badari West contained burial goods. Moreover, forty-one percent of these same graves at Badari North and twenty-seven percent of those at Badari West contained *one* burial object only, while only fourteen percent of the Badari South graves belonged in this category. In nearly all cases, this single object was more likely to be a rough pot than a luxury item. Similarily, eighteen percent of the Badari North graves and twenty-three percent of the Badari West burials were completely without grave goods while only eight percent of the graves at Badari South lacked burial artefacts [Table 4.6].

Seventy-seven percent [2,284] of the total number of burial offerings at Badari were luxury items. Fifty-five percent of all burial goods at Badari West were luxury goods and forty-three percent of these luxury items were discovered in two undisturbed graves. Descriptive statistics for grave goods from plundered, disturbed and undisturbed tombs in all the Badari cemeteries are given below in Table 4.1. Many of the categories contained in this table are *redundant*. For example, the number of burial items found in plundered graves [788] also includes those found in the plundered graves of adult males [145], adult females [77], children [154] and unknown grave occupants [408]. Old individuals from plundered tombs were excluded. The *total* number of grave goods [2955] are those found with children [856], adults [1587], old individuals [42] and unknown grave occupants [470].

Thirty-nine percent of the Badari graves had no pottery, but the largest percentage of it occurred at Badari North, and the least amount was found in graves at Badari Far-north and Mid-south [Table 4.3]. In those burials that did contain pottery, thirteen percent had the rough type; sixteen percent had the unpolished kind; and twenty-five percent had the rippled variety. Polished ware was found in thirteen percent of the burials. Six percent of the burials at Badari contained more than one variety of pottery.

A quantitative analysis of the Badari cemetery goods showed that the largest number of burial goods was located at Badari West. However, when the *values* of

grave goods were estimated by giving weighted scores to luxury items, it was found that the most prestigious objects occurred at Badari South, which registered a wealth index of sixty-one, the highest obtained for a Badarian cemetery. The wealth indices for the remaining cemeteries at Badari were thirty-six at Badari West, twenty-nine at Badari North, twenty-two at Badari East, twelve at Badari Mid-South, five at Badari Far-North, and three at Badari Far-South. The overall Badari wealth index was twenty-four [Table 4.6].

At Badari, the largest numbers of shells and beads were found at Badari West. One slate palette was recovered from Badari East and one was found at Badari Mid-south. Eight palettes were discovered at Badari West and six were found at Badari North while half that number was found at Badari South. Ivory artefacts were most numerous in the latter cemetery, where thirty-six of these objects were found in sixteen of the graves [Table 7.2].

In addition, sixty-seven percent of the total grave goods was located at Badari West, along with thirty-five percent of the total burials. Shells were found in twenty-three graves and pottery was found with fifty burials. Although the mean tomb size at this cemetery was only 0.97 square metres, seventy-one percent of the total luxury goods was recovered here [Table 4.3]: glazed steatite beads were taken from nineteen graves, slate palettes were discovered with eight burials and ivory artefacts were found in seven tombs. Twenty-five of these graves belonged to children, while thirty-five of the grave occupants were adult males and twenty-five were adult females [Table 4.2].

At Badari North, twenty-one percent of the total burial goods and twenty one percent of the total luxury goods were contained in tombs with a mean area of 1.34 square metres. At this cemetery, 616 grave goods, including 470 luxury items, were dispersed among ninety-three burials [Table 4.3]. Pottery occurred in fifty three graves and shells were found in fourteen. Glazed steatite beads were retrieved from thirteen burials. Slate palettes were found in six graves and ivory objects were discovered with twelve burials [Table 4.4]. Forty males, twenty-one females and a dozen children were discovered in these graves.

The nine burials at Badari East contained sixteen grave offerings or 0.54

percent of the total grave offerings in the Badari cemeteries. The single palette at this location and the ivory object at Badari Far-north each accounted for 0.03 percent of the luxury goods total. There were no luxury goods among the thirteen grave offerings found at Badari Far-south. At Badari Mid-south, 0.24 percent of the total grave goods and 0.08 percent of the total luxury goods were discovered in graves with a mean area of 0.72 square metres. These five tombs were among the smallest at Badari.

Table 4.1: Descriptive statistics for grave goods from Badarian burials in all seven cemeteries at Badari

	Mean per Grave	Standard Deviation	Total Number of Graves	Total Grave Goods
Number of grave goods:				
In all plundered graves	8.85	18.50	89	788
In all disturbed graves	3.82	8.26	22	84
In all undisturbed graves	15.20	65.59	131	1991
In all plundered graves of adult males	9.67	17.42	15	145
In all plundered graves of adult females	5.92	14.08	13	77
In all plundered graves of children	25.67	32.15	6	154
In all plundered graves: occupant unknown	7.56	17.59	54	408
In all disturbed graves of adult males	2.33	1.94	9	21
In all disturbed graves of adult females	1.88	1.89	8	15
In all disturbed graves of children	1.00	0.00	1	1
In all disturbed graves: occupant unknown	11.75	18.88	4	47
In all undisturbed graves of adult males	20.86	96.34	55	1147
In all undisturbed graves of adult females	6.92	19.91	25	173
In all undisturbed graves of children	21.69	37.66	29	629
In all undisturbed graves: occupant unknown	2.00	0.00	2	4
Found with children	20.38	34.63	42	856
Found with adults	11.84	62.87	134	1587
Found with old individuals	2.00	2.67	21	42
Found with unknown grave occupants	7.23	16.65	65	470
In all seven cemeteries	11.28	47.91	262	2955

Table 4.2: Descriptive statistics for grave occupants from Badarian burials near Badari

	Badari North		Badari Far-North	
	Number	**Percent**	**Number**	**Percent**
Age status of grave occupant: child	12	12.90	0	0.00
Age status of grave occupant: adult	52	55.91	2	66.67
Age status of grave occupant: old	9	9.68	0	0.00
Age status of grave occupant: unknown	20	21.51	1	33.33
TOTAL	93		3	
Grave occupants: male	40	43.01	1	33.33
Grave occupants: female	21	22.58	1	33.33
Grave occupants: sex unknown	32	34.41	1	33.33
TOTAL	93		3	
Grave condition: plundered	33	35.48	2	66.67
Grave condition: disturbed	5	5.38	0	0.00
Grave condition: undisturbed	54	58.07	1	33.33
Grave condition: unknown	1	1.08	0	0.00
TOTAL	93		3	

	Badari West		Badari East	
	Number	**Percent**	**Number**	**Percent**
Age status of grave occupant: child	25	26.88	1	11.11
Age status of grave occupant: adult	51	54.84	3	33.33
Age status of grave occupant: old	11	11.83	1	11.11
Age status of grave occupant: unknown	6	6.45	4	44.44
TOTAL	93		9	
Grave occupants: male	35	37.63	1	11.11
Grave occupants: female	25	26.88	3	33.33
Grave occupants: sex unknown	33	35.48	5	55.56
TOTAL	93		9	
Grave condition: plundered	5	5.38	4	44.44
Grave condition: disturbed	7	7.53	1	11.11
Grave condition: undisturbed	63	67.74	3	33.33
Grave condition: unknown	18	19.36	1	11.11
TOTAL	93		9	

Table 4.2 continued: Descriptive statistics for grave occupants from Badarian burials near Badari

	Badari South		Badari Mid-South	
	Number	Percent	Number	Percent
Age status of grave occupant: child	4	7.41	0	0.00
Age status of grave occupant: adult	18	33.33	5	100.00
Age status of grave Occupant: old	0	0.00	0	0.00
Age status of grave occupant: unknown	32	59.26	0	0.00
TOTAL	54		5	
Grave occupants: male	10	18.52	3	60.00
Grave occupants: female	8	14.82	2	40.00
Grave occupants: sex unknown	36	66.67	0	0.00
TOTAL	54		5	
Grave condition: plundered	44	81.48	1	20.00
Grave condition: disturbed	6	11.11	0	0.00
Grave condition: undisturbed	4	7.41	4	80.00
Grave condition: unknown	0	0.00	0	0.00
TOTAL	54		5	

	Badari Far-South	
	Number	Percent
Age status of grave occupant: child	0	0.00
Age status of grave occupant: adult	3	60.00
Age status of grave occupant: old	0	0.00
Age status of grave occupant: unknown	2	40.00
TOTAL	5	
Grave occupants: male	3	60.00
Grave occupants: female	0	0.00
Grave occupants: sex unknown	2	40.00
TOTAL	5	
Grave condition: plundered	0	0.00
Grave condition: disturbed	3	60.00
Grave condition: undisturbed	2	40.00
Grave condition: unknown	0	0.00
TOTAL	5	

Table 4.3: Burial goods from Badarian burials near Badari [Percentages are based on the total number of luxury goods (?284), shells (332), pottery (208), and grave goods (2955) at all seven Badari cemeteries]

	Badari North		**Badari Far-North**	
	Number	**Percent**	**Number**	**Percent**
Total luxury goods	470	20.58	1	0.04
Shells	37	11.14	10	3.01
Pottery	76	36 54	4	1.92
Total grave goods	616	20.85	16	0.54
	Badari West		**Badari East**	
	Number	**Percent**	**Number**	**Percent**
Total luxury goods	1624	71.10	1	0.04
Shells	252	75.90	0	0
Pottery	66	31.73	14	6.73
Total grave goods	1990	67.34	16	0.54
	Badari South		**Badari Mid-South**	
	Number	**Percent**	**Number**	**Percent**
Total luxury goods	186	8.14	2	0.08
Shells	33	9.94	0	0
Pottery	36	17.30	4	1.92
Total grave goods	297	10.05	7	0.24
	Badari Far-South			
	Number	**Percent**		
Total luxury goods	0	0		
Shells	0	0		
Pottery	8	3.85		
Total grave goods	13	0.44		

Table 4.4: Burial characteristics of Badarian burials near Badari

	Badari North		Badari Far-North	
	Number	**Percent**	**Number**	**Percent**
Total burials	93		3	
Burials with ivory	12	12.90	1	33.33
Burials with palettes	6	6.45	0	0
Burials with beads	13	13.98	0	0
Burials with shells	14	15.05	1	33.33
Burials with pottery	53	56.99	3	100.00
	Badari West		**Badari East**	
	Number	**Percent**	**Number**	**Percent**
Total burials	93		9	
Burials with ivory	7	7.53	0	0
Burials with palettes	8	7.53	1	11.11
Burials with beads	19	20.43	0	0
Burials with shells	23	24.73	0	0
Burials with pottery	50	53.76	9	100.00
	Badari South		**Badari Mid-South**	
	Number	**Percent**	**Number**	**Percent**
Total burials	54		5	
Burials with ivory	16	29.63	0	0
Burials with palettes	3	5.56	1	20.00
Burials with beads	14	25.93	1	20.00
Burials with shells	11	20.37	0	0
Burials with pottery	25	46.30	3	60.00

Table 4.5: Frequency distribution of total grave goods [2955] from all 262 Badarian burials near Badari

	Number	Percent
Graves with no burial goods	51	19.47
Graves with 1 item	90	34.35
Graves with 2 items	39	14.89
Graves with 3 items	14	5.34
Graves with 4 items	9	3.44
Graves with 5 items	7	2.67
Graves with 6 items	6	2.29
Graves with 7 items	3	1.15
Graves with 8 items	5	1.91
Graves with 9 items	1	0.38
Graves with 10 items	1	0.38
Graves with between 11 and 200 items	34	12.98
Graves with over 500 items	2	0.76
Total number of graves with burial goods	211	80.53

Table 4.6: Frequency distribution of grave goods from seven Badarian cemeteries near Badari

	Badari North		Badari Far-North	
	Number	**Percent**	**Number**	**Percent**
Graves with no burial goods	18	19.36	0	0.00
Graves with 1 burial good	41	44.09	1	33.33
Graves with 2 burial goods	13	13.98	1	33.33
Graves with between 3 and 10 burial goods	12	12.90	0	0.00
Graves with between 11 and 13 burial goods	-		1	33.33
Graves with between 11 and 115 burial goods	9	9.68		
Total number of graves with burial goods	75	80.63	3	100.00
Total number of graves	93		3	
Total number of burial goods	616		16	
Total goods value	2723		16	
Wealth index	29		5	

Table 4.6 continued: Frequency distribution of grave goods from seven Badarian cemeteries near Badari

	Badari West		Badari East	
	Number	Percent	Number	Percent
Graves with no burial goods	23	24.73	0	0.00
Graves with 1 burial good	27	29.03	5	55.56
Graves with 2 burial goods	12	12.90	2	22.22
Graves with between 3 and 10 burial goods	13	13.98	2	22.22
Graves with between 11 and 511 burial goods	18	19.35	-	-
Total number of Graves with burial goods	70	75.25	9	100.00
Total number of graves	93		9	
Total number of burial goods	1990		16	
Total goods value	3323		196	
Wealth index	36		22	

	Badari South		Badari Mid-South	
	Number	Percent	Number	Percent
Graves with no burial goods	8	14.82	1	20.00
Graves with 1 burial good	11	25.93	1	20.00
Graves with 2 burial goods	7	12.97	3	60.00
Graves with between 3 and 10 burial goods	17	31.48	-	-
Graves with between 11 and 55 burial goods	8	14.82	-	-
Total number of graves with burial goods	46	85.19	1	80.00
Total number of graves	51		5	
Total number of burial goods	297		7	
Total goods value	3288		60	
Wealth index	61		12	

Table 4.6 continued: Frequency distribution of grave goods from seven Badarian cemeteries near Badari

	Badari Far-South	
	Number	**Percent**
Graves with no burial goods	1	20.00
Graves with 1 burial good	1	20.00
Graves with 2 burial goods	1	20.00
Graves with between 3 and 10 burial goods	2	40.00
Total number of graves with burial goods	4	80.00
Total number of graves	5	
Total number of burial goods	13	
Total goods value	13	
Wealth index	3	

Table 4.7: Grave areas, in sq. metres, of Badarian burials near Badari

	Badari North	**Badari Far-North**
Maximum	3.51	4.12
Minimum	0.61	0.62
Mean	1.34	2.10
	Badari West	**Badari East**
Maximum	3.25	2.96
Minimum	0.19	0.40
Mean	0.97	1.03
	Badari South	**Badari Mid-South**
Maximum	4.31	1.07
Minimum	0.28	0.40
Mean	02.05	0.72
	Badari Far-South	
Maximum	1.60	
Minimum	0.57	
Mean	1.01	

4.2 Test for association

Since an initial frequency distribution of grave areas within all seven cemeteries indicated an unexpected variation in the sizes of graves from 0.19 to 1.31 square metres [Table 4.7], and since it was immediately apparent that there was great diversity in the nature and number of grave goods present in the various tombs, the cemetery data were further examined in an attempt to establish whether there were any significant differences between cemeteries or within cemeteries in terms of the number and type of burial goods recovered or in the extent of plundering reported.

The data were also analysed to determine whether there was any association between the occurrence of burial goods and the age or sex of the grave occupants. Cross-tabulation was employed in each case, and the findings summarized in contingency tables 4.8 to 4.12. In every instance, the null hypothesis states that there is no association between the set of variables under study. The null hypothesis could be rejected in the first, second and fourth situations. The data indicate that there is some association between grave goods and grave area [Table 4.8], as well as between grave goods and age status [Table 4.9]. However, the data do not indicate any association between grave goods and the sex of a grave occupant [Table 4.10]. There is also an association between grave goods and grave condition [Table 4.11, Table 4.12]. The data also show that, although larger graves tend to have more grave goods [Table 4.8], the value of the contingency coefficient indicates that this relationship is not very strong.

The positive association between grave goods and age status [Table 4.9] is that more than the expected number of children seem to have large numbers of burial goods, while more than the expected number of adults seem to have no burial goods. In other words, children appear to have more grave offerings than adults. Likewise, the positive association between grave goods and grave condition [Table 4.11, Table 4.12] is that far more than the expected number of graves with *more* than three burial goods tend to be plundered while less than expected are undisturbed.

Cross-tabulations were also employed to determine whether relationships existed between the *presence* of beads, slate palettes, or ivory and either the sex or

DF:	6
Total Chi-square:	18.186
p:	0.0058
Contingency coefficient:	0.279

	Cell frequencies	Small	Medium	Large	Totals
Goods =0	Observed	23	7	3	33
	Expected	15.2	11.05	6.75	33
Goods =1	Observed	35	29	10	74
	Expected	31.07	24.78	15.14	74
Goods =2	Observed	15	11	6	32
	Expected	14.73	10.72	6.55	32
Goods ≥3	Observed	26	25	25	76
	Expected	35	25.45	15.55	76

Table 4.8: Badari cemeteries: grave goods and grave area

age of a grave occupant or the condition of a particular grave. The data indicate that there is an association between the presence of beads and the age status of grave occupants, but no relationship between the presence of beads and grave condition or the sex of grave occupants was demonstrated. The positive association between beads and age status resulted from the contingency table evidence that twice [fifteen] the expected [7.25] number of children's graves contained beads. No relationship between the presence of palettes and either grave condition or the age or sex of Badari grave occupants was found, and the data did not indicate a relationship between the presence of ivory artefacts and either the age or sex of a grave occupant. The data also show that there *is* an association between the presence of ivory and grave condition. Twice [twenty-seven] the expected [13.21] number of graves that contained ivory were plundered

DF:	6
Total Chi-square:	18.923
p=0.0043	
Contingency coefficient:	0.296

	Cell frequencies	Child	Adult	Old	Totals
Goods =0	Observed	4	41	5	50
	Expected	10.66	31.01	5.33	50
Goods =1	Observed	11	50	7	71
	Expected	15.14	18.29	7.57	71
Goods =2	Observed	3	17	4	24
	Expected	5 12	16 32	2.56	21
Goods ≥ 3	Observed	21	26	5	52
	Expected	11 09	35.37	5.54	52

Table 4.9: Badari cemeteries: grave goods and age status

DF:	3
Total Chi-square:	0.397
p:	0.9409
Contingency coefficient:	0.051

	Cell frequencies	Male	Female	Totals
Goods =0	Observed	27	19	46
	Expected	27 96	18.04	46
Goods =1	Observed	31	22	56
	Expected	34.01	21.96	56
Goods =2	Observed	14	7	21
	Expected	12 76	8 24	21
Goods ≥ 3	Observed	18	12	30
	Expected	18.24	11.76	30

Table 4.10: Badari cemeteries. grave goods and sex of grave occupant

DF:	6
Total Chi-square:	18.456
p:	0.0052
Contingency coefficient:	0.266

	Cell frequencies	Plundered	Undisturbed	Disturbed	Totals
Goods =0	Observed	9	32	1	42
	Expected	15.45	22.74	3.82	42
Goods =1	Observed	28	49	11	88
	Expected	32.36	47.64	8	88
Goods =2	Observed	13	21	3	37
	Expected	13.61	20.03	3.36	37
Goods ≥ 3	Observed	39	29	7	75
	Expected	27.58	40.6	6 82	75

Table 4.11: Badari cemeteries: grave goods and grave condition

DF:	3
Total Chi-square:	15.643
p:	0.0013
Contingency coefficient:	0.246

	Cell frequencies	Plundered	Undisturbed	Totals
Goods =0	Observed	10	32	42
	Expected	19.26	22.74	42
Goods =1	Observed	39	49	88
	Expected	40.36	47.64	88
Goods =2	Observed	16	21	37
	Expected	16.97	20.03	37
Goods ≥ 3	Observed	46	29	75
	Expected	34.4	40.6	75

Table 4.12: Badari cemeteries: grave goods and grave condition (plundered and undisturbed)

4.3 Test for randomness

The revelation that there *was* some association between the number of burial goods present in a particular grave and the size of the grave as well as its condition and the age of its occupant was followed by a test designed to determine the characteristics of burial goods distribution in the Badari cemeteries. It was suggested that by adopting the hypothesis that the grave goods were dispersed at random, the apportionment of grave goods would have a multinomial distribution [see Appendix A], which refers to the statistical model that describes the distribution of grave goods throughout the graves under the assumption of randomness. [The term "distributed at random" is used in this thesis to mean that in a sample of f grave goods that are distributed among n graves, any *individual* grave good has an equal chance of occurring in any individual grave and the probability of this occurrence is $1/n$ for every individual grave good. In other words, every individual burial good has the same probability of occurring in every grave. The term "distributed at random" is also employed to mean that the f grave goods are independently distributed] Thus, the placement of any individual grave good in a particular grave has no bearing on the placement of any other grave good in a grave (W. J. Anderson 1988 personal communication).

It was found that the hypothesis that grave goods were distributed at random could be rejected for grave good dispersal among undisturbed children's graves as well as those of adult males and females in all seven Badari cemeteries [Appendix B and Appendix C: 1-3]. Similar results were obtained for the grave good distribution in the undisturbed graves of children, adult females and adult males at Badari West [Appendix D: 1-3]. At Badari North, the hypothesis that burials goods were distributed uniformly could also be rejected for grave good dispersal among undisturbed, children's graves. However, it could *not* be rejected for burial offering distribution in the undisturbed graves of adult males and females. A summary of these tests is given in Appendix D [4-6]. Furthermore, it was found that at Badari West, the hypothesis could be rejected for grave good dispersal among undisturbed subadult graves as well as among adult male and female graves containing ten or less than ten burial offer

ings For adult male undisturbed graves at this same cemetery that contained ten or less than ten burial offerings, the hypothesis that the grave goods were uniformly distributed could *not* be rejected. These tests are summarized in Appendix G.

Chapter 5

The Mostagedda cemeteries: data analysis

5.1 Descriptive statistics

The five Badarian cemeteries at Mostagedda contained 369 graves from which 3,467 burial offerings were recovered. Old individuals were found in thirteen graves and subadults were discovered in 124. Adults occupied 180 of these graves. In the remaining fifty-two graves, the grave occupant was unknown. Half of the burial goods occurred at Mostagedda West, twenty-three percent at Mostagedda East, ten percent at Mostagedda Far-North, seven percent at Mostagedda North, and the remaining ten percent at Mostagedda South. Fifty-three percent of the Mostagedda graves were undisturbed. In these ninety-eight graves, burial goods ranged from zero to 510 in Burial 592 at Mostagedda West. The mean number of grave goods in these undisturbed graves was 12.36. The undisturbed graves of adult females contained the highest mean number [14.21] of burial offerings. In undisturbed children's graves, the mean number of burial goods was 12.99, and the mean number found in the undisturbed graves of adult males was 13.58. However, when Burial 592 was excluded, the mean number of grave goods found in the undisturbed graves of adult males fell to 4.39. Descriptive statistics for grave goods from the Mostagedda cemeteries are given in Tables 5.1-5.5. Grave areas are recorded in Table 5.6.

Forty-five percent [1,564] of the total burial offerings [3,467] at Mostagedda were luxury artefacts. Fifty-one percent of these luxury goods occurred at Mostagedda West, thirty-five percent at Mostagedda East, nine percent at Mostagedda North, four percent at Mostagedda Far-North, and one percent [seventeen objects] at Mostagedda South.

Forty-five percent of the Mostagedda graves contained no pottery. Rough ware was found in twenty percent of the burials, while fifteen percent contained unpolished pottery. Rippled pottery occurred in nineteen percent and polished ware was found in eight percent of the burials.

Whereas the quantitative analysis of Mostagedda burial offerings established that graves at Mostagedda West contained the largest number of burial offerings as well as the largest number of luxury goods, a qualitative analysis of the luxury goods suggested that the most valuable luxury items were located at Mostagedda Far North At this cemetery, a wealth index of twenty-seven was obtained The wealth indices at the remaining cemeteries were as follows: twenty-three at Mostagedda East, twenty-one at Mostagedda South as well as at Mostagedda West and thirteen at Mostagedda North. The average Mostagedda wealth index was twenty-one [Table 5.1].

Table 5.1: Descriptive statistics for grave goods from Badarian burials in all five cemeteries at Mostagedda

	Mean per Grave	Standard Deviation	Total Number of graves	Total Grave Goods
Number of grave goods:				
In all plundered graves	7.33	18.57	98	718
In all disturbed graves	1.73	11.28	51	211
In all undisturbed graves	12.76	11.25	196	2122
In all undisturbed graves: 592 omitted	9.81	26.18	195	1912
In all plundered graves of adult males	5.23	11.02	26	136
In all plundered graves of adult females	7.71	16.53	21	162
In all plundered graves of children	13.41	33.91	17	228
In all plundered graves: occupant unknown	6.45	11.05	29	187
In all disturbed graves of adult males	3.11	1.35	16	55
In all disturbed graves of adult females	9.06	18.52	17	154
In all disturbed graves of children	1.91	2.84	11	21
In all disturbed graves: occupant unknown	2.00	1.41	4	8
In all undisturbed graves of adult males	13.58	69.65	55	747
In all undisturbed graves of adult males:592 omitted	1.39	11.39	54	247
In all undisturbed graves of adult females	14.21	30.19	38	540
In all undisturbed graves of children	12.99	31.38	86	1117
In all undisturbed graves: occupant unknown	1.00		1	1
Found with children	11.65	29.67	121	1133
Found with adults	9.98	11.84	180	1797
Found with old individuals	1.23	1.01	13	16
Found with unknown grave occupants: age unknown	4.25	10.78	52	221
In all five cemeteries	9.40	31.17	369	3467

Table 5.2: Descriptive statistics for grave occupants from Badarian burials near Mostagedda

	Mostagedda North		Mostagedda East	
	Number	Percent	Number	Percent
Age status of grave occupant: child	10	32.26	40	37.01
Age status of grave Occupant: adult	14	45.16	55	50.93
Age status of grave Occupant: old	1	3.23	2	1.85
Age status of grave Occupant: unknown	6	19.35	11	10.19
TOTAL	31		108	
Grave occupants: male	10	32.26	35	32.11
Grave occupants, female	5	16.13	20	18.52
Grave occupants, sex unknown	16	51.61	53	49.07
TOTAL	31		108	
Grave condition: plundered	7	22.58	21	19.11
Grave condition: disturbed	3	9.68	18	16.68
Grave condition: undisturbed	16	51.61	66	61.11
Grave condition, unknown	5	16.13	3	2.78
TOTAL	31		108	

	Mostagedda South		Mostagedda West	
	Number	Percent	Number	Percent
Age status of grave occupant: child	15	31.88	52	38.81
Age status of grave occupant: adult	17	39.51	62	16.27
Age status of grave occupant, old	5	11.63	5	3.73
Age status of grave occupant: unknown	6	13.95	15	11.19
TOTAL	13		131	
Grave occupants: male	12	27.91	36	26.87
Grave occupants, female	10	23.26	33	21.63
Grave occupants: sex unknown	21	18.84	65	18.51
TOTAL	13		131	
Grave condition, plundered	5	11.63	30	22.39
Grave condition, disturbed	6	13.95	17	12.69
Grave condition, undisturbed	29	71	71	55.22
Grave condition, unknown	3	6.98	13	9.70
TOTAL	13		131	

Table 5.2 continued: Descriptive statistics for grave occupants from Badarian burials near Mostagedda

	Mostagedda Far-North	
	Number	Percent
Age status of grave occupant: child	7	13.21
Age status of grave occupant: adult	32	60.37
Age status of grave occupant: old	0	0
Age status of grave occupant: unknown	14	26.41
TOTAL	53	
Grave occupants: male	17	32.07
Grave occupants: female	18	33.96
Grave occupants: sex unknown	18	33.96
TOTAL	53	
Grave condition: plundered	35	66.03
Grave condition: disturbed	7	13.21
Grave condition: undisturbed	11	20.75
Grave condition: unknown	0	0
TOTAL	53	

Table 5.3. Frequency distribution of total grave goods [3467] from all 369 Badarian burials near Mostagedda

	Number	Percent
Graves with no burial goods	110	29.81
Graves with 1 item	115	31.17
Graves with 2 items	19	13.28
Graves with 3 items	15	4.07
Graves with 4 items	14	3.79
Graves with 5 items	5	1.36
Graves with 6 items	3	0.82
Graves with 7 items	3	0.82
Graves with 8 items	3	0.82
Graves with 9 items	4	1.08
Graves with 10 items	3	0.82
Graves with between 11 and 200 items	44	11.92
Graves with over 500 items	1	0.27
Total number of graves with burial goods	259	70.19

Table 5.4: Frequency distribution of grave goods from five Badarian cemeteries near Mostagedda

	Mostagedda North		Mostagedda East	
	Number	**Percent**	**Number**	**Percent**
Graves with no burial goods	9	29.03	37	31.26
Graves with 1 burial good	11	35.19	30	27.78
Graves with 2 burial goods	5	16.13	15	13.89
Graves with between 3 and 10 burial goods	3	9.68	60	55.56
Graves with over 10 burial goods	3	9.68		
Total number of graves with burial goods	22	70.97	71	65.74
Total number of graves	31		108	
Total number of burial goods	257		799	
Total goods value	101		2135	
Wealth index	13		23	
	Mostagedda South		**Mostagedda West**	
	Number	**Percent**	**Number**	**Percent**
Graves with no burial goods	6	13.95	15	33.58
Graves with 1 burial good	17	39.54	42	31.34
Graves with 2 burial goods			12	8.96
Graves with between 1 and 10 burial goods	33	76.74	70	52.24
Total number of graves with burial goods	37	86.04	89	66.42
Total number of graves	43		134	
Total number of burial goods	346		1736	
Total goods value	893		2638	
Wealth index	21		21	

Table 5.4 continued: Frequency distribution of grave goods from five Badarian cemeteries near Mostagedda

	Mostagedda Far-North	
	Number	**Percent**
Graves with no burial goods	13	21.53
Graves with 1 burial good	15	28.30
Graves with 2 burial goods	6	11.32
Graves with between 3 and 10 burial goods	11	20.76
Graves with over 10 burial goods	8	15.10
Total number of graves with burial goods	40	75.48
Total number of graves	53	
Total number of burial goods	329	
Total goods value	1133	
Wealth index	27	

Table 5.5: Descriptive statistics for grave goods from Badarian burials near Mostagedda

	Mostagedda North		Mostagedda East	
	Mean	Standard Deviation	Mean	Standard Deviation
Grave goods found with children	18.20	50.64	9.70	28.82
Grave goods found with adults	1.36	1.39	6.96	17.31
Grave goods found with the old	1.00		2.00	0
Grave goods found with males	1.10	1.51	4.91	11.72
Grave goods found with females	1.20	1.10	10.70	20.95
Grave goods in plundered graves	8.86	18.64	2.00	2.17
Grave goods in disturbed graves	1.33	0.58	6.22	14.79
Grave goods in undisturbed graves	11.91	10.12	9.59	26.12
	Mostagedda South		Mostagedda West	
	Mean	Standard Deviation	Mean	Standard Deviation
Grave goods found with children	15.10	36.00	11.92	25.20
Grave goods found with adults	5.88	13.82	17.17	67.98
Grave goods found with the old	1.20	0.84	1.00	1.11
Grave goods found with males	5.75	15.54	17.22	85.12
Grave goods found with females	3.70	7.18	13.70	30.49
Grave goods in plundered graves	12.40	23.86	11.10	27.86
Grave goods in disturbed graves	1.83	1.17	5.12	12.22
Grave goods in undisturbed graves	9.31	26.57	16.81	62.67
Grave goods in undisturbed graves. Burial 592 omitted from the dataset			10.06	23.62

Table 5.5 continued: Descriptive statistics for grave goods from Badarian burials near Mostagedda

	Mostagedda Far-North	
	Mean	**Standard Deviation**
Grave goods found with children	1.71	1.25
Grave goods found with adults	7.19	14.96
Grave goods found with the old	0	0
Grave goods found with males	4.71	1.98
Grave goods found with females	8.83	19.48
Grave goods in plundered graves	6.26	12.43
Grave goods in disturbed graves	3.86	1.41
Grave goods in undisturbed graves	7.55	20.85

Table 5.6. Grave areas, in sq. metres, of Badarian burials near Mostagedda

	Mostagedda North	**Mostagedda East**
Maximum	1.78	2.10
Minimum	0.25	0.21
Mean	0.99	0.85
	Mostagedda South	**Mostagedda West**
Maximum	2.10	2.55
Minimum	0.11	0.15
Mean	1.00	1.02
	Mostagedda Far-North	
Maximum	3.03	
Minimum	0.32	
Mean	1.18	

5.2 Test for association

Grave areas at Mostagedda ranged from 0.14 square metres at Mostagedda South to 3.03 square metres at Mostagedda Far-North [Table 5.6]. The average mean grave area for all the Mostagedda cemeteries was 1.04 square metres. The smallest grave was found in the cemetery with the smallest number of luxury goods, although the smallest mean grave area [0.85 square metres] was found at Mostagedda East, the cemetery that contained thirty-five percent of the luxury offerings. The largest percentage of plundered burials [sixty-six percent] occurred at Mostagedda Far North [Table 5.2], and the largest mean grave area [1.48 square metres] was also recorded for this cemetery. However, the largest mean number of burial goods was found in children's tombs at Mostagedda North, and the next largest mean number of grave goods was found in male burials at Mostagedda West [Table 5.5]. In order to discover whether there was any significant association between the occurrence of grave offerings and grave sizes, grave condition, age, or sex of the grave occupants, cross tabulation was carried out for each set of variables and the results presented in contingency tables [5.7-5.11]. The data do not indicate any association between grave goods and grave area [Table 5.7], or between grave goods and age status [Table 5.8] or between grave goods and the sex of the grave occupants [Table 5.9] or between grave goods and grave condition [Table 5.10, Table 5.11].

To determine whether significant relationships existed between the *presence* of beads, slate palettes, or ivory, and either the sex or age of a grave occupant, or the condition of a particular grave, cross-tabulations were employed. The data did not demonstrate a relationship between any of the variables tested.

DF:	6
Total Chi-square:	9.065
p:	0.1699
Contingency coefficient:	0.192

	Cell frequencies	Small	Medium	Large	Totals
Goods =0	Observed	19	11	0	30
	Expected	16.14	11.44	2.42	30
Goods =1	Observed	47	34	4	85
	Expected	45.74	32.42	6.84	85
Goods =2	Observed	18	18	4	40
	Expected	21.53	15.25	3.22	40
Goods ≥ 3	Observed	43	27	11	81
	Expected	43.59	30.89	6.52	81

Table 5.7: Mostagedda cemeteries: grave goods and grave area

DF:	6
Total Chi-square:	11.705
p.	0.0689
Contingency coefficient:	0.189

	Cell frequencies	Child	Adult	Old	Totals
Goods =0	Observed	45	51	1	103
	Expected	10.29	58.49	1.22	103
Goods =1	Observed	31	56	3	90
	Expected	35.21	51.10	3.69	90
Goods =2	Observed	12	24	5	41
	Expected	16.01	23.28	1.68	41
Goods ≥ 3	Observed	36	46	1	83
	Expected	32.47	47.13	3.40	83

Table 5.8: Mostagedda cemeteries: grave goods and age status

DF:	3
Total Chi-square:	1 324
p:	0.7235
Contingency coefficient.	0 082

	Cell frequencies	Male	Female	Totals
Goods =0	Observed	31	23	57
	Expected	31 99	25 01	57
Goods =1	Observed	33	28	61
	Expected	34 23	26 77	61
Goods =2	Observed	18	11	29
	Expected	16.28	12 72	29
Goods $\geq$ 3	Observed	25	24	49
	Expected	27 50	21 50	19

Table 5.9: Mostagedda cemeteries: grave goods and sex of grave occupant

DF:	6
Total Chi-square:	3.011
p:	0.8075
Contingency coefficient.	0.093

	Cell frequencies	Plundered	Undisturbed	Disturbed	Totals
Goods =0	Observed	26	61	14	101
	Expected	28 69	57 38	14.93	101
Goods =1	Observed	27	64	16	107
	Expected	30.39	60 79	15.82	107
Goods =2	Observed	14	24	8	46
	Expected	13.07	26 13	6 8	46
Goods $\geq$ 3	Observed	31	47	13	91
	Expected	25.85	51 70	13.15	91

Table 5.10: Mostagedda cemeteries: grave goods and grave condition

DF:	3
Total Chi-square:	2.307
p:	0.5111
Contingency coefficient:	0.082

	Cell frequencies	Plundered	Undisturbed	Totals
Goods =0	Observed	40	60	100
	Expected	43.19	56.81	100
Goods =1	Observed	43	65	108
	Expected	46.64	61.36	108
Goods =2	Observed	22	24	46
	Expected	19.87	26.13	46
Goods $\geq$ 3	Observed	44	47	91
	Expected	39.3	51.7	91

Table 5.11: Mostagedda cemeteries: grave goods and grave condition (plundered and undisturbed)

5.3 Test for randomness

A Goodness of Fit test, designed to identify whether or not the grave goods in the Badarian graves at Mostagedda were uniformly distributed, was applied to the data. Uniformly distributed or distributed at random means that during placement, every grave good has the same probability of occurring in every grave. The results indicate that burial goods in the undisturbed graves of adult males were *no* distributed in a random manner. Likewise, grave goods in the undisturbed graves of adult females and in the undisturbed graves of children were *not* randomly dispersed. Results of these tests are summarized in Appendix C [4-6]. The results of Goodness of Fit tests on undisturbed children's graves as well as those of adult males and females at Mostagedda West, Mostagedda East and Mostagedda Far-North are summarized in Appendix E [1-12]. At Mostagedda North as well as at Mostagedda Far-North, the test could not be performed for the undisturbed graves of adult males because the expected cell frequencies of burial goods contained in the graves were all less than five. For identical reasons, the test could not be carried out on the undisturbed graves of adult females at Mostagedda North or on undisturbed children's burials at Mostagedda Far-North. For each of the other cemeteries, it was discovered that the hypothesis that grave goods were distributed at random could be rejected for grave good dispersal in the undisturbed graves of children as well as those of adult males and females.

It was also found that at Mostagedda West, the hypothesis could be rejected for grave good dispersal among undisturbed children's burials as well as among adult female burials containing not more than ten grave offerings. However, for adult males' undisturbed graves that contained not more than ten grave goods, it was *not* possible to reject the hypothesis that the grave goods were distributed at random [Appendix G: 4-6].

Chapter 6

The Matmar cemeteries: data analysis

6.1 Descriptive statistics

At Matmar, 1071 grave goods were obtained from ninety-four Badarian graves in six cemeteries. More than half of these burial goods [693] were found in forty three undisturbed graves. Plundered graves yielded 351 items, and 231 of these objects were obtained from the plundered graves of five adult males. Only eleven items were found in the nine plundered graves of adult females, while seven plundered children's graves contained ninety artefacts [Table 6.1]. Seventy-six percent of the Matmar graves contained burial goods, but thirty-six percent of these contained only one burial item. Fifteen percent of the graves contained between eleven and 200 burial artefacts and a single grave at Matmar West yielded 213 items [Table 6.3].

In the fourteen graves at Matmar West, the highest mean number [65.60] of burial goods was found in the graves of five adult males. The mean number of items recovered from the five children's graves was 13.80, and from three females' graves, it was 0.67. The four plundered graves at this cemetery were those of two adult males and two children. Among those burials at Matmar East for which the age and sex of the grave occupant could be determined, the highest mean number [23.11] of burial goods occurred in children's graves, and the next highest was found

in the graves of females An average of 1.13 burial goods was found in the graves of males [Table 6.4]. Eighty-seven percent of the total burial offerings at Matmar were found these two cemeteries, and fifty percent percent of these occurred in the tombs at Matmar East. Thirty-seven percent of the tomb goods occurred at Matmar West, seven percent at Matmar North; one percent at Matmar Far-South and 0.1 percent at Matmar Far-North.

Wealth indices indicated, however, that the most valuable tomb goods were located in two tombs at Matmar North, and also that the wealthiest graves were those at Matmar West which scored a wealth index of forty-five. The next richest cemetery was Matmar East with a wealth index of thirty-eight [Table 6.5] Nevertheless, in all of these cemeteries, the occurrence of extremely large standard deviations suggests that in spite of the existence of a few wealthy burials, the majority of tombs belonged to individuals of low economic status [Table 6.1].

There were no luxury goods at Matmar Far-North, but in the two burials that constituted the cemetery at Matmar North, forty-three of the fifty grave goods were luxury items. Of the twenty-nine luxury goods at Matmar South, twenty eight were beads; there was one palette. Of the seven luxury items at Matmar Far South, three were ivory and four were beads. The luxury goods at Matmar East consisted of two ivory objects and 188 beads At Matmar West, 302 of 400 tomb goods were luxury items. These consisted of one palette and 301 beads The small number of graves [fourteen] in this cemetery probably contributed heavily to the large wealth index [forty-five] obtained

No pottery was found in thirty-seven percent of the burials at Matmar Twenty-seven percent and twenty percent of these graves contained rough and unpolished pottery respectively Rippled pottery was recovered from eleven percent of the tombs; polished pottery occurred in ten percent of the burials

Table 6.1: Descriptive statistics for grave goods from Badarian burials in all six cemeteries at Matmar

	Mean per Grave	Standard Deviation	Total Number of graves	Total grave Goods
Number of grave goods:				
In all plundered graves	13.50	42.03	26	351
In all disturbed graves	1.43	1.13	7	10
In all undisturbed graves	16.12	31.98	13	693
In all plundered graves of adult males	46.20	93.41	5	231
In all plundered graves of adult females	1.22	0.83	9	11
In all plundered graves of children	12.86	18.12	7	90
In all plundered graves, occupant unknown	3.80	1.66	5	19
In all disturbed graves of adult males	1.43	1.13	7	10
In all disturbed graves of adult females	0	0	0	0
In all disturbed graves of children	0	0	0	0
In all disturbed graves, occupant unknown	0	0	0	0
In all undisturbed graves of adult males	1.33	0.82	6	8
In all undisturbed graves of adult females	24.00	56.30	8	192
In all undisturbed graves of children	18.59	31.61	17	316
In all undisturbed graves: occupant unknown	46.00	-	1	46
Found with children	13.16	25.21	32	121
Found with adults	10.30	39.70	41	453
Found with old individuals	13.00	33.14	10	130
Found with grave occupants: age unknown	8.38	15.66	8	67
In all six cemeteries	11.39	32.71	91	1071

Table 6.2: Descriptive statistics for grave occupants from Badarian burials near Matmar

	Matmar North		Matmar Far-North	
	Number	Percent	Number	Percent
Age status of grave occupant: child	0	0	1	50.00
Age status of grave occupant: adult	1	50.00	1	50.00
Age status of grave occupant: old	0	0	0	0
Age status of grave occupant: unknown	1	50.00	1	50.00
TOTAL	2		2	
Grave occupants: male	0	0	0	0
Grave occupants: female	1	50.00	1	50.00
Grave occupants: sex unknown	1	50.00	1	50.00
TOTAL	2		2	
Grave condition: plundered	0	0	0	0
Grave condition: disturbed	0	0	0	0
Grave condition: undisturbed	2	100.00	2	100.00
Grave condition: unknown	0	0	0	0
TOTAL	2		2	

	Matmar West		Matmar East	
	Number	Percent	Number	Percent
Age status of grave occupant: child	5	35.71	11	15.16
Age status of grave occupant: adult	5	35.71	11	35.19
Age status of grave occupant: old	4	28.57	6	19.36
Age status of grave occupant: unknown	0	0	0	0
TOTAL	14		31	
Grave occupants: male	5	35.71	8	25.81
Grave occupants: female	3	21.13	9	29.03
Grave occupants: sex unknown	6	42.86	14	45.16
TOTAL	14		31	
Grave condition: plundered	4	28.57	3	9.68
Grave condition: disturbed	0	0	3	9.68
Grave condition: undisturbed	9	71.43	24	77.42
Grave condition: unknown	0	0	1	3.23
TOTAL	14		31	

Table 6.2 continued: Descriptive statistics for grave occupants from Badarian burials near Matmar

	Matmar South		Matmar Far-South	
	Number	**Percent**	**Number**	**Percent**
Age status of grave occupant: child	12	29.27	0	0
Age status of grave occupant: adult	26	63.41	0	0
Age status of grave occupant: old	0	0	0	0
Age status of grave occupant: unknown	3	7.32	4	100.00
TOTAL	41		4	
Grave occupants: male	11	26.83	0	0
Grave occupants: female	15	36.66	0	0
Grave occupants: sex unknown	15	36.66	4	100.00
TOTAL	41		4	
Grave condition: plundered	17	41.46	2	50.00
Grave condition: disturbed	4	9.76	0	0
Grave condition: undisturbed	5	12.20	0	0
Grave condition: unknown	15	36.66	2	50.00
TOTAL	41		4	

Table 6.3: Frequency distribution of total grave goods [1071] from all 91 Badarian burials near Matmar

	Number	Percent
Graves with no burial goods	23	21 17
Graves with 1 item	34	36 17
Graves with 2 items	10	10.61
Graves with 3 items	2	2.13
Graves with 4 items	4	1 26
Graves with 5 items	2	2.13
Graves with 6 items	3	3 19
Graves with 7 items	0	0 00
Graves with 8 items	0	0.00
Graves with 9 items	1	1 06
Graves with 10 items	0	0 00
Graves with between 11 and 200 items	14	14 89
Graves with over 200 items	1	1.06
Total number of graves with burial goods	71	75 53

Table 6.4. Descriptive statistics for grave goods from Badarian burials near Matmar

	Matmar North		Matmar Far-North	
	Mean	Standard Deviation	Mean	Standard Deviation
Grave goods found with children	0	0	0	0
Grave goods found with adults	4	-	1.00	-
Grave goods found with the old	0	0	0	-
Grave goods found with males	0	0	-	-
Grave goods found with females	4	-	1	-
Grave goods found with occupant, sex unknown	46	-	0	-
Grave goods in plundered graves	0	0	-	-
Grave goods in disturbed graves	0	0	-	-
Grave goods in undisturbed graves	25.00	29.70	0.50	0.71

	Matmar West		Matmar East	
	Mean	Standard Deviation	Mean	Standard Deviation
Grave goods found with children	13.80	21.95	23.14	33.50
Grave goods found with adults	43.20	94.92	17.73	48.30
Grave goods found with the old	28.75	52.87	2.50	2.35
Grave goods found with males	65.60	94.27	1.13	0.64
Grave goods found with females	0.67	0.58	22.33	52.86
Grave goods found with occupants: sex unknown	11.67	20.31	23.14	33.50
Grave goods in plundered graves	69.75	97.95	1.00	0
Grave goods in disturbed graves	0	0	1.00	0
Grave goods in undisturbed graves	12.10	33.72	21.36	40.51
Grave goods in graves of unknown condition	0	0	15.00	-

Table 6.4 continued: Descriptive statistics for grave goods from Badarian burials near Matmar

	Matmar South		Matmar Far-South	
	Mean	Standard Deviation	Mean	Standard Deviation
Grave goods found with children	2.33	1.31		
Grave goods found with adults	1.12	2.96	-	
Grave goods found with the old	0	0		
Grave goods found with males	2.16	1.32	0	
Grave goods found with females	0.67	0.90	0	
Grave goods found with occupants: sex unknown	2.27	3.85	3.75	5.50
Grave goods in plundered graves	3.29	1.51	6.50	7.78
Grave goods in disturbed graves	1.75	1.50		
Grave goods in undisturbed graves	1.60	1.52		
Grave goods in graves of unknown condition	0	0	1.00	

Table 6.5: Frequency distribution of grave goods from six Badarian cemeteries near Matmar

	Matmar North		Matmar Far-North	
	Number	Percent	Number	Percent
Graves with no burial goods	0	0.00	1	50.00
Graves with 1 burial good	0	0.00	1	50.00
Graves with 2 burial goods				
Graves with between 1 and 10 burial goods	1	50.00	0	0.00
Graves with between 11 and 50 burial goods	1	50.00	0	0.00
Total number of graves with burial goods	2	100.00	1	
Total number of graves	2		2	
Total number of burial goods	50		1	
Total goods value	99		1	
Wealth index	50		0.5	

	Matmar West		Matmar East	
	Number	Percent	Number	Percent
Graves with no burial goods	1	7.14	2	6.45
Graves with 1 burial good	7	50.00	13	41.94
Graves with between 2 and 10 burial goods	2	14.29	9	29.03
Graves with between 11 and 250 burial goods	4	28.57	7	22.58
Total number of graves with burial goods	13	92.86	29	93.55
Total number of graves	14		31	
Total number of burial goods	400		531	
Total goods value	623		1177	
Wealth index	45		38	

Table 6.5 continued: Frequency distribution of grave goods from six Badarian cemeteries near Matmar

	Matmar South		Matmar Far-South	
	Number	Percent	Number	Percent
Graves with no burial goods	20	18.78	0	0.00
Graves with 1 burial good	10	21.39	3	75.00
Graves with 2 burial goods	5	12.20	0	0.00
Graves with between 3 and 20 burial goods	6	14.63	1	25.00
Total number of graves with burial goods	21	51.22	1	100.00
Total number of graves	41		4	
Total number of burial goods	68		15	
Total goods value	200		61	
Wealth index	5		15	

Table 6.6: Grave areas, in sq. metres, of Badarian burials near Matmar

	Matmar North	Matmar Far-North
Maximum	0.50	0.48
Minimum	0.47	0.45
Mean	0.48	0.46

	Matmar West	Matmar East
Maximum	2.30	1.60
Minimum	0.54	0.21
Mean	0.88	0.70

	Matmar South	Matmar Far-South
Maximum	3.50	-
Minimum	0.36	-
Mean	1.55	2.38

6.2 Test for association

The mean grave area [Table 6.6] for all six cemeteries at Matmar was 1.08 square metres, and areas ranged from 0.21 square metres at Matmar East to 3.50 square metres at Matmar South. Unlike the situation at Mostagedda, the smallest grave was found in the cemetery with the largest number of burial goods and a relatively high wealth index [thirty-eight].

The largest mean number of grave goods [16.20] was found in the plundered graves of adult males, and the next largest mean number [24.00] was discovered in the undisturbed graves of adult females. In those children's graves that were plundered, the mean number of goods [12.86] was lower than in undisturbed children's graves [18.59]. Plundered females' graves contained an average of 1.22 burial goods [Table 6.1]. In order to discover whether there was any *significant* association between the occurrence of grave offerings and grave sizes or grave condition, or whether there was any significant association between grave offerings and the age or sex of grave occupants, cross-tabulation was performed for each set of variables and the results presented in contingency tables [6.7-6.11].

The cross-tabulation results indicate that at Matmar there is no relationship between grave goods and grave area [Table 6.7], or between grave goods and grave condition [Table 6.10, Table 6.11], but there is some relationship between grave goods and age status [Table 6.8], and no relationship between grave goods and the sex of the grave occupants [Table 6.9]. The positive relationship between grave goods and age status [Table 6.8] is that subadults tend to have more grave goods than adults. Also, the contingency coefficient indicates that the relationship between the two variables is moderately strong. The data show that more than the expected number of children are found in tombs that contain more than three grave goods and less than the expected number are found in tombs with one burial good, while more than the expected number of adults are found in tombs with one grave offering and less than the expected number are found in tombs with more than three burial goods.

Cross-tabulations were used to determine whether significant relationships existed between the *presence* of beads, slate palettes, or ivory, and either the sex or age

DF:	1
Total Chi-square:	0.301
p:	0.5812
Contingency coefficient:	0.071

	Cell frequencies	Small	Large	Totals
Goods ≤ 1	Observed	17	5	22
	Expected	16.11	5.89	22
Goods ≥ 2	Observed	24	10	34
	Expected	24.89	9.11	34

Table 6.7: Matmar cemeteries: grave goods and grave area

of a grave occupant, or the condition of a particular grave. There were insufficient data to construct a contingency table for the association between the presence of ivory artefacts and the sex of grave occupants at Matmar. But, of the variables tested, cross-tabulations did not demonstrate a relationship between any of them

DF:	6
Total Chi-square:	14.315
p:	0.0263
Contingency coefficient:	0.378

	Cell frequencies	Child	Adult	Old	Totals
Goods =0	Observed	9	13	0	22
	Expected	8.19	11.26	2.56	22
Goods =1	Observed	6	19	6	31
	Expected	11.53	15.86	3.60	31
Goods =2	Observed	3	5	0	8
	Expected	2.98	4.09	0.93	8
Goods ≥ 3	Observed	14	7	4	25
	Expected	9.30	12.79	2.91	25

Table 6.8: Matmar cemeteries: grave goods and age status

DF:	3
Total Chi-square:	3.51
p:	0.3156
Contingency coefficient:	0.250

	Cell frequencies	Male	Female	Totals
Goods =0	Observed	4	9	13
	Expected	5.89	7.11	13
Goods =1	Observed	11	13	24
	Expected	10.87	13.13	24
Goods =2	Observed	4	1	5
	Expected	2.26	2.74	5
Goods ≥ 3	Observed	5	6	11
	Expected	4.98	6.02	11

Table 6.9: Matmar cemeteries: grave goods and sex of grave occupant

DF:	6
Total Chi-square:	6.174
p:	0.404
Contingency coefficient:	0.274

	Cell frequencies	Plundered	Undisturbed	Disturbed	Totals
Goods =0	Observed	3	4	0	7
	Expected	2.39	3.96	0.64	7
Goods =1	Observed	10	17	6	33
	Expected	11.29	18.67	3.04	33
Goods =2	Observed	4	5	0	9
	Expected	3.08	5.09	0.83	9
Goods ≥ 3	Observed	9	17	1	27
	Expected	9.24	15.28	2.49	27

Table 6.10: Matmar cemeteries: grave goods and grave condition

DF:	3
Total Chi-square:	0.797
p:	0.8502
Contingency coefficient:	0.102

	Cell frequencies	Plundered	Undisturbed	Totals
Goods =0	Observed	3	4	7
	Expected	3.04	3.96	7
Goods =1	Observed	16	17	33
	Expected	14.33	18.27	33
Goods =2	Observed	4	5	9
	Expected	3.91	5.09	9
Goods ≥ 3	Observed	10	17	27
	Expected	11.72	15.28	27

Table 6.11: Matmar cemeteries: grave goods and grave condition (plundered and undisturbed)

6.3 Test for randomness

The results of a Goodness of Fit test for the random distribution of grave goods among undisturbed Matmar graves indicate that the hypothesis that the burial goods were distributed randomly can be rejected [Appendix C: 7]. Further tests on the undisturbed graves of different age and sex categories or on the undisturbed graves at individual cemeteries were not possible because of small sample sizes. At Matmar South, the largest of the Matmar cemeteries, there was only one undisturbed subadult grave, two undisturbed graves of adult males, and two undisturbed graves of adult females [Appendix F: 1-3]. Nevertheless, the initial test on the combined undisturbed graves at all six Matmar cemeteries indicates that burial goods at Matmar were *not* distributed at random.

Chapter 7

The Badarian cemeteries: interpretations

7.1 Badari

Some archaeologists have suggested that economic differences between members of the Badarian population were small (Trigger 1983: 27) and their social system may have been basically egalitarian. Thus, the inclusion of grave goods with some burials and not with others may be attributed to personal choice or to status differences achieved as the result of personal effort or perhaps even to changes in burial customs over time. Changes in this context is used to denote variations in the *number* of grave goods included in tombs; not the adoption of new or different mortuary practices.

Although it could be argued that some Badarian people simply chose to be buried with personal adornments while others did not, the detection that the grave goods at the seven Badari predynastic cemeteries under consideration were *not* distributed in a random manner requires an explanation beyond that of personal choice on the part of the grave occupant or his or her kin group. At least one factor to which a non-random dispersion of burial goods may perhaps be attributed is age [see Contingency Table 4.9].

In the Contingency Table 4.9 cross-tabulation, the null hypothesis states

that there is no association between the number of burial goods discovered in a given tomb and the age status of its grave occupant. Also, because the computed χ^2 value of 18.923 is larger than the critical table value of $\chi^2_{05,6} = 12.5916$, the null hypothesis can be rejected with only a five percent chance of error. The data therefore indicate that there *is* an association between the number of burial goods discovered in a particular tomb and the age status of its grave occupant, but the nature of this association must be further established through an interpretation of the cross-tabulation results.

Thus, a study of the 'Observed Frequency' values in Contingency Table 4.9 reveals that of the three age categories listed, adults comprise the largest number of persons [134] associated with grave goods. Only forty-two children and twenty-one old individuals are associated with burial goods.

This distribution of mortuary equipment is consistent with an interpretation of the Badarian socioeconomic system as one that exhibits both a minimum of social complexity and marginal differences in wealth between its members. Moreover, it has been observed that status differences in such societies are often found to be age-dependent and also that these distinctions may be reflected in the society's mortuary practices. For example, Binford reports that in seven of eleven instances where status differentiation within a society was based on age, separate burial locations were used for adults and children. Two patterns were recognized: house burials were reserved for children while a cemetery was used for adults, or, children were buried on the outskirts of the settlement while adults were buried within it. (1972: 233-234). However, although there *is* an apparent association between grave goods and age status at Badari, there is no unmistakable evidence of differential treatment of individual grave occupants in terms of age-related burial location.

Furthermore, the 'Observed Frequency Table' data also show that nearly equal numbers of children and adults [twenty-one and twenty-six respectively], as opposed to only five old individuals, received more than three grave goods each. Also, almost twice the expected number of children received more than three burial offerings, and twice as many children as old people received at least one burial good, although four children were found to lack burial goods and five old individuals were interred without grave offerings. Still, a larger percentage of old adults were found

to lack burial offerings, since there were forty-two children and only twenty-one old adults in these cemeteries near Badari.

There are therefore several reasons why this particular association of age and grave goods cannot be interpreted as an indication that status differences within Badarian society were age-dependent or dependent on seniority. First of all, in the four cemeteries in which immature burials were discovered, the largest mean number of grave goods is found with children [Table 7.1]. Secondly, the largest number of grave goods is found with adults rather than with old individuals, and thirdly, twenty-four percent of the old grave occupants as opposed to thirty percent of the adults and ten percent of the children had *no* grave offerings whatsoever. Besides, out of a total of fifty-four undisturbed graves at Badari North, eight were those of old individuals with a mean number of 0.75 grave goods deposited in their tombs. The mean number of burial goods in the ten undisturbed children's graves at the same cemetery was 12.60.

In a cross-tabulation of grave goods and age status at Badari West, the null hypothesis that there was no association between the two variables was rejected. It was found that almost equal numbers of subadults and old individuals were likely to have no grave offerings or either one or two grave offerings, whereas *children were three times as likely as old adults to have three or more than three grave goods.*

However, in a cross-tabulation of grave goods and age status for Badari South, it was found that the null hypothesis could *not* be rejected. In other words, the data did *not* indicate any association between the number of burial goods discovered in a given tomb from this cemetery and the age status of its grave occupant. Moreover, although ten percent of the total Badarian tomb offerings and forty-six percent of the total ivory goods were recovered from these burials, none of the grave occupants at this cemetery was listed as "old". It would therefore appear that the nature of the association between grave goods and age status within the Badari cemeteries consists of a high association of grave goods with children *but not with old individuals.* Thus, it can be concluded that the non-random distribution of Badarian mortuary offerings cannot be attributed to status distinctions achieved solely as the result of age.

Moreover, a comparison of children's burial offerings in the seven cemeteries shows that the mean number of grave goods deposited in the twenty-five children's

tombs at Badari West was 26.64 while that in the twelve children's graves at Badari North was 10.67 and 14.75 was the mean for offerings in the burials of four children at Badari South. There were three burial goods in the grave of the only child found at Badari East. Subadult burials were absent from the cemeteries at Badari Far-north, Mid-south and Far-south [Table 7.1]. In Burials 5134, 5350 and 5719, three undisturbed children's graves at Badari South, Badari North and Badari West, the total number of grave offerings is four, one and ten artefacts respectively. The four burial goods in 5134 were a polished and rippled black topped red pot, two *Nerita* shells of Red Sea origin, and a "saw-edged flint". The only artefact in 5350 was a pinkish-brown pot. Malachite, alabaster, quartzite, an ivory bangle, a spoon, a bone tool, wooden rods, a flint core, part of a hippopotamus tusk, and the remains of a well preserved black pot were recovered from 5719. However, in Burial 5742, a nearby grave at Badari West, a fourth undisturbed child had been entombed with a single unpolished pot. (Brunton and Caton Thompson 1928: 8-16).

Both *between* cemeteries and *within* cemeteries, these differences in the quantity and quality of offerings may be interpreted as an indication of an unequal distribution of material wealth amongst the grave occupants. These discoveries of plentiful burial offerings in the graves of young children are necessary but insufficient evidence to demonstrate the existence of a rudimentary system of ranking among members of the Badarian population (Peebles and Kus 1977: 431). Unless further evidence of economic inequality between members of Badarian communities can be produced, their social system may be portrayed as being basically egalitarian.

Table 7.1: Descriptive statistics for grave goods from Badarian burials near Badari

	Badari North		Badari Far-North	
	Mean	Standard Deviation	Mean	Standard Deviation
Grave goods found with children	10.67	22.35	0	-
Grave goods found with adults	4.39	11.91	1.50	0.71
Grave goods found with the old	1.11	1.36	0	-
Grave goods found with males	3.65	11.12	1.00	-
Grave goods found with females	4.38	11.27	2.00	-
Grave goods in plundered graves	12.91	25.10	7.00	8.49
Grave goods in disturbed graves	2.40	1.67	0	-
Grave goods in undisturbed graves	3.28	11.11	2.00	-

Table 7.1 continued: Descriptive statistics for grave goods from Badarian burials near Badari

	Badari West		Badari East	
	Mean	Standard Deviation	Mean	Standard Deviation
Grave goods found with children	26.61	40.15	3.00	
Grave goods found with adults	25.10	100.35	1.00	0
Grave goods found with the old	2.73	3.38	2.00	-
Grave goods found with males	32.66	119.79	1.00	-
Grave goods found with females	6.92	19.98	1.33	0.58
Grave goods in plundered graves	20.20	33.07	2.00	1.41
Grave goods in disturbed graves	0.86	0.38	1.00	-
Grave goods in undisturbed graves	28.49	92.56	1.33	0.58
Grave goods in undisturbed graves: Burial 5705 and Burial 5735 omitted from the dataset	12.67	28.91	[61 graves]	
Grave goods in undisturbed graves with less than 100 burial goods	8.65	18.31	[59 graves]	
Grave goods in undisturbed graves of adult males with less than 50 burial goods	4.01	9.83	[27 graves]	

Table 7.1 continued: Descriptive statistics for grave goods from Badarian burials near Badari

	Badari South		Badari Mid-South	
	Mean	Standard Deviation	Mean	Standard Deviation
Grave goods found with children	14.75	24.89	0	-
Grave goods found with adults	3.28	4.61	1.4	0.89
Grave goods found with the old	-	-	-	-
Grave goods found with males	3.70	5.79	1.67	0.58
Grave goods found with females	2.75	2.82	1.00	1.41
Grave goods in plundered graves	5.39	9.07	2.00	-
Grave goods in disturbed graves	8.83	15.38	0	-
Grave goods in undisturbed graves	1.75	2.06	1.25	0.96

	Badari Far-South	
	Mean	Standard Deviation
Grave goods found with children	0	-
Grave goods found with adults	2.33	3.22
Grave goods found with the old	0	-
Grave goods found with males	2.33	3.22
Grave goods found with females	0	-
Grave goods in plundered graves	0	-
Grave goods in disturbed graves	1	2.00
Grave goods in undisturbed graves	0.5	0.71

Table 7.2: Burial goods from Badarian burials near Badari [Percentages are based on the total number of grave goods, 2955, at all seven cemeteries]

	Badari North		Badari Far-North	
	Number	Percent	Number	Percent
Ivory	18	0.61	1	0.03
Palettes	6	0.20	0	0
Beads	446	15.09	0	0
Total luxury goods	470	15.90	1	0.03
Shells	37	1.25	10	0.34
Pottery	76	2.57	4	0.14
Total grave goods	616	20.85	16	0.54
	Badari West		Badari East	
	Number	Percent	Number	Percent
Ivory	23	0.78	0	0
Palettes	8	0.27	1	0.03
Beads	1593	53.57	0	0
Total luxury goods	1621	54.96	1	0.03
Shells	252	8.53	0	0
Pottery	66	2.23	14	0.47
Total grave goods	1990	67.34	16	0.54
	Badari South		Badari Mid-South	
	Number	Percent	Number	Percent
Ivory	36	1.22	0	0
Palettes	3	0.10	1	0.03
Beads	147	4.97	1	0
Total luxury goods	186	6.29	2	0.07
Shells	33	1.12	0	0
Pottery	36	1.22	4	0.14
Total grave goods	297	10.05	7	0.24
	Badari Far-South			
	Number	Percent		
Ivory	0	0		
Palettes	0	0		
Beads	0	0		
Total luxury goods	0			
Shells	0	0		
Pottery	8	0.27		
Total grave goods	13	0.44		

Table 7.3: Burial goods from Badarian burials near Badari [Percentages are based on the total number of grave goods at the individual cemeteries]

	Badari North		Badari Far-North	
	Number	Percent	Number	Percent
Ivory	18	2.92	1	6.25
Palettes	6	0.97	0	0
Beads	446	72.40	0	0
Total luxury goods	470		1	
Shells	37	6.00	10	62.50
Pottery	76	12.31	4	25.00
Total grave goods	616		16	
	Badari West		**Badari East**	
	Number	Percent	Number	Percent
Ivory	23	1.16	0	0
Palettes	8	0.10	1	6.25
Beads	1593	80.05	0	0
Total luxury goods	1621		1	
Shells	252	12.66	0	0
Pottery	66	3.32	11	87.50
Total grave goods	1990		16	
	Badari South		**Badari Mid-South**	
	Number	Percent	Number	Percent
Ivory	36	12.12	0	0
Palettes	3	1.01	1	14.29
Beads	117	49.50	1	14.29
Total luxury goods	186		2	
Shells	33	11 11	0	0
Pottery	36	12.12	4	57.14
Total grave goods	297		7	
	Badari Far-South			
	Number	Percent		
Ivory	0	0		
Palettes	0	0		
Beads	0	0		
Total luxury goods	0			
Shells	0	0		
Pottery	8	61.51		
Total grave goods	13			

In contrast to those researchers who suggested that the Badarian social system was basically egalitarian, Hoffman claims that there were marked economic differences between members of the Badarian population (1981: 113) and that their social system was distinctly megalitarian. Thus, the inclusion of grave goods with some burials and not with others may be attributed to "differential access to resources"(Bard 1987: 46). It has previously been established that the data from the Badari cemeteries indicate the following: (i) an association between the number of burial goods recovered from the various tombs and the sizes as well as the condition of the graves, (ii) an association between the number of grave goods present and those individuals categorized as children, and (iii) no association between the sex of the grave occupants and the number of grave goods present. Furthermore, the demonstration of the non-random distribution of grave goods in all undisturbed graves of children, adult males and adult females in all seven cemeteries, as well as in undisturbed graves of children, adult females and adult males at Badari West indicate a differential dispersion of burial offerings within both sex and age categories. At Badari, ten percent of the total grave goods [297 items] and eight percent of the total luxury artefacts [186 objects] were recovered from the fifty-four tombs at Badari South [Table 7.2]. The mean area of each of these graves was 2.05 square metres. There were glazed steatite beads in fourteen burials, slate palettes in three graves, and ivory artefacts in sixteen.

Moreover, a careful study of the distribution of luxury goods recovered from these graves revealed that:

1. Graves containing luxury goods tend to have areas that are larger than the mean grave area computed for all graves. For example, the mean grave size for all graves is 1.32 square metres. At Badari South, the mean grave size for graves that contain one ivory artefact is 2.12 square metres; at Badari North it is 2.69 square metres. At Badari West it is 1.37 square metres, but in this cemetery, mean grave size for all graves is only 0.97 square metres; thus, the graves here that contain luxury items tend to be bigger as well. The grave at Badari Far-North in which an ivory finger ring was found is 4.12 square metres.

Also, it is remarkable that *five* ivory objects were retrieved from Burial 5151, the disturbed grave of an adult female at Badari South. It is 3.03 square metres in area. A disturbed grave in the same cemetery contained *seven* ivory artefacts; its area is 3.25 square metres. It is hardly surprising that Brunton noted "...a considerable difference ..in the size of the graves in the different patches of cemetery" (Brunton and Caton Thompson 1928: 18).

2. Graves containing luxury goods tend to have more grave goods than other graves. The mean number of burial goods found in the graves at Badari is 11.28; however, 30.33 is the mean number of grave goods present in graves at Badari North that contain one ivory artefact, and 157.00 is the mean number of burial goods found in this category of graves at Badari West. At Badari North, 44.00 is the mean number of grave goods present in tombs from which two ivory objects were collected, and seventy-seven burial offerings were found in the Badari West grave with fifteen ivory artefacts. Even at at Badari South, where only forty-four percent of the burials still contained luxury objects after plundering, forty grave offerings were discovered in the grave that contained seven ivory goods.

3. Graves containing luxury goods tend to be more "elaborate" than other graves. Although Brunton observed that little evidence was found to support the suggestion that some graves were roofed, he reported that "...in many of the burials the matting which surrounded the body was kept up by means of sticks, forming a sort of miniature tent. [Besides, in Burial 5103 at Badari North], in addition to the matting there had been sticks in the grave ...to support matting against the sides or from a brushwood roof... [Also], in one instance in Area 5800 [Badari West] Mr. Engelbach noticed a hole in the side of a grave with traces of wood dust in it. This seems to have been the socket of a roofing pole; but no other such holes were observed" (Brunton and Caton Thompson 1928: 11, 18-20). Moreover, while Badarian corpses were wrapped in matting in the most common form of burial, "hamper coffins" were identified in some instances. Some of these occurred in graves that contained both luxury goods

and large numbers of burial offerings. For example, Burial 5710 at Badari West is described as the undisturbed tomb of a child "in a rush coffin" Gravegoods included blue glazed steatite beads, an ivory spoon, a slate palette, a carnelian bead, a black-topped brown pot, and a string of shells. Hamper coffins may also have been present in Burials 5101, 5701, and 5716. These burials were those of a female, a child with flowers and a male. The latter lay in a rectangular grave with two wooden, ornamented "throw-sticks" (Brunton and Caton Thompson 1928: 14-15).

4. Graves containing luxury goods tend to be "disturbed". A brief account of the distribution of ivory artefacts in the Badari cemeteries will serve to illustrate this point. A total of seventy-eight ivory objects were retrieved from thirty-six tombs in three cemeteries [Table 7.3]. Fifty-four of these ivory artefacts were removed from plundered graves; twelve artefacts occurred in disturbed graves and twelve artefacts were removed from undisturbed graves. Thus, of the thirty-six Badari graves that contained ivory objects, only seven were undisturbed. Two were listed as disturbed; the rest were all plundered [Table 7.4]. It would appear to be highly significant that no ivory artefacts occurred in the undisturbed graves at Badari South, whereas twelve ivory artefacts were found in two of the seven disturbed tombs and twenty-four ivory objects were retrieved from sixteen of the forty-eight plundered tombs at this cemetery. Moreover, cross-tabulation between grave condition and the *presence or absence* of ivory artefacts at all seven Badari cemeteries showed that twice [twenty-seven] the expected number [13.24] of graves that contained ivory was plundered, while less than half [seven] the expected number [19.49] was undisturbed

Brunton's data also show that in many cases the artefacts found in the tombs are probably imported goods. In the plundered graves, only the broken parts of the presumably more valued articles were usually left behind. Even so, imported goods are more often found in the disturbed or plundered burials. Locally made artefacts usually tend to predominate in the undisturbed graves

The undisturbed tombs with the largest number of grave offerings are Burials

Table 7.4: Distribution of ivory artefacts in Badarian burials near Badari

Grave number and condition	Badari location	Grave occupant	Grave area in sq. metres	Total grave goods	Total luxury goods
Graves with 1 ivory artefact:					
4803 (plundered)	far-north	unknown	4.12	13	1
5101 (plundered)	south	unknown	3.22	28	23
5107 (plundered)	south	unknown	3.29	14	14
5115 (plundered)	south	adult male	0.99	3	1
5118 (plundered)	south	unknown	0.56	2	omitted
5124 (plundered)	south	unknown	1.86	5	omitted
5128 (plundered)	south	adult male	1.30	2	1
5133 (plundered)	south	unknown	3.37	5	4
5144 (plundered)	south	unknown	2.33	1	1
5397 (plundered)	north	unknown	2.58	106	104
5399 (plundered)	north	old female	3.10	4	2
5402 (plundered)	north	unknown	2.58	2	1
5403 (plundered)	north	unknown	3.51	77	70
5406 (plundered)	north	unknown	1.94	16	5
5428 (plundered)	north	unknown	2.89	7	5
5444 (plundered)	north	unknown	1.03	8	2
5446 (plundered)	north	unknown	2.89	2	1
5449 (plundered)	north	adult male	3.51	51	51
5457 (plundered)	north	unknown	2.87	4	1
5705 (undisturbed)	west	adult male	2.52	511	502
5710 (undisturbed)	west	child	0.59	103	52
5745 (undisturbed)	west	old female	1.14	5	2
5762 (undisturbed)	west	adult male	1.21	11	1
Graves with 2 ivory artefacts:					
5106 (plundered)	south	unknown	1.51	2	2
5126 (plundered)	south	unknown	2.91	4	2
5130 (plundered)	south	unknown	1.86	7	4
5131 (plundered)	south	unknown	3.55	2	2
5150 (plundered)	south	adult male	1.70	2	2
5161 (plundered)	south	male child	1.42	15	5
5719 (undisturbed)	west	child	0.45	10	2
5738 (undisturbed)	west	adult female	1.81	78	66

Grave number and condition	Badari location	Grave occupant	Grave area in sq. metres	Total grave goods	Total luxury goods
Graves with 3 ivory artefacts:					
5143 (plundered)	south	unknown	3.41	6	3
5152 (plundered)	south	unknown	0.82	5	4
Graves with 4 ivory artefacts:					
5390 (undisturbed)	north	adult female	1.03	12	6
5453 (plundered)	north	unknown	2.96	8	5
Grave with 5 ivory artefacts:					
5151 (disturbed)	south	adult female	3.03	6	5
Grave with 7 ivory artefacts:					
5112 (disturbed)	south	unknown	3.25	40	17
Grave with 15 ivory artefacts:					
5740 (plundered)	west	child	0.77	77	65

Table 7.5: Sources of raw materials recovered from Badarian burials in the Nile Valley [Adapted from Krzyzaniak 1977: 32-33; Brunton and Caton Thompson 1928: 41]

Raw materials	Sources				
	Nile Valley	Western Desert	Eastern Desert and Red Sea coasts	Nubia	Sinai
alabaster			x		x
basalt		x			
carnelian		x	x	x	
copper			x	x	x
clay	x				
flint	x	x	x	x	
ivory	x			x	
jasper			x		
limestone	x	x	x		
malachite			x		x
shells	x		x		
slate			x		
steatite			x	x	
turquoise				x	

5705 and 5735 at Badari West. The graves are those of adult males. Burial 5705 is 2.52 square metres in area and it contained 511 artefacts including a broken black topped red pot of rippled ware, an alabaster bead from Sinai or the Eastern Desert, an ivory bracelet, "masses of green glazed steatite cylinder beads" made of stone from Nubia or the Eastern Desert, red ochre, three bone needles, a bone piercer, a *Nerita* shell of Red Sea origin, a *Cymathium* shell, "a saw-edged flint knife [and] a natural pebble" (Brunton and Caton Thompson 1928: 14). Five hundred and eleven objects were also recovered from Burial 5735 which was 1.68 square metres in area. A pendant of green stone, glazed green steatite beads, and *Clanculus* as well as *Nerita* shells were found in this grave (Brunton and Caton Thompson 1928: 15).

However, a larger and perhaps more richly furnished tomb was Burial 5112 at Badari South, a disturbed grave that contained "no bones" and held a large *variety* of grave goods. The tomb was 3.25 square metres in area, and the forty-one remaining burial offerings included two finely rippled black topped brown pots, one rough brown pot, one smooth brown pot, malachite, a long slate palette, an ivory bracelet, "five ivory pins or teeth of a comb", a copper pin, four steatite beads, one blue glazed steatite bead, two pink limestone pendants, a breccia pendant, a white and orange limestone pendant, a bone needle and a bone awl (Brunton and Caton Thompson 1928: 7). Although many of the objects from this tomb are available locally in the Nile Valley, the ivory, the malachite, the copper, the steatite and the slate are all of 'foreign' origin [Table 7.5].

An even bigger tomb was Burial 5403 at Badari North. It contained the largest number of grave goods found in a plundered tomb. Brunton reported that the grave was "badly plundered and [the] body gone. In addition to the matting there had been sticks in the grave... to support... a brushwood roof". The area of the tomb was 3.51 square metres and the remaining twenty-two burial goods included "[s]everal large and small stone beads... a broken slate palette... a grinding pebble of jasper; a scrap of *Spatha* shell [and a] piece of a wide ivory bracelet, inlaid with beads..."(Brunton and Caton Thompson 1928: 11).

The data therefore suggest that highly visible graves were subject to plundering and also that such graves comprised a *minority* of the total burials in these

cemeteries. Of the 262 graves at all seven Badari cemeteries, 131 [fifty percent] were recorded as undisturbed. There were sixty-three such graves at Badari West, one at Badari Far-north, three at Badari East, four at Badari Mid-south, two at Badari Far-south, and fifty-four at Badari North while only four of the burials at Badari South were undisturbed. Twenty-two burials were listed as disturbed: six at Badari South, five at Badari North and seven at Badari West. The condition of twenty burials was described as unknown; the remaining eighty-nine were listed as plundered. Therefore, *only thirty-four percent of the total number of burials were plundered.*

Five of these plundered graves were discovered at Badari West and thirty-three were found at Badari North. At Badari South, forty-four burials, or eighty-one percent of the cemetery total, were plundered. Without doubt, therefore, the scale on which the business of grave robbing was conducted varied from cemetery to cemetery. It is also perhaps significant that the largest amount of ivory was recovered from Badari South, the same cemetery for which the highest rate of plundering is recorded. Furthermore, although thirty potsherds was the total number retrieved from the combined grave clusters at Badari Far-north, East, Mid-south and Far-south, the cemetery at Badari South yielded only thirty-six items of pottery or seventeen percent of the total amount recovered at Badari.

Krzyzaniak reports that the clay which was utilized in the manufacture of Badarian pottery was found locally (1977: 32), whereas ivory was probably imported from the south (Brunton and Caton Thompson 1928: 41). The slate, steatite, copper, turquoise, carnelian, jasper and malachite found in some graves were all imported and assumed by Brunton to be evidence of trade (Brunton and Caton Thompson 1928: 41-42; Krzyzaniak 1977: 32-33). The evidence indicates that these 'luxury goods' were dispersed in a minority of the Badarian graves and that plundering of these graves actually took place during the Badarian period.

At Badari South, Burial 5162 is reported to be that of an undisturbed adult male. The corpse was wrapped in matting and unaccompanied by burial goods. Nineteen inches [0.48 metres] *under* this grave, Brunton discovered Burial 5163, the plundered tomb of an adult female. Eight grave goods, including an *Ancillaria* shell of Red Sea origin (Brunton and Caton Thompson 1928: 38), malachite, a shell bead,

four slate beads, and a carnelian bead, remained in the plundered grave. These burial offerings were all imports. The origin of the carnelian may have been either the Western or the Eastern Desert or Nubia; the slate must have been obtained from the Eastern Desert and the malachite from either Sinai or the Eastern Desert (Krzyzaniak 1977: 32-33).

The discovery that the dispersion of grave goods amongst the Badarian graves is non-random; the finding that thirty-five of the grave occupants had been entombed with more than ten grave goods each, while ninety had received only one burial offering and fifty-one had received none; the discovery that there was an association between the number of burial goods recovered from the various tombs and the sizes of graves as well as the condition of graves, and grave occupants listed as 'children'; the finding that the data do not indicate an association between the sex of a grave occupant and the number of grave goods retrieved from any particular grave; the detection of differences in the quantity and quality of grave offerings both *between* and *within* cemeteries, the detection that the most richly furnished graves were restricted to a minority of the mortuary population, and furthermore that such tombs were subject to plundering - all these factors may be interpreted as a manifestation of the unequal distribution of material wealth amongst grave occupants and thus an indication of differential access to resources by members the same Badarian community.

Another indication that both social and economic differences existed amongst Badarian groups is provided by the observation that, apart from those undisturbed graves that contained no grave offerings, at least four different "types" of burial appeared to exist at Badari.

1. Wealthy interments that contained *objects made specifically for burial* constitute 3.1 percent of the Badari burials. These tombs contained non-utilitarian objects, such as the elephant ivory statuette from 5107 (Brunton and Caton Thompson 1928: 7), and pottery types, like the decorated variety from Burial 4803 at Badari Far-North (Brunton and Caton Thompson 1928: 7), that were almost never recovered from "village" deposits.

Phosphate analysis of pottery from the Nagada-Khattara area has shown that the phosphate content of the upper and lower portions of pots recovered from burials shows little variation. In contrast, in pottery removed from settlement areas, there was a considerable difference in the phosphate levels in the upper and lower parts of the pot. Since it has been demonstrated that a higher phosphate level exists in the base than in the rim of a used ceramic cooking pot, it was concluded that *the pottery found in the graves had been specially produced as burial offerings* (Hassan 1981: 386-387).

Brunton and Caton Thompson appear to have encountered a similar distinction between village and cemetery pottery in the Badari region. Luxury items as well as pottery may have been either obtained by trade or produced *solely to be used as grave goods, and different status groups may have used different pottery types in their burials.* Caton Thompson suggested that an uncombed sherd of grey ware from the sub-breccia deposits at Hemamieh may perhaps be 'village' pottery (Brunton and Caton Thompson 1928: 116), and Brunton claimed that some Badarian 'village' ware resembles pottery of the Amratian period. In an instance where several pots were found together at Mostagedda, he reported that the "pottery is more the village than cemetery type... [and resembles that] of the Amratian period" (Brunton 1937: 42).

In addition to those interments that contained artefacts that had probably been produced specifically for burial, the Badari graves consisted of:

2. Wealthy interments with possibly *used* articles, such as Burial 5112, in which Brunton discovered an ivory vase that still contained some malachite cosmetic paste, and Burial 5444, in which he found a "worn slate palette" (Brunton and Caton Thompson 1928: 7, 13). Five percent of the Badari graves can be assigned to this category of burials.

3. Burials that were similar to the "wealthy" burials in every respect but substituted products manufactured from local materials. Thus, the combs in 5390 were fashioned of *bone* rather than ivory, and the female figurine in Burial 5227

was made of *pottery* (Brunton and Caton Thompson 1928: 9-11). Twelve tombs [4.58 percent] can be included in this category.

4. Burials that contained *used* domestic objects, such as the repaired black-topped brown bowl in 4848, the smoky pots with the elderly females in 5405 and 5414, or the smoke blackened pot with the adult male in 5728. Graves of this type account for eight percent of the Badari total.

Given the thesis that the burial status of a particular individual will correspond to the social position occupied by the deceased during his or her lifetime (O'Shea 1984: 10), the identification of major categorical differences between the burials at Badari suggests the existence of several different burial statuses symbolizing several different social positions. The economic differences between the burials, and thus between the social positions symbolized, further imply the existence of unequal access to resources by members of Badarian society.

The claim of unequal resource use among these communities was also supported by the discovery that economic differences were expressed in the spatial patterning produced by the placement of graves *within* certain cemeteries as well as by the *location* of particular cemeteries. Thus, an analysis of the graves at Badari North demonstrated that burials were grouped in two spatially distinct areas. Although there was one child in the western part of the cemetery who had been interred with sixty objects, the graves in this section normally contained only one offering in each burial along with the remains of mainly undisturbed males and children. *Luxury goods were restricted to the burials in the eastern half of the cemetery.* Two copper beads were recovered from a subadult burial in this section, the tomb of a plundered adult female yielded five turquoise beads, and a carved ibex head was recovered from the grave of an adult male. Twelve burials contained ivory and six contained palettes. None of these materials was found in graves in the western area [Figure 8].

Both "rich" and "poor" burials were also represented at Badari West, where graves containing luxury goods tended to be concentrated in the southern part of the cemetery [Figure 10]. Thus, 5705 is spatially close to 5735, and both are the undisturbed graves of adult males in which masses of green glazed steatite beads had

been placed. Forty-six percent of the beads from Badari were discovered in these two tombs. A "large number" of green glazed steatite beads was also found in Burial 5721 (Brunton and Caton Thompson 1928: 14-15). Brunton also reported that a belt, composed of "...at least five thousand blue glazed steatite beads", had been found at Mostagedda in 592, the grave of an adult male (1937: 37); and at Matmar, the remains of a similar bead "belt" were discovered in Burial 3091 (1948: 8, 10). The latter was also a male burial. Fourteen percent of the Badarian graves contained a total of 4,261 beads, of which forty-one percent was found in these five burials.

At Badari, beads occurred in only forty-seven burials. Nineteen of these [forty percent] occurred at Badari West. The Badari West tombs also contained fifty-one percent of the total number of excavated Badarian beads, and most of them were found in Burials 5705 and 5735. Beck reported a hardness value of *seven* for the Badarian steatite beads (Brunton 1937: 60), and Brunton suggested that a metal tool must have been used in their manufacture because the "piercing... is remarkably regular...[and] truly cylindrical..." (1937: 51). Lucas, an authority on predynastic Egyptian materials, noted that the glaze used, which is 'glass coating another substance", must be melted and maintained at high temperatures (Brunton 1937: 61). The need for specialized tools, as well as the occurrence of glazed steatite beads in large quantities in a small percentage of tombs, suggests that if these beads had been produced locally, they may have been fashioned by relatively skilled craftsmen rather than by members of the average Badarian household.

The apparent restriction of bead belts to the graves of adult males also suggests that these belts may have been symbolic of inherited authority. Although Brunton reported that the area between the two cemeteries was "barren" (1928: 13), the close location of "wealthy" Badari West and Badari South graves on the same desert spur may be a reflection of the appropriation of a burial plot by an emerging power group at Badari (Brown 1981: 29). A similar situation may have existed in Area 500/1100 at Mostagedda [see Figure 5], where Brunton discovered possible Badarian "bed burials" on the 'island' spur where 592 was found. Whereas the male in the latter tomb was accompanied by approximately five thousand beads of blue glazed steatite and was "lying on matting and sticks", the possible "bed burials" contained

only "rope matting on a frame of sticks" (Brunton 1937: 36-37). At Armant, bed burials were interpreted as symbols of high status and authority (Bard 1987: 121, 125). The tombs in Area 500 at Mostagedda, as well as Burials 5705 and 5735 at Badari West, may have been symbolically similar to those at Armant. Glazed bead belts, that may have been associated with a type of "bed" burial, may also have been indicative of high status and authority.

Thus, at Badari West, both 5705 and 5735 may have been the tombs of group leaders. Other nearby burials included 5710, a child endowed with ivory and carnelian; 5740, the plundered grave of a child who still retained seventy-seven artefacts including fifteen ivory objects and three turquoise beads; 5745, a very old female who had been given an elaborate bird-headed ivory spoon; and several large graves, such as 5716, which measured 3.25 square metres and contained a hamper coffin as well as the remains of an adult male.

Those burials at Badari South that contained ivory were clustered in the south-western portion of the cemetery, whereas burials containing rippled pottery tended to be concentrated in the south-eastern section [Figures 11, 12]. Nevertheless, practically all the burials contained luxury objects in spite of the fact that nearly all of them had been plundered. Although Brunton discovered that a large number of plundered tombs lacked bodies, enough skeletal material remained to provide evidence that *the cemetery had been used for both adults and children from the more economically advantaged segment of the population.* The adult female in Burial 5151 still retained five ivory artefacts; an ivory fish-hook and an ivory vase, as well as jasper and agate beads, were found in 5161, the plundered grave of a subadult; although the grave had been plundered, the child in 5119 was still accompanied by beads of blue glazed steatite, and with the adult male in 5150 were the remains of a bracelet and a cup, both of ivory (Brunton and Caton Thompson 1928: 8-9). In addition to the previously established characteristics of the Badari mortuary data, the evidence that many burial offerings may have been specifically manufactured for grave use; that different social categories were probably symbolized through the employment of different grave furnishings; and that *certain burial locations* were mostly composed of the tombs of males, females and subadults whose grave offerings consisted of ma-

terials to which the majority of the population had little or no access apart from robbery, all indicate that some form of social hierarchy existed and was recognized within Badarian society.

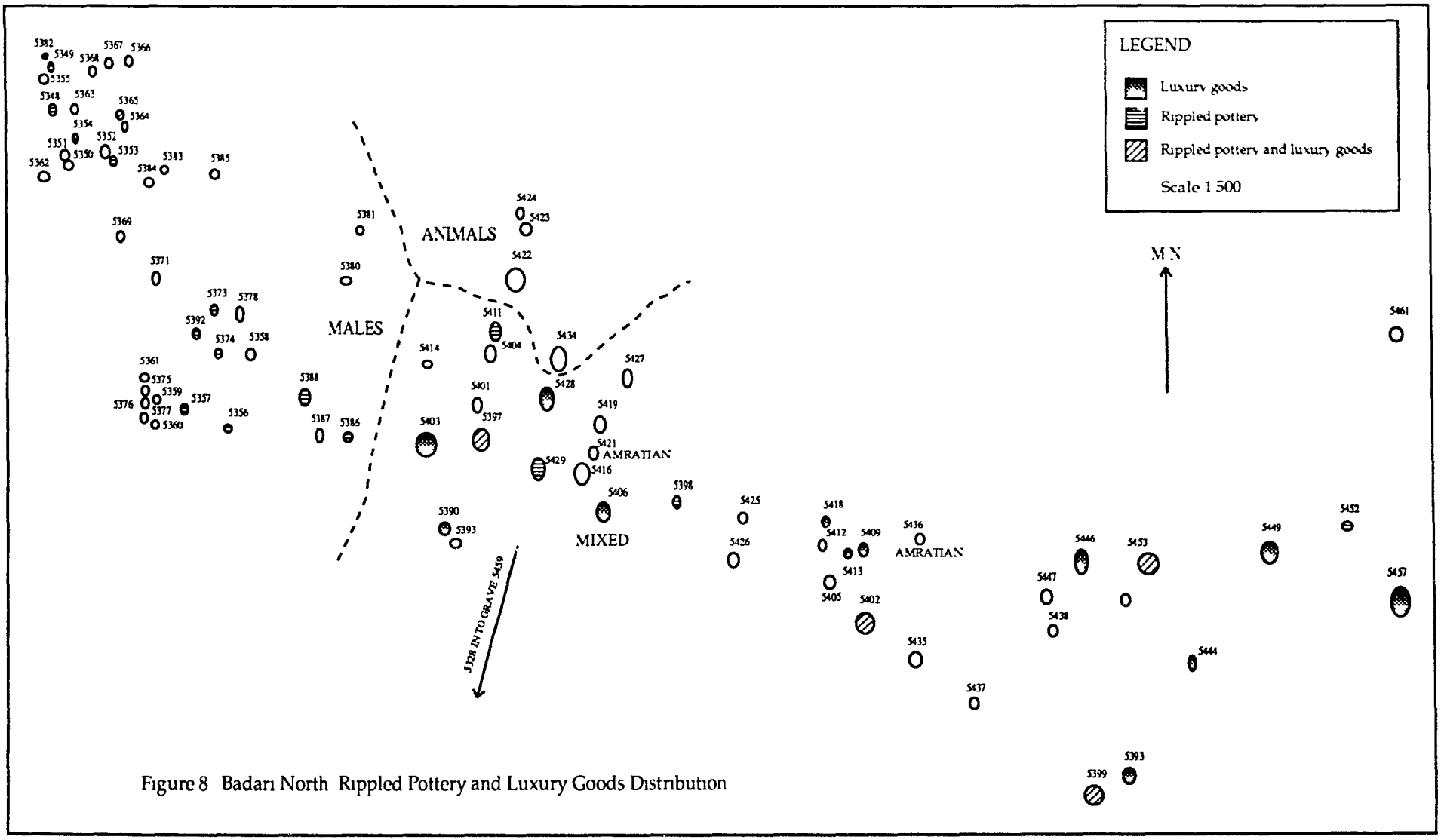

Figure 8 Badari North Rippled Pottery and Luxury Goods Distribution

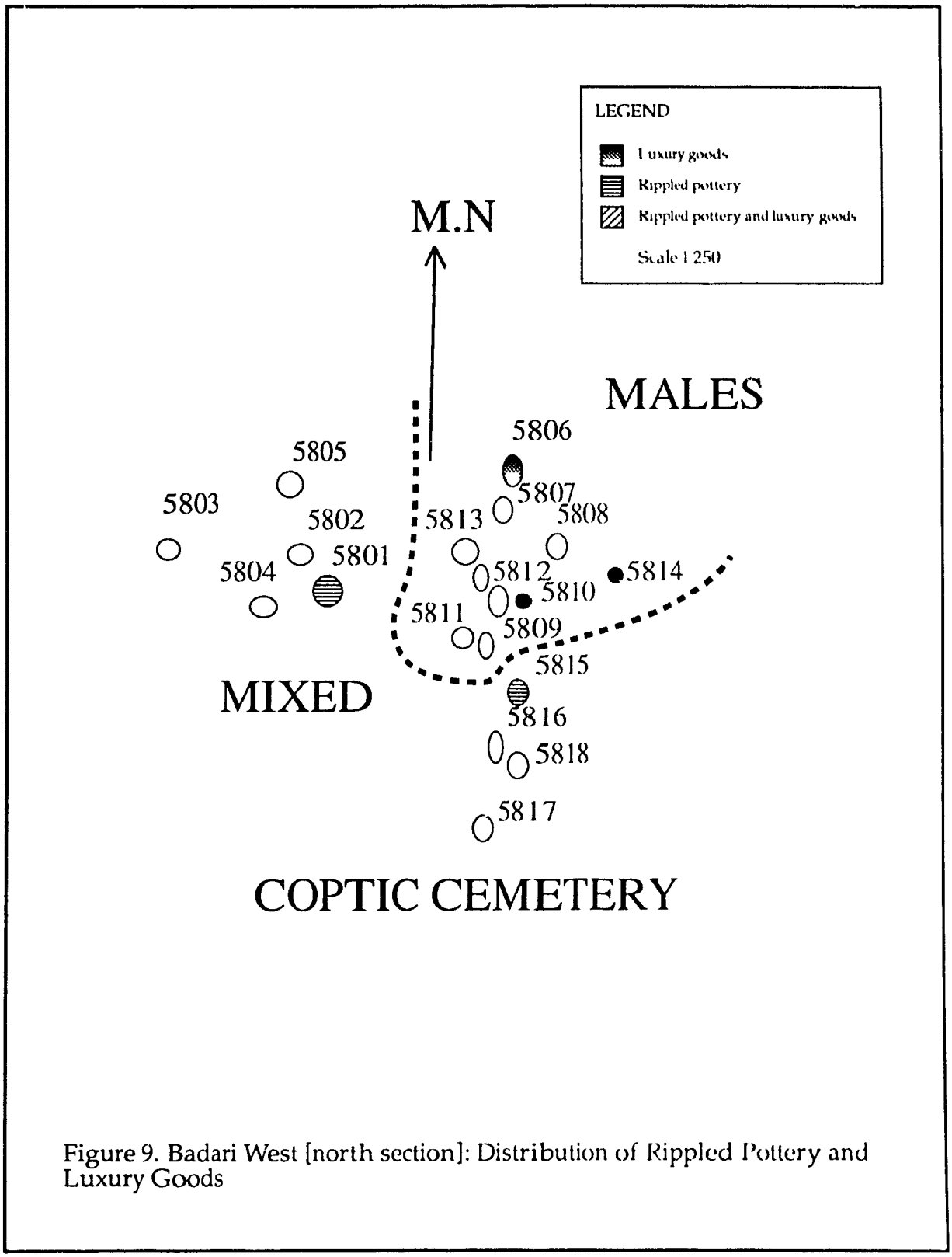

Figure 9. Badari West [north section]: Distribution of Rippled Pottery and Luxury Goods

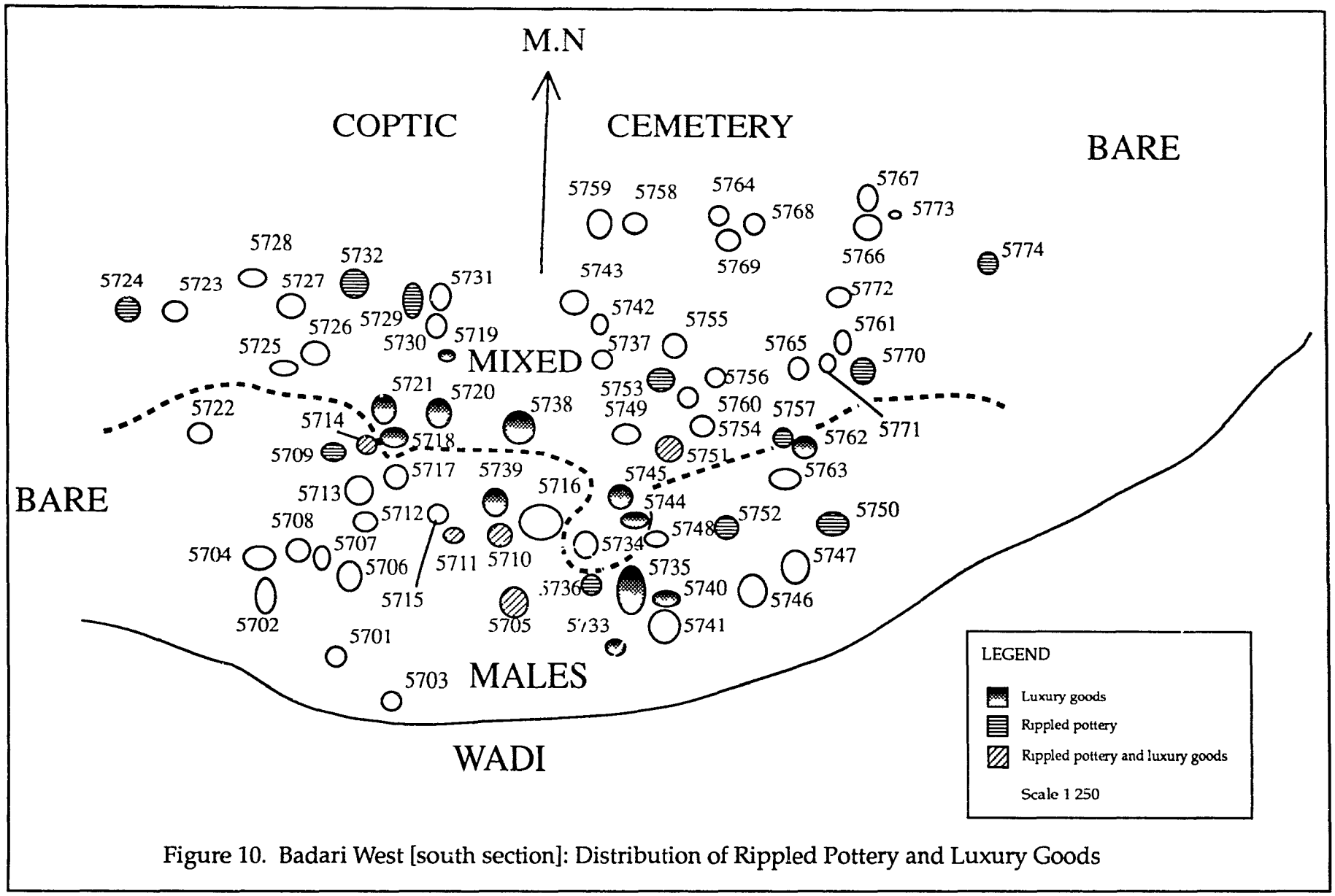

Figure 10. Badari West [south section]: Distribution of Rippled Pottery and Luxury Goods

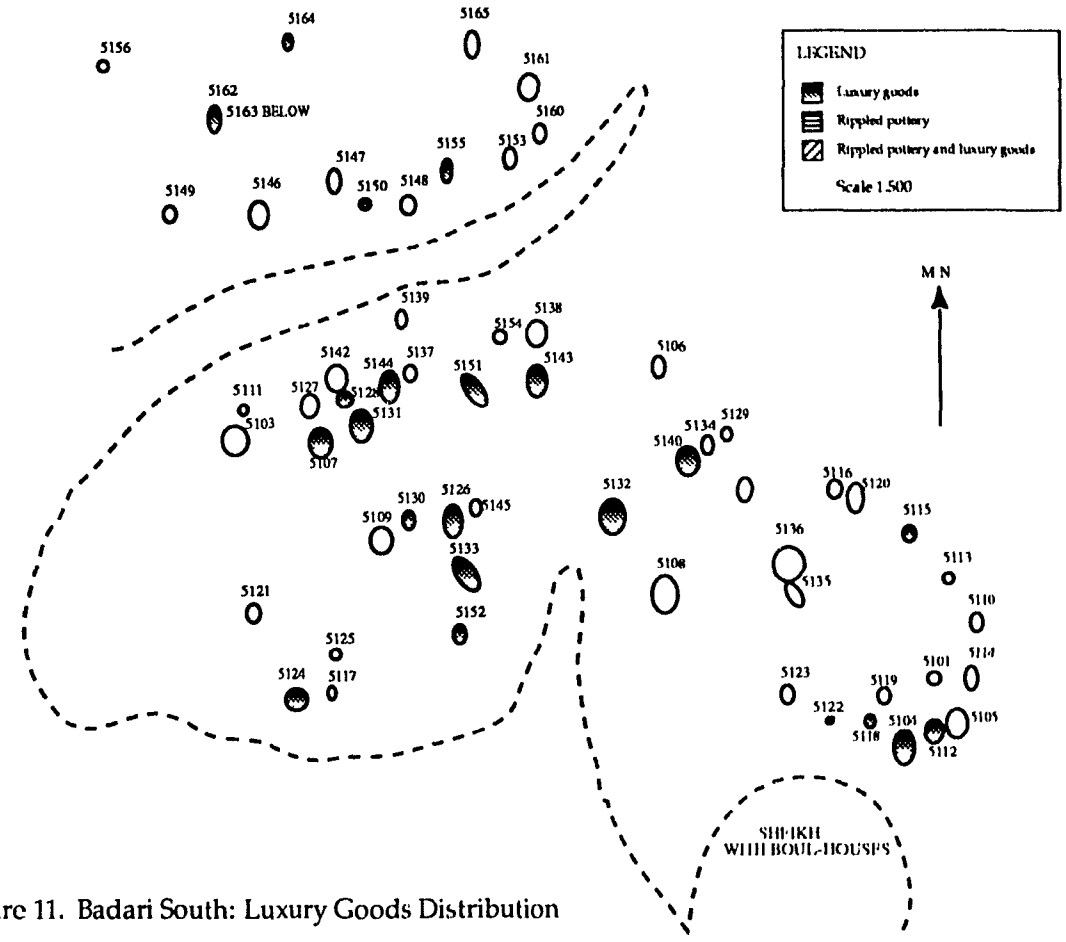

Figure 11. Badari South: Luxury Goods Distribution

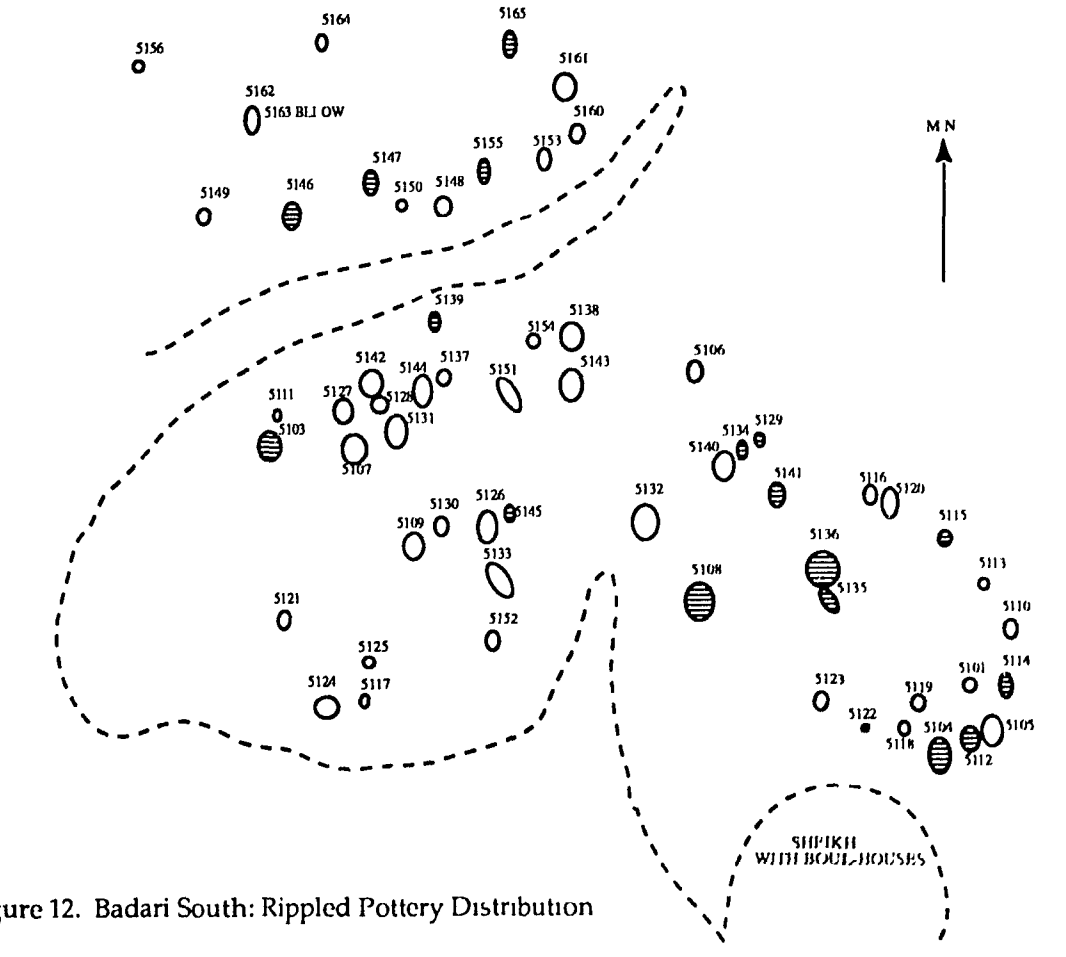

Figure 12. Badari South: Rippled Pottery Distribution

7.2 Mostagedda

At Mostagedda, it was established that the burial offerings were *not* randomly distributed among the Badarian graves [Appendix C: 4-6], and also that *the distribution of goods was determined by factors other than the age or the sex of the grave occupant.*

Unlike the situation at Badari, the data indicate that at Mostagedda there is *no* association between the number of grave offerings discovered with a burial and the age status of the tomb occupant [Contingency Table 5.8]. Thus, although *more* than the expected number of subadults are found in burials that contain more than three grave offerings, the null hypothesis cannot be rejected because the computed χ^2 value is smaller than the critical table value. Contingency Table 5.8 also reveals that more than the expected number of children are found in burials without offerings, while less than the expected number of adults fall into this category. In general, the burial offerings appear to be fairly evenly distributed among the age groups. It was also not possible to reject the hypothesis that there is no association between the number of grave goods discovered in a particular grave and the sex of the tomb occupant [Contingency Table 5.9].

Furthermore, although there was no significant association between grave size [Contingency Table 5.7] and the quantity of burial offerings found in a particular tomb, and although the wealth indices suggested that luxury items of approximately equal value occurred in three of the cemeteries, the indices also indicated that *the wealthier burials tended to be concentrated at Mostagedda Far-North,* where the wealth index is twenty-seven, while the poorest were those at Mostagedda North, for which a wealth index of thirteen was obtained.

Although only one interment [Burial 592] that probably contained objects made specifically for burial was recognized, five percent of the total Mostagedda burials contained goods that had been fashioned from "exotic" materials. Thus, the female in 428 was entombed with an array of ivory objects including a comb, a vase and a spoon (Brunton 1937: 34). In addition, at least three types of burial could be recognized at Mostagedda:

1. Wealthy interments with possibly *used* toilet articles accounted for three percent of the total. A burial of this type is the undisturbed grave, 2840, which contained a female and a child as well as an ivory bracelet, an ivory spoon, and an alabaster palette with one surface stained red and the other green (Brunton 1937: 6).

2. Burials that were similar to the "wealthy" Badari burials in every respect but substituted products manufactured from local materials. Thus, in Burial 1214, the malachite needed to fulfill the cosmetic requirement was placed in a *bone* spoon (Brunton 1937: 38), and, whereas the female in the undisturbed burial, 428, was accompanied by a "deep-bowled *ivory* spoon stained green with malachite paste" (Brunton 1937: 34), *Mutela* shells filled with malachite paste were found in Burials 3555 and 496B. Five percent of the total burials were of this type.

3. Burials that contained used domestic objects. At Mostagedda East, a smoke blackened bowl accompanied the child in Burial 3531, and a smoke-blackened cooking pot was found in the tomb of the adult male in 3515 (Brunton 1937: 42). Eleven percent of the Mostagedda graves can be assigned to this burial category.

This identification of differences in burial status between grave occupants at Mostagedda suggests the existence of different social positions in life (O'Shea 1984: 10). Also, although not as pronounced as at Badari, the existence of economic differences between these social positions further implies the existence of limited access to resources by certain members of Badarian society.

In addition to the burials that displayed economic differences, interments revealed that some Badarian communities may have employed more than one form of body treatment during corpse disposal. Headless corpses, multiple burials, and possible symbolic graves have all been discovered in Badarian burial contexts. Thus, an adolescent in Area 2000 at Matmar had been interred without a head (Brunton 1948: 7); the body in Burial 2015 at Hemamieh was missing a head (Brunton and

Caton Thompson 1928: 4); and not only was the head of the adult female in an undisturbed grave [Burial 5766] at Badari also missing, but in its place was a pot (Brunton and Caton Thompson 1928: 17). Likewise, a pot had been substituted for the head of the male in the lower, undisturbed, Mostagedda burial in 1206 (Brunton 1937: 38). At Mostagedda, heads were also absent from the intact bodies of the young female in Burial 478; the adult male in Area 300(i); the young male in Burial 444 whose grave had remained undisturbed; the male in Burial 449, an disturbed tomb (Brunton 1937: 33-36); and the adult male in Burial 3515 (Brunton 1937: 42). The Mostagedda corpses in 1229 and 2229 were headless, as were the infants in Area 2200(iv), and in Burial 2708 (Brunton 1937: 40-41). In five cases for which information was given, Brunton reported normal body positions in which the corpse lay on its left side and was oriented towards the south. Body positions were not recorded in four instances, and in three, including the infant in Burial 2708 who was oriented towards the east, they were reported to be abnormal. Thus, the young male in Burial 444 lay on his right side instead of the more customary left, and in 444 as well as 449 the bodies were oriented towards the north. The absence of grave goods as well as the "nonnormative" burial positions and body treatment accorded these two males may symbolize their involvement in deviant behaviour of some kind or mark unusual circumstances connected with their deaths. The presence of two infants among the remaining headless burials suggests that this alternative burial mode was reserved for individuals whose deaths occurred under unusual circumstances (O'Shea 1984: 107). Retaliatory head-hunting has been suggested to account for the occurrence of these headless skeletons (Trigger 1983: 31).

As at Badari, there was evidence at Mostagedda that grave robbing had occurred during the Badarian age. Underlying the male in the undisturbed burial, 196A, was a plundered grave in which nothing remained besides a local *Mutela* shell and an *Ancillaria* of probable Red Sea origin (Brunton 1937: 6; 52). Also, *under* a Badarian grave in Cemetery 400, Brunton discovered a plundered grave that lacked a body but contained a black-topped red pot (1937: 34, 45). The disappearance of bodies from many plundered graves during the Badarian period, as well as the efforts to obtain beads or ivory through robbery indicate that: (i) these goods were of great

symbolic if not economic value as burial offerings and (ii) some sort of burial cult may already have been in existence which encouraged the destruction of the bodies from violated tombs. This ancient plundering of the Badarian tombs also indicates that certain members of the society may have felt disadvantaged because of restrictions on their access to burial offerings.

Thus, although there was no significant association between grave condition and the number of grave offerings found in a particular Mostagedda tomb [Contingency Tables 5.10, 5.11], the distribution of plundered graves showed that robbery had occurred in thirty-five percent of the burials at both Mostagedda East and Mostagedda West, thirty-three percent at Mostagedda North, and twenty-six percent of those at Mostagedda South, whereas *seventy-nine* percent of the interments at Mostagedda Far-North were pillaged [Table 5.2]. When compared with other cemeteries, *plundered graves occurred more than twice as often at the cemetery where the highest wealth index was also obtained.*

A few wealthy individuals were represented in each of three Mostagedda cemeteries. At the largest cemetery, Mostagedda West, ivory was found in Burials 408 and 428; palettes were recovered from two graves, alabaster from one, copper beads from one [596], and large quantities of glazed steatite beads were discovered with the adult male in the undisturbed grave, 592. The exact locations of the two latter graves are unknown; the others were situated on two desert spurs northeast of Mostagedda [Figure 13]. Other "wealthy" burials were similarly dispersed across the spur in Area 400 and further north in Area 500. Ivory was found in two graves at Mostagedda South; one was that of a child, the other that of a female. Slate palettes were discovered in six burials at the same locality [Table 7.7]. Of these, three had been plundered; two belonged to females; and the sixth was the undisturbed grave [2841] of an adult male. Although few in number, these graves were spatially close; one was superimposed on another, and only 2841 was slightly larger than the average for this cemetery [Figure 14]. Mostagedda East contained 108 burials, making it the second largest of the five Mostagedda cemeteries [Figure 15]. Copper was discovered in two graves at this location; ivory was found in six tombs and palettes in four. Three of the graves that contained ivory were spatially close [3521, 3522, and 3537],

but in spite of the occurrence of a relatively large number of luxury artefacts in this cemetery, no "prosperous" area was demarcated. These findings would appear to suggest that burial statuses [and therefore social positions] at Mostagedda were not as differentiated as at Badari.

At Cemetery 1200 [Mostagedda Far-North], however, *grave wealth had been concentrated at a single location* on a spur southeast of Mostagedda [Figure 16]. There, as at Badari, it was found that:

1. Graves containing luxury goods tended to have areas that were larger than the mean grave area of 1.04 square metres calculated for all Mostagedda graves. Thus, the mean grave area for the fifteen graves at Mostagedda Far-North that contained luxury objects was 1.69 square metres.

2. Graves containing luxury goods tended to have more grave goods than other graves. At Mostagedda the mean number of grave goods recovered from the 369 burials was 9.40 [Table 4.12], whereas at Mostagedda Far-North, the mean number of grave goods present in the fifteen graves that contained luxury items was 14.53, and the mean number of burial goods recovered from graves that contained an ivory artefact was 21.00 [Table 7.8].

3. Graves containing luxury goods tended to be more "elaborate" than others. Thus, the individual in 1211 had been laid on a "bier made of sticks running transversely under the body", and hamper coffins were observed in two burials. In 1226 "many sticks [remained] from a bier or hamper coffin", and in 1254, the largest of the 369 graves at Mostagedda, "the body had been apparently placed in a hamper... the sticks of which varied from 1 to 3 cms. in diameter"(Brunton 1937: 38-39). This type of burial may well be a forerunner to the Armant bed burials that Bard has interpreted as possibly being symbolic of authority (1987: 121).

1. Graves containing luxury goods tended to be plundered. Fifteen burials at Mostagedda Far-North contained luxury artefacts; thirteen, or eighty-six percent,

of these graves had been plundered. Seven of the eight tombs in which ivory objects were found had also been plundered.

At Mostagedda, therefore, it would appear that the tendency for more than one corporate group to become attached to a specific burial location was not as pronounced as at Badari, where three spatially distinct zones of "prosperity" were identified in three of the seven cemeteries. With the exception of Mostagedda Far North, there was less economic differentiation between members of the Mostagedda population. The inability of the people in this region to control significant access to the trade items required for burial may be the reason why very little differentiation existed between cemeteries in this area. The fact that graves containing luxury items were only fifteen in number is without doubt the major reason why no correlation was observed between "wealth" and plundered tombs at this locality.

Nevertheless, the discovery that grave goods were not randomly distributed among the Mostagedda graves, as well as that there was no association between the number of objects recovered from the various burials and either the age or the sex of a grave occupant, and that some graves containing luxury goods were restricted to a minority of the burial population, who had also been interred in a spatially distinct area, as well as that these graves were more apt to be plundered than the graves at other Mostagedda cemeteries, all suggest that material wealth had been unequally distributed amongst the mortuary population. This may in turn be interpreted as an indication of differential access to resources by members of the same Badarian community in which both social and economic differences existed

Table 7.6: Burial goods from Badarian burials near Mostagedda [Percentages are based on the total number of grave goods, 3467, at the five Mostagedda cemeteries]

	Mostagedda North		Mostagedda Far-North	
	Number	Percent	Number	Percent
Ivory	0	0	9	0.26
Palettes	0	0	2	0.06
Beads	136	3.92	49	1.41
Total luxury goods	136	3.92	60	1.73
Shells	91	2.71	197	5.68
Pottery	21	0.61	52	1.49
Total grave goods	257	7.41	329	9.48
	Mostagedda West		Mostagedda East	
	Number	Percent	Number	Percent
Ivory	6	0.17	10	0.29
Palettes	2	0.06	4	0.12
Beads	791	22.81	529	15.26
Total luxury goods	799	23.04	543	15.66
Shells	728	21.00	140	4.04
Pottery	81	2.34	72	2.08
Total grave goods	1736	50.07	790	22.78
	Mostagedda South			
	Number	Percent		
Ivory	3	0.09		
Palettes	6	0.17		
Beads	8	0.23		
Total luxury goods	17	0.19		
Shells	271	7.90		
Pottery	38	1.10		
Total grave goods	316	9.98		

Table 7.7: Burial characteristics of Badarian burials near Mostagedda

	Mostagedda North		Mostagedda Far-North	
	Number	Percent	Number	Percent
Total burials	31		53	
Burials with ivory	0	0	8	15.10
Burials with palettes	0	0	2	3.77
Burials with beads	4	12.90	8	15.10
Burials with shells	3	9.68	12	22.61
Burials with pottery	16	51.62	34	64.16
	Mostagedda West		**Mostagedda East**	
	Number	Percent	Number	Percent
Total burials	134		108	
Burials with ivory	3	2.24	6	5.56
Burials with palettes	2	1.49	4	3.70
Burials with beads	11	8.21	12	11.11
Burials with shells	30	22.39	12	11.11
Burials with pottery	63	47.02	56	51.85
	Mostagedda South			
	Number	Percent		
Total burials	43			
Burials with ivory	2	4.65		
Burials with palettes	6	13.95		
Burials with beads	4	9.52		
Burials with shells	5	11.63		
Burials with pottery	33	76.74		
Burials with rippled pottery	14			

Table 7.8: Distribution of ivory artefacts in Badarian burials near Mostagedda

Grave number and condition	Mostagedda location	Grave occupant	Grave area in sq. metres	Total grave goods	Total luxury goods
Graves with 1 ivory artefact:					
108 (undisturbed)	west	child	0.95	55	2
1215 (plundered)	far-north	adult male	1.08	17	8
1217 (plundered)	far-north	adult male	1.33	5	2
1218 (plundered)	far-north	adult male	1.96	13	2
1219 (undisturbed)	far-north	adult female	1.00	70	1
1226 (plundered)	far-north	adult male	2.18	3	1
1259 (plundered)	far-north	male	2.30	5	1
2253 (plundered)	east	child	0.19	4	1
3501 (undisturbed)	east	child	-	54	51
3521 (plundered)	east	adult male	-	4	1
3522 (plundered)	east	adult female	-	51	51
3537 (undisturbed)	easth	adult male	0.75	73	73
2829 (undisturbed)	south	child	0.71	4	2
Graves with 2 ivory artefacts:					
595 (plundered)	west	unknown	1.30	30	11
1205 (plundered)	far-north	adult male	1.35	3	2
2810 (undisturbed)	south	adult female	0.85	24	3
Graves with 3 ivory artefacts:					
128 (undisturbed)	west	adult female	1.35	7	3
1251 (plundered)	far-north	adult male	3.03	5	3
Graves with 5 ivory artefacts:					
2211 (undisturbed)	east	child	0.36	8	5

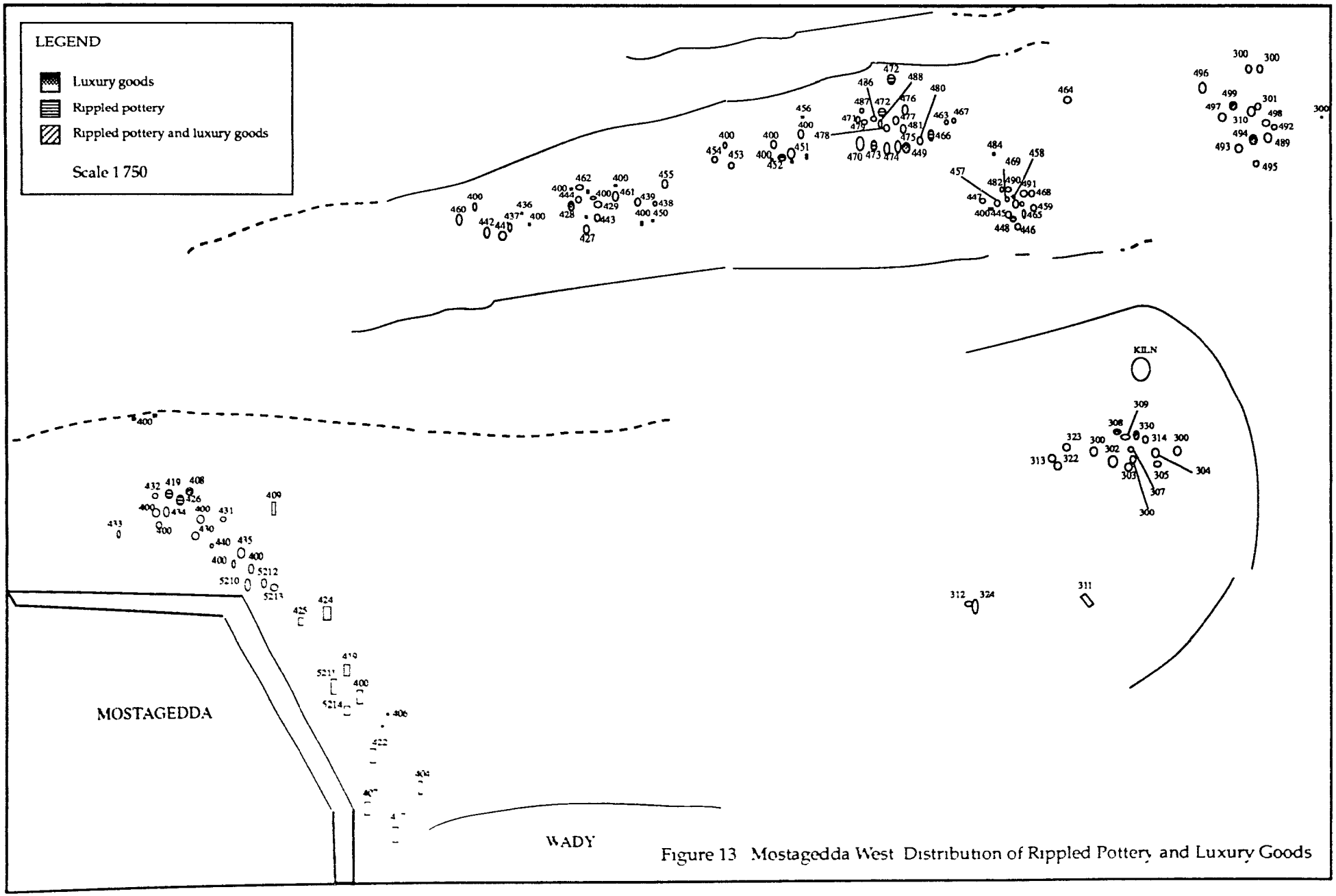

Figure 13 Mostagedda West Distribution of Rippled Pottery and Luxury Goods

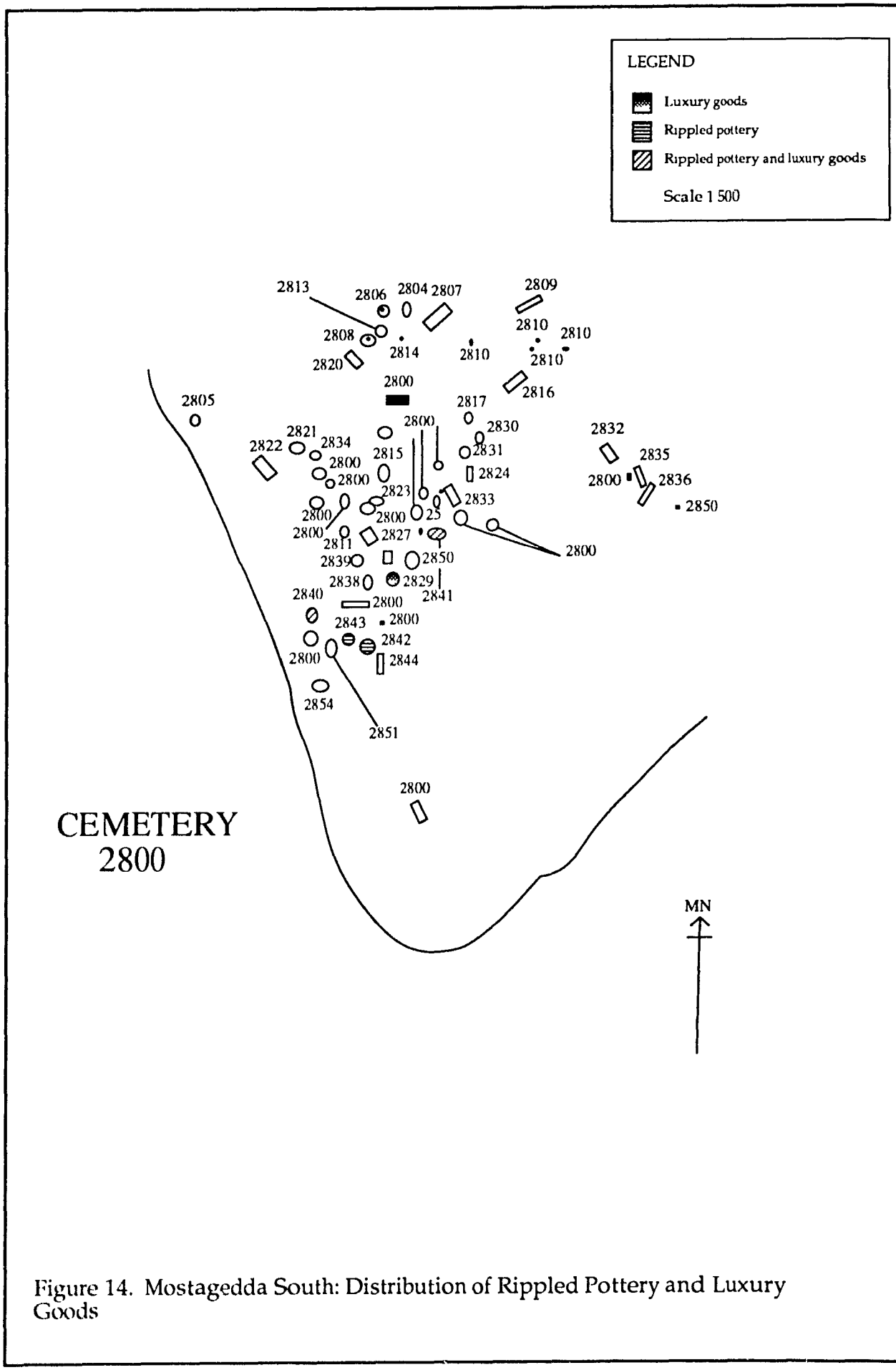

Figure 14. Mostagedda South: Distribution of Rippled Pottery and Luxury Goods

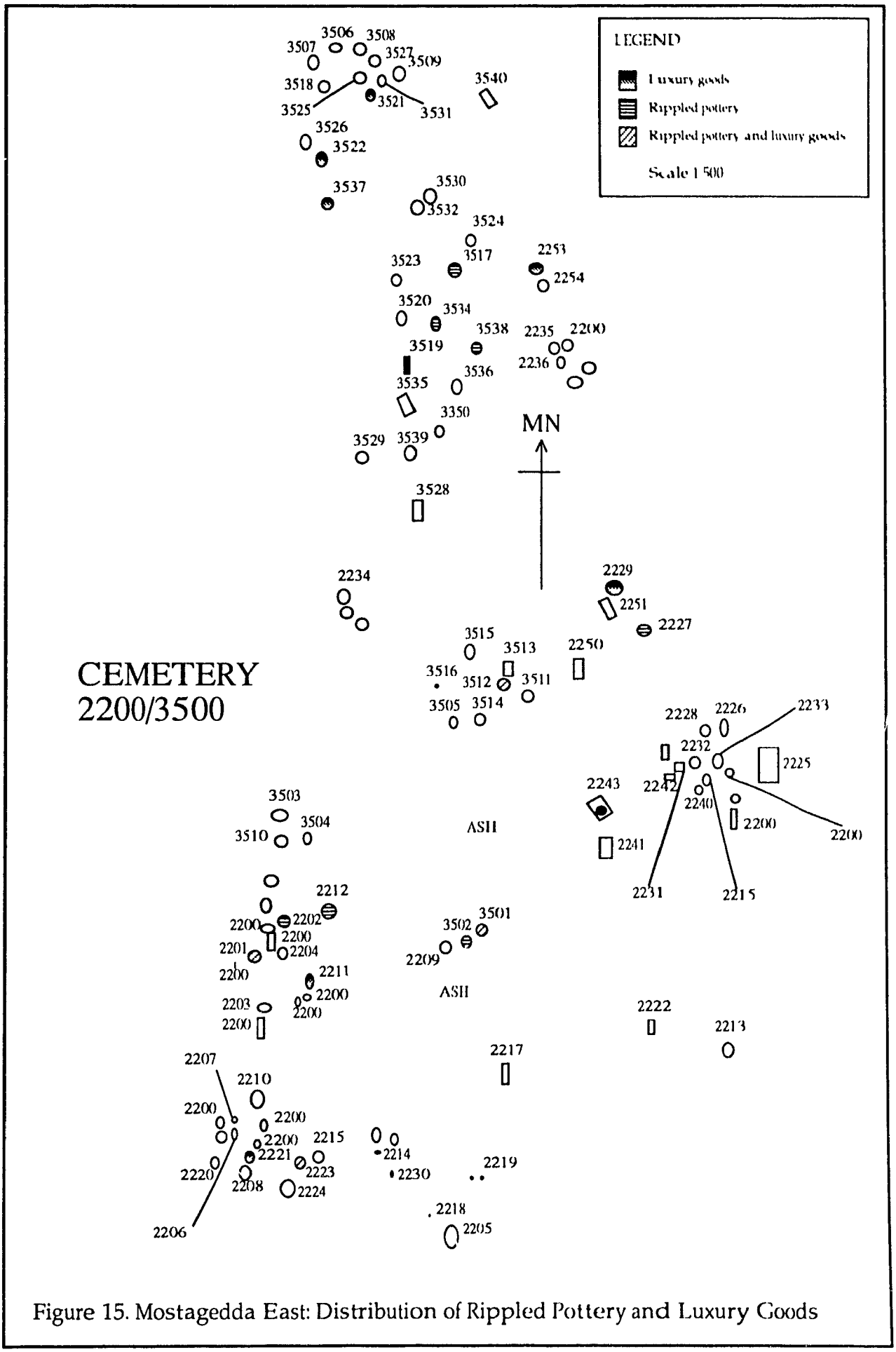

Figure 15. Mostagedda East: Distribution of Rippled Pottery and Luxury Goods

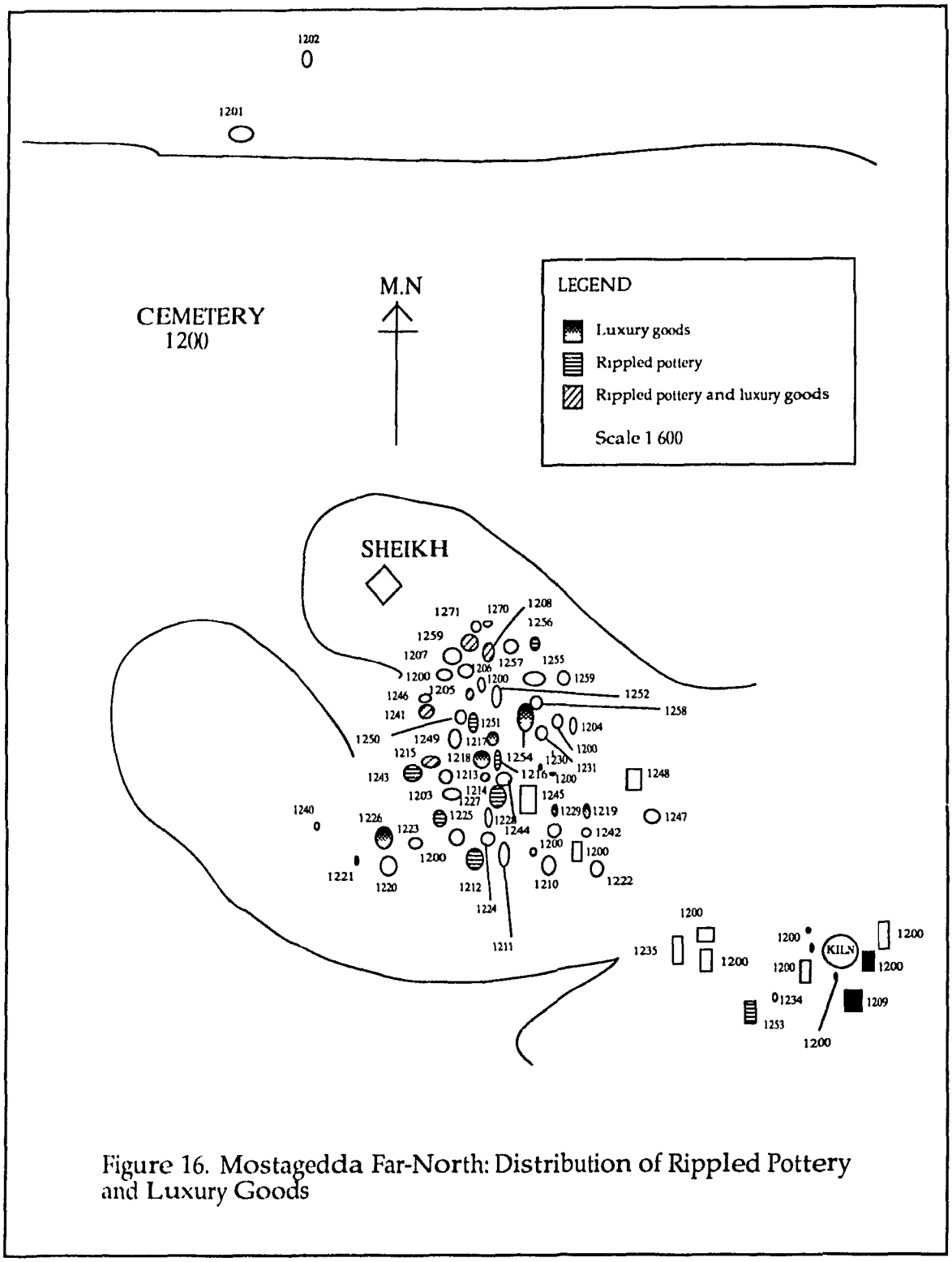

Figure 16. Mostagedda Far-North: Distribution of Rippled Pottery and Luxury Goods

7.3 Matmar

A detailed analysis of the Matmar burials could not be performed because the available published data were insufficient. A lack of grave plans prevented the preparation of a spatial analysis, and in most cases the only information recorded consisted of tallies such as "there were fifteen males, twenty-three females, twenty-seven children..." (Brunton 1948: 8). Nevertheless, it was established that even at Matmar, grave offerings were *not* randomly distributed amongst the grave population [Appendix C: 7]; there was no relationship between the number of grave goods discovered in any grave and the sex of the grave occupant, and subadults tended to have more grave offerings than adults. Also, although there was no significant relationship between the number of burial offerings found in a grave and either its area or its condition, and there was no direct evidence that Matmar tombs had been plundered during the Badarian era, there were many indications that economic differences had existed between the Matmar inhabitants.

Although there were no burials that could be classed as "wealthy", several differences were noted in the *quality* of artefacts associated with specific tombs. The largest number of possibly "restricted" luxury items occurred at Matmar West, where a bead belt, as well as turquoise and rare carnelian beads were recovered from Burial 3094, the plundered tomb of an adult male (Brunton 1948: 8); carnelian beads were also found in two graves at Matmar East, one of which [2507] also contained five copper artefacts; and two ivory fish hooks had been placed in Burial 2508.

In Burial 2516, which contained fish hooks of shell, and in Burial 3107, from which a bone needle and thread were recovered, the artefacts used were fashioned from materials which were probably obtained locally.

A third category of burial statuses that could be recognized among the Matmar burials consisted of those which were associated with *used* domestic objects. Thus, nothing besides a smoke-blackened pot had accompanied the undisturbed adult male in Burial 2033 at Matmar South.

While not as pronounced as those that appeared to exist at Badari and Mostagedda, the existence of these different burial statuses among the mortuary

population at Matmar seems indicative of the existence of different social positions during life.

Also, given the pattern of plundering that has been documented for both Badari and Mostagedda, it is quite probable that the high frequency of robbery observed at Matmar South is a reflection of the former concentration of a considerable amount of wealth in that cemetery. Of the forty-one burials recorded there, seventeen, or forty-one percent, had been plundered. Thus, the only remaining luxury goods consisted of a palette and twenty-eight beads. The motivation for robbery on a vast scale, as well as the location of both the largest grave [3.50 square metres] and the largest mean grave area [1.55 square metres] in this same cemetery [Table 6.6] suggest that Brunton's assessment of "general poverty" at Matmar (1948: 9) may not be applicable to Matmar South. The remains of a hamper coffin in Burial 2006, and post holes in 2019 indicating the former existence of a roof over the grave, are further evidence that some graves had been more elaborate than others. These burials were presumably of individuals who enjoyed an "unusual" number of duty-status relationships with other community members and who were thus entitled to more than the "normal" amount of corporate participation in the mortuary process, both in terms of energy expenditure and economic contributions.

It was not possible to discover whether or not these burials were spatially removed from those of the economically disadvantaged members of the population; however, Brunton reported that "the main group of graves was in the centre of the spur...". In addition, there was no spatial separation between the burials of males, females or children (1948: 7), who tended to outnumber adults at many cemeteries. It is therefore highly likely that grave placement was carried out according to economic and social criteria, in the manner observed at Mostagedda and Badari. Thus, particular cemeteries, or certain areas of cemeteries, may have been associated with the more "affluent" members of the society.

Chapter 8

Conclusion

A general analysis of the data resulting from Brunton's excavations of Badarian cemeteries suggests that the distribution of burial goods amongst the occupants of Badarian tombs occurred in a nonrandom fashion. A more specific study indicated that the 111 ivory artefacts among these offerings were also distributed among the graves in a nonrandom manner [Appendix II: 1]. Furthermore, a frequency distribution of the total grave offerings at all eighteen Badarian cemeteries revealed that the dispersion of goods was *bimodal* [Figure 17]. This reflected the division of Badarian graves into a large group [ninety-two percent] of "poor" burials containing less than thirty-five objects each, and a smaller group [eight percent] of "wealthy" tombs, each of which contained more than thirty-five objects. This grouping of graves suggests a corresponding social division of the Badarian population. The data also indicate an association between the number of burial goods recovered from the various tombs and (i) the sizes of graves; (ii) the condition of graves and (iii) grave occupants designated 'children'. However, the data do not indicate an association between the sex of the grave occupants and the number of grave goods retrieved from any particular grave. Moreover, it was discovered that plundered graves tended to be those which contained most grave offerings and most luxury goods as well as those that were slightly larger and more 'elaborate' than average. In addition, the spatial analysis of these data indicates that 1) Badarian communities made use of formal disposal areas to which inclusion was granted on the basis of economic status rather than age or sex, and 2)

that some form of resource control was operative and that this control may have been vested in a hereditary authority.

Although it is possible that the lack of later Amratian and Gerzean components in the largest Badarian cemeteries may be the result of Brunton's characterization of the poorer graves as "Badarian" and the wealthier ones as "Amratian", it is more likely that the two-tier social system identified from the Badarian mortuary remains reflects the burials of "economically" distinct groups amongst whom social ranking developed as the result of corporate group control over highly valued resources.

O'Shea has suggested that "horizontal social distinctions [such as age and sex] will be expressed through attributes of relatively equal energy intensity... such as varying grave orientation, posture, or spatial separation". In addition, when vertical social distinctions exist in a society, the various kinds of horizontal social differentiation present should be crosscut by other types of mortuary distinction (1984: 43-47).

At those Badarian cemeteries for which grave plans were available, the most notable aspect of burial placement was the tendency to separate burials into distinct clusters in various sections of the same cemetery. In two instances, Brunton asserted that a segregation of the sexes was the object of this differentiation in burial treatment. "Female graves were not placed apart; where there are graves of women there are also graves of men alongside. [However], certain areas... were reserved for men. In Cemetery 5300-5400 [Badari North], the whole of the western... part contains no female grave whatever, with the exception of 5392, where the sex was rather doubtful. In Area 5700 [at Badari West]... all the graves nearest the wadi bank are of men or children, without exception" (Brunton and Caton Thompson 1928: 19-20). An analysis of the western section of Cemetery 5300-5100 revealed that in at least three [5376 5380 and 5392], or eight percent, of the instances the sex of the grave occupant was doubtful. Also, of the thirty-eight skeletons recovered from this part of the cemetery, nine [twenty-four percent] belonged to children and were therefore of undetermined sex. Thus, thirty-two percent of the grave occupants could not be categorized as males. Similarly, of the thirty-two graves that lined the wadi bank at Badari West, ten [thirty-one percent] were of children. Brunton's observation that

the eight graves in the north-eastern portion of this same cemetery were reserved for male burials is likewise invalidated by his inability to assign male status to sixty-three percent of the grave occupants, due to the occurrence among these burials of three children's graves [5807, 5809 and 5811], one female's grave [5802] and one unidentified grave [Burial 5813]. No other expressions of horizontal social differentiation could be discerned from the pattern of Badarian burial treatment, although corpses were occasionally oriented in directions other than towards the south. Thus, some other explanation must be sought for the patterning observed by Brunton. After a review of the ethnographic evidence from thirty societies, Tainter suggested that the "presence of formal disposal areas will strongly indicate that the archaeologist has isolated individual corporate groups..." (1978: 123). The tendency to place burials in clusters along the desert spurs might, therefore, reflect the existence of family or clan groups amongst whom pottery, like mussel shells among the Pawnee, may have been employed to denote membership (O'Shea 1984: 107). It would then appear that amongst the Badarians, individuals who belonged to the same corporate group did not necessarily share an identical burial status, since the mortuary data indicate that *a variety of different statuses were seemingly represented in each burial cluster.*

Pottery distribution within the Badarian graves suggests that within the Badarian community pottery served as an ethnic rather than a vertical or horizontal social marker. Cross-tabulations between the *presence or absence* of pottery and the age and sex status of grave occupants at all Badarian cemeteries did *not* demonstrate a relationship between any of these variables: Pottery was expected to be found in 107.58 subadults' graves and found in 103; it was expected in 191.51 adults' graves and found in 192; and expected in 23.91 old individuals' tombs and discovered in thirty-one. Likewise, pottery was expected in 125.92 males' graves and observed in 129, and expected in 97.08 females' graves and found in ninety-four. The data also do not indicate *any* association between the *presence* of pottery in a Badarian grave and the condition of the grave. Cross-tabulation of these two variables indicated that pottery was expected to be found in 124.65 plundered graves and discovered in 123; expected in 46.82 disturbed tombs and found in fifty; and expected in 216.53 undisturbed graves and found in 215.

But, a cross-tabulation of grave condition and pottery at all the Badarian cemeteries indicated that there *is* some association between the *total amount of pottery* present in a particular grave and the condition of the grave. Thus, while undisturbed graves have the approximate expected low pottery values, more than the expected number of disturbed graves, and almost twice the expected number of plundered graves, contained three or more pots [Appendix: Table H.1]. However, there appeared to be no association between "economic status" and the *type* of pottery that occurred in a particular grave. In seven percent of the Badarian graves that contained only one burial good, that single item was a rough pot. Sixty-eight percent of these graves were undisturbed. However, rough pottery was also present in six percent of those burials that contained more than three burial offerings. Only five graves contained four or more pots. All were plundered, and all contained both polished and rippled ware in addition to unpolished and rough pottery.

Furthermore, the distribution of the rippled pottery used to identify Badarian graves certainly seems to suggest that within the Badarian community rippled pottery served as an ethnic marker since it was associated with both prosperous and non-prosperous groups within cemeteries. This separation between individuals who differed in burial status was most notable at Badari North where rippled pottery was found to be relatively abundant in the western portion of the cemetery which was completely lacking in luxury goods of any kind. Thus, when the sixty items found in the tomb of one child were omitted from the calculations, 1.05 was the average number of grave goods occurring in thirty-seven undisturbed graves in the western area of Cemetery 5300 (Badari North). In practically every instance, the burial offering was a pot; a rippled variety was used in eleven, or thirty percent of the burials. In nine cases the rippled pot was the only burial offering. Rippled pottery was also likely to be found in plundered graves. At Badari, for example, thirty-nine pots, or fifty-three percent of the rippled pottery, were discovered in plundered graves. Rippled pottery was recovered from fourteen tombs at Mostagedda Far-North; thirteen of these, or ninety-three percent, were plundered. At Matmar, where eleven percent of the graves contained rippled pottery, twelve rippled pots were distributed amongst ten burials. Only four of these were undisturbed. One disturbed tomb contained an adult female

with four grave goods including a palette and a shell, while the other contained an adult male and no other burial offerings. The three plundered tombs were those of a child with a palette and fifty shells; an adult male with a shell and 101 beads, and an adult female with nothing besides three rippled pots. The remaining rippled pot was found in a plundered grave that also contained seven beads and a rough pot. Sixty-seven percent of the Matmar rippled pottery was therefore discovered in plundered or disturbed tombs.

The distribution of polished pottery within Badarian graves also seems to indicate that within the Badarian community it may have served primarily as an ethnic rather than a vertical social marker. Although far more restricted in its distribution than the rippled pottery, and more often associated with prosperous groups, it was also occasionally discovered in the "poorer" graves. At Badari, polished pottery was almost always restricted to the "richer" graves, although it was also found in six percent of the relatively poor burials at Badari West. Thirty-three, or thirteen percent of the graves at Badari contained polished pottery. *The cumulative wealth index of all Badari graves is twenty-four; the wealth index for the thirty-three graves with polished pottery is sixty-three.* At Badari North, two [two percent] of the graves in the western section contained polished pottery. Both of these burials were undisturbed In the eastern portion of the cemetery, polished pottery was recovered from eight, or nine percent, of the graves. Eighty-eight percent of these graves were plundered. The wealth index for this entire cemetery is twenty-nine; that of the two graves in the western section that contained polished ware is forty, while that of the eight graves in the eastern area with polished pottery is seventy-nine. Seventeen percent of the graves at Badari South contained polished pottery. All were plundered The wealth index for this entire cemetery is sixty-one; that of the nine graves with polished pottery is 109. At this same cemetery, rippled pottery occurred in thirty three percent of the graves, and eighty-nine percent of these had been plundered. The wealth index for the eighteen graves that contained rippled pots is sixty, a value that is slightly lower than that obtained for the cemetery as a whole. However, not only was there a close correspondence between polished pottery and grave wealth at this cemetery, but a spatial analysis showed that five [fifty-six percent] of these graves were situated

in the south-western portion of the cemetery. Fifty-six percent [ten] of the graves with rippled pottery was located in the south-eastern section of the cemetery, while the north-west and south-west areas each contained twenty-two percent.

Eight percent of the Mostagedda graves contained polished pottery. The wealth index for these graves was twenty-one; that for all the Mostagedda cemeteries was twenty-two. However, although only forty percent of all burials at Mostagedda had been plundered, sixty-two percent of those with polished pottery were plundered burials. At Matmar, polished pottery was found in ten percent of the graves, and six of these nine tombs were plundered. The wealth index of those graves from which polished pots were excavated is nine, whereas the overall Matmar wealth index is twenty-six. Nevertheless, sixty-seven percent of the Matmar polished pottery was discovered in plundered burials.

This distribution of rippled and polished pottery therefore suggests that *pottery was consistently ignored* by Badarian tomb robbers whose activities were traced to the Badarian period by Brunton, who found plundered Badarian tombs beneath intact Badarian graves at both Badari and Mostagedda. This ancient plundering of the Badarian tombs also suggests that certain members of the society may have been disadvantaged because of restrictions on their access to burial offerings.

The implication of this phenomenon is that some burial offerings may have been regarded as "sumptuary" items that served to mark differences in rank and to which restricted access was socially sanctioned (Baird 1987: 121). Thus, plunderers were engaged in removing "sociotechnic" artefacts [or those that served to symbolize social rank or vertical social differentiation] from tombs. A spatial analysis of the cemetery plots provided by Brunton for burials at Badari North, Badari West, Badari South and Mostagedda Far-North did indeed suggest that *certain burial items, such as ivory objects and carnelian beads, tended to cluster in specific areas.*

At Badari South the grave plot distribution revealed that burials were grouped in three sections. Roughly equal numbers of burials were located in each section. Graves were first categorized in terms of the presence or absence of ivory. Although some ivory bearing tombs were situated in both the north-western and south-western areas, ten graves containing ivory were clustered in the south-western portion of the

cemetery. Among these were tombs that contained an elaborate statuette of elephant ivory, a knobbed ivory bracelet, and fancy ivory combs as well as spoons. Only four graves in the south-eastern part of the cemetery contained ivory, and ivory occurred in only two graves in the north-west portion. Ivory was discovered in a dozen Badari North graves and in seven tombs at Badari West.

Of the three burials at Badari South that contained carnelian beads, two [Burials 5111 and 5132] were located within the orbit of the ivory bearing tombs. At Badari West, carnelian was recovered from two burials, 5710 and 5718, both situated in the previously identified cluster of tombs that contained luxury objects. Five burials in the eastern section of the cemetery at Badari North also contained carnelian [5397, 5399, 5403, 5413 and 5449].

O'Shea has also proposed that the "relative pervasiveness of an attribute may suggest critical elements affecting its occurrence. A trait occurring in approximately half of the observed burial units may symbolize a basic, binary division... whereas an attribute occurring in only a few graves might reflect a more restricted social status, such as the symbol of prominent status or the constrained distribution of an exotic trade commodity..." (1981: 43-47).

Brunton's excavations established that access to carnelian was probably even more restricted than access to ivory since only seventeen of the total number of Badarian burials unearthed contained objects *manufactured from carnelian* (Brunton 1937: 52; 1948: 10). Ten of these tombs were located at Badari, four at Mostagedda and three at Matmar.

Although energy expenditure on either tomb construction or burial offering manufacture is difficult to assess, the occurrence of a large number of rather elaborately carved ivory objects as well as the presence of turquoise, jasper and carnelian beads, all evidence of the existence of trading networks and craft specialization, indicate that considerable wealth had been concentrated in some tombs, especially those at Badari South, and moreover, that those members of the community with the *most* access to ivory [and possibly the "wealthiest"] tended to be buried in the south-western portion of the cemetery. Unfortunately, since most corpses had probably been destroyed by grave robbers, only ten bodies remained in the north-west

area of the cemetery, seven in the south-west and five in the south-eastern section. However, throughout the cemetery, luxury goods such as slate palettes, malachite, blue glazed steatite beads, and occasionally, even ivory, were found in the burials of adult males [5155; 5115; 5128; 5150], adult females [5151; 5163] and children [5119]. A great deal of wealth had also been concentrated in the tombs of both adults and children at Mostagedda Far-North, Badari North, and Badari West. Moreover, it was established that the more economically advantaged members of the community tended to be buried in restricted portions of the latter two cemeteries.

Thus, the results of this analysis seem to indicate that the burials of some Badarian adults and children are evidence of "greater energy expenditure" than those of other adults and children. Such individuals were in the minority and were presumably those who held a different and higher status in relation to the majority of individuals within Badarian society. The tombs of these individuals who were accorded separate status and more lavish burial offerings therefore have some items as grave goods that are not shared by other members of the society (Peebles and Kus 1977: 431) The findings of this analysis therefore appear to be inconsistent with the portrayal of Badarian society as "egalitarian" or lacking in social complexity. It was therefore concluded that "[d]ifferential access to resources is demonstrated by the very unequal distribution of grave goods" (Bard 1987: 46), and, moreover, that because economic differences between members of the Badarian community were striking, then social system must be considered to be inegalitarian. Although it was not demonstrated that such differential access included differences in access to "the basic resources that sustain life" (Fried 1967: 186), it is quite possible that if some form of a burial cult was in existence, such differences in access would translate as differential access to 'immortality' for members of the same population. Perhaps it was for this reason that the more economically deprived members of the Badarian community resorted to plundering the tombs of the wealthier Nile Valley inhabitants.

Finally, a study of the sequence dates assigned to pottery from these graves by Flinders Petrie revealed that a small sample of graves from each cemetery falls into the period represented by each sequence date [Appendix: Table II.2]. This may be an indication that the sequence dating "chronology" designed for the Badarian

period is inaccurate. It may also be an indication that all the Badarian cemeteries were utilized over long periods of time. The late predynastic cemeteries at Armant, Nagada, and Diospolis Parva were certainly reused over long time periods, and during the historic era there is also evidence of the long use of specific cemeteries.

Thus, although difficult to detect, the possibility exists that the observed non-random apportionment of burial goods amongst Badarian tombs is the result of minimal changes over time in "egalitarian" burial practices that encouraged an increase in the number of offerings that accompanied the dead. If larger numbers of artefacts were being *equally distributed* in *all* graves at each period in time, no social differentiation may have occurred throughout the Badarian era. Unfortunately, "dates" are only available for five percent [thirty-seven] of the 725 Badarian graves used in this analysis. A further analysis of these "dated" graves revealed that those burials containing the highest number of grave goods tended to cluster at the end of the sequence designated by Petrie as the latest in time [Appendix. Table II.2]. However, although many of these "later" graves [thirty-eight percent of those dated between S.D. 25 and S.D. 30] also contained larger numbers of luxury offerings than those earlier in the series, there appeared to be no correlation between either ivory artefacts, or palettes, and a "late" sequence date. The increase in tomb offerings during S.D. 28 and 29 can be attributed entirely to the presence of large numbers of shells and beads in six [sixteen percent] of the dated tombs. Four of these were located in the "rich" east section at Badari North; one was at Badari South and the other at Badari West.

The eight sequence dates available for the western section of the cemetery at Badari North suggest that it was utilized throughout the whole Badarian period, *none* of the graves had been plundered; only one or two grave offerings had been placed in each grave, and luxury items were absent from all graves except Burial 5374, which contained nine objects, including two beads, that were assigned to S.D. 25.

The twelve dated graves from the eastern section at Badari North also suggest that this portion of the cemetery had been used throughout the entire Badarian era. Seventy-five percent of the burials had been plundered, and the two undisturbed

graves were the "latest" in time. This indicates that the rate of plundering did not deviate over time. Between S.D. 21 and 26, the average number of offerings in each dated grave is 3.43; between S.D. 27 and 29, the average number of offerings in the dated graves is 42.6. Palettes and ivory are found in both "early" and "late" graves in this cemetery, while the increase in offerings evidenced between S.D. 27 and 29 is due to the presence of a large number of beads.

There also appeared to be no correlation between grave area and sequence date such as would be expected if tombs were actually becoming more "elaborate" over time. At Armant, Bard found that the "earlier [Amratian] graves were rough ovals, commonly of less than 1 sq.m. in area, while the later ones were rectangular, varying from 1 to 3 sq.m. in area" (1987: 80-81). At Badari North, the existence of a rather weak relationship between grave size and the richness of grave goods presents the possibility that the "end" of Petrie's sequence merely represents the more economically advantaged members of the Badari North community.

At Badari South, sequence dates are available for seven graves. As at Badari North, the dates indicate that the cemetery was in use during the whole Badarian period. The three "oldest" graves appear to have been dug in the south-east while the two "latest" graves are situated in the north-west and south-west. Only one of these graves [S.D. 21] was undisturbed; the remainder [eighty-six percent] was plundered. This suggests a constant rate of plundering over time. Moreover, the poorest grave occurred at the end of the sequence whereas the richest tomb [5112] was assigned to S.D. 22. Burial offerings recovered from the latter grave included polished, unpolished, rippled and rough pottery; seven ivory artefacts; a palette; beads; shells; and a copper pin, reported to be the only metal tool found in a Badarian grave. In addition, no diachronic deviation could be observed in either the type of grave offering, total number of pots or total number of grave goods deposited in these graves.

The sequence dates for seven Badari West graves span the period from S.D. 21 to S.D. 28. The condition of one burial was not reported; the rest [eighty-six percent] were undisturbed. There was a definite increase in the total number of goods deposited in these graves over time: one item during S.D. 21, three at S.D. 24, and twelve at S.D. 28. However, of the graves assigned to S.D. 25, one contained

four pots and another three, while the third contained four beads, three shells and a pot. *These differences suggest that even during the same time period, there were differences in the types of burial offerings placed in graves.*

Likewise, of the graves assigned to S.D. 27, one *undisturbed* grave in the "poorer" western section at Badari North contained one rippled pot while one *plundered* grave from the "richer" eastern section of the *same* cemetery contained a shell, 103 beads, a polished pot and a rippled pot. The remaining S.D. 27 graves were located at Badari North and South. That in the eastern section at Badari North contained a polished pot; that at Badari South contained ten beads and two rippled pots. Both had been plundered. *These differences indicate that during the same time period, there were differences in the types of burial offerings that were placed in the graves of different cemeteries.* Because such differences are evident from the "earliest" time periods, it would appear that social status and thus grave *location* rather than "date" was the primary factor that determined both the number and types of artefacts that tended to be placed within a particular grave.

In addition, by using the straight-line probabilistic model, $y = a + bx$, where y is the dependent or response variable [total grave goods from 'dated' graves]; a is the y intercept; b is the slope of the line; and x is the independent or predictor variable [sequence date], a regression of total "dated" grave goods on sequence dates was performed (McClave and Dietrich 1988: 681). The computed value of R-squared [where R is the correlation coefficient between the two variables] was 0.107. With only a five percent chance of error, *the test indicated no significant relationship between grave goods and sequence date* [Figure 18].

Although three different "types" of Badarian burial could be distinguished among the richer graves (those that contained goods of exotic materials fashioned specifically for burial, those that contained used goods made from exotic materials, and those with goods made of local products) the economic differences between these were insufficient to infer different "wealth" levels between them. The major distinction between Badarian burials appears to be one between a small group of "richer" and a large group of "poorer" burials which suggests that *the amount of differentiation present was probably equal to that established by Baid for the Amratian burials*

at Armant. There is thus evidence of a two-tier hierarchy within Badarian society although these burials are presumably far older than those at Armant, where the data indicate that even by the Amratian period only two classes of grave type can be distinguished.

In order to assess "grave differentiation and changes in this through time" amongst the dated predynastic burials at Armant, Kathryn Bard conducted a cluster analysis on the *types* of burial offerings found in the graves of different time periods. She was able to show that predynastic graves tended to separate into two clusters. Even the twenty-eight graves from the earliest Amratian period, "Ic", formed two distinct clusters of eight and nineteen graves respectively. Since the average size of the small cluster of eight graves was 1.15 square metres and contained an average of 2.87 undecorated pots, while the average size of the large cluster of nineteen graves was 0.8 square metres and contained an average of 0.65 undecorated pots (1987: 102), Bard concluded that "the clusters clearly differentiate between two groups of richer and poorer graves in the earlier...and later...periods" (1987: 123-125).

Bard also reported that among the Armant burials, "social differentiation, in terms of burial goods, does not deviate through time..." (1987: 123-125). Unfortunately, due to the small sample size of the "dated" Badarian graves, it was not possible to determine whether any significant changes in social differentiation had taken place within the Badarian communities over time. However, the analysis of mortuary data from Brunton's excavations does suggest that the type of social differentiation described by Bard for the Amratian population at Armant had occurred to a similar degree at an even earlier period among the Badarian communities that inhabited the east bank of the Nile between Matmar and Etmanieh.

Although an argument for the existence of social hierarchy amongst Badarian groups has been presented, an alternative explanation can be offered for the apparent division into "richer" and "poorer" groups. Since Badarian inequality appears to have been poorly developed, *the placement of burial offerings in some graves and not in others may have been motivated by the recognition of inherited prestige within an egalitarian context.* James Brown has suggested that it is necessary to distinguish between "inherited prestige" and "inherited authority" because both conditions can

be symbolized by the presence of "lavish" burial offerings in the graves of subadults. (1981: 29-30). It was suggested that bead belts may have functioned as symbols of authority amongst the Badarians, but other classes of luxury goods were lacking from three of the five graves in which bead belts were discovered, and only the Matmar burial [3094], which also contained carnelian and turquoise, had been plundered. Unless items that specifically symbolize authority are discovered, the existence of inherited authority amongst the Badarians cannot be assumed. However, Brown has cautioned that the absence of authority symbols "may not indicate the absence of inherited authority" (1981: 30).

Brown has also suggested that in instances where social ranking is poorly developed, age and sex distinctions, as well as "circumstances of death and social deviance" will tend be symbolized, and grave wealth will be minimal (1981: 29). Statistical tests indicate that two groupings of Badarian tombs could be distinguished by the placement of particular *classes* of burial goods with specific age or sex categories. Cross-tabulations between the *presence* of tools and both the age and sex of grave occupants in all Badarian cemeteries revealed that there *is* an association between tools and both variables. *Tools are more likely to be found with adults and males than with children or females; the reverse is true of shells.* Less [nine] than the expected [16.38] number of subadult graves contained tools, while more [thirty-seven] than the expected [29.62] number of adults' graves contained tools. More [thirty-three] than the expected [25.98] number of males' graves, and less [thirteen] than the expected [20.02] number of females' graves had tools. Similarly, cross-tabulations established that there is a relationship between the presence of shells and both age and sex categories. However, more [forty-eight] than the expected [35.97] number of children's graves contained shells, and fewer [fifty-three] than the expected [65.03] number of adults' tombs had shells. More [thirty-four] females' graves than expected [26.12] had shells, and less [twenty-six] than the expected [33.88] number of males' tombs contained shells. Unfortunately, it could not be demonstrated that any other categories of burial offerings had been distributed along either age or sex lines.

Brown also postulates that "rights to symbolically special burial locations" are better indicators of the emergence of ascribed statuses than the presence of

subadult burials (1981: 29). Burial clusters have been identified on desert spurs once utilized by Badarian communities, and have been interpreted as evidence of the attachment to land by emerging power groups. But burial clusters could also have resulted from the long use by everyone of confined areas, initially chosen because of the limited space that was available on desert spurs during the annual flood season. Thus, since it is extremely difficult to confirm the existence of inegalitarianism in situations where inequality is incipient rather than developed, the possibility that only inherited prestige, rather than social stratification, is symbolized in Badarian burials should not be overlooked.

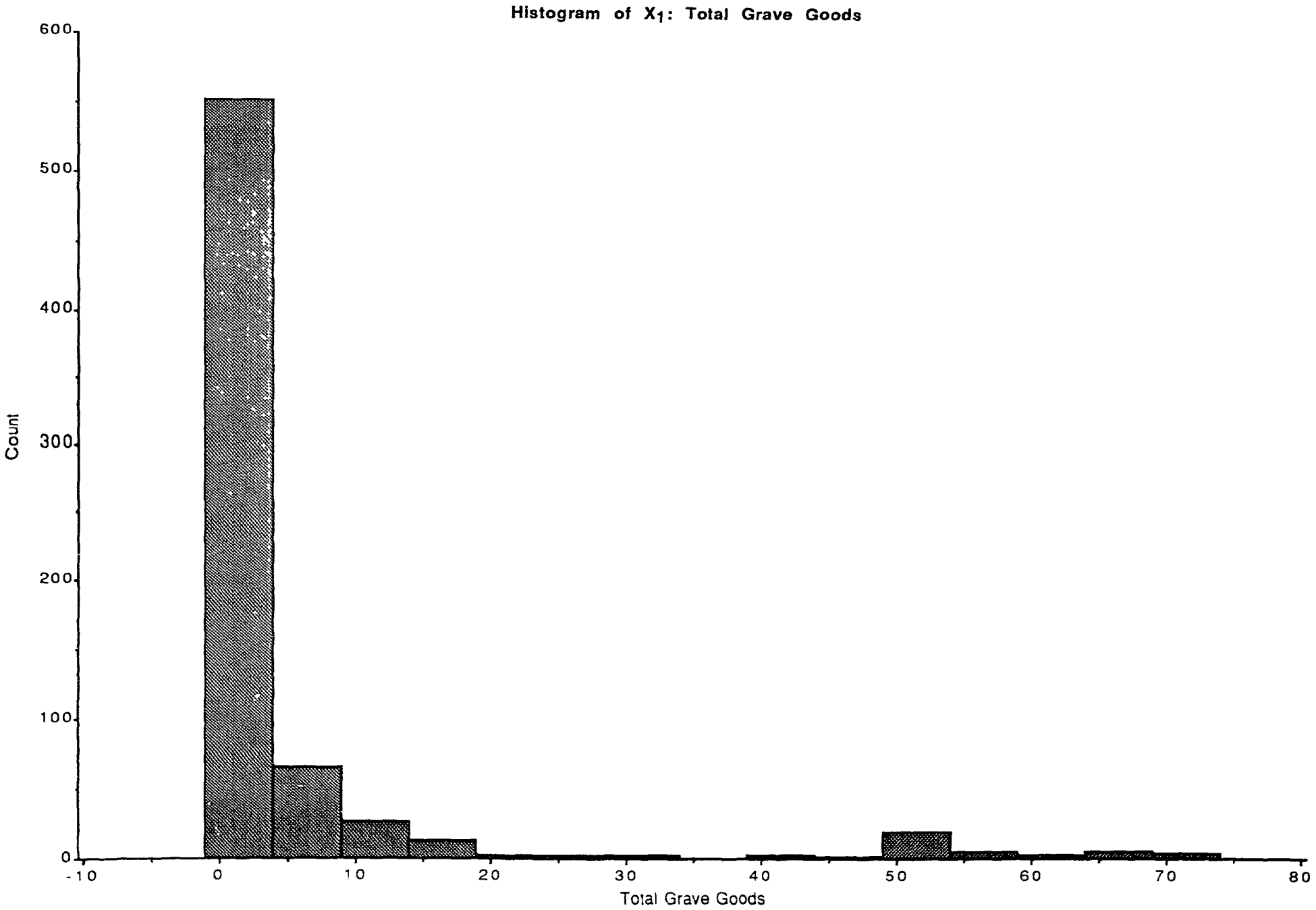

Figure 17 Badari Mostagedda and Matmar Histogram of Total Grave Good Distribution for All Cemeteries

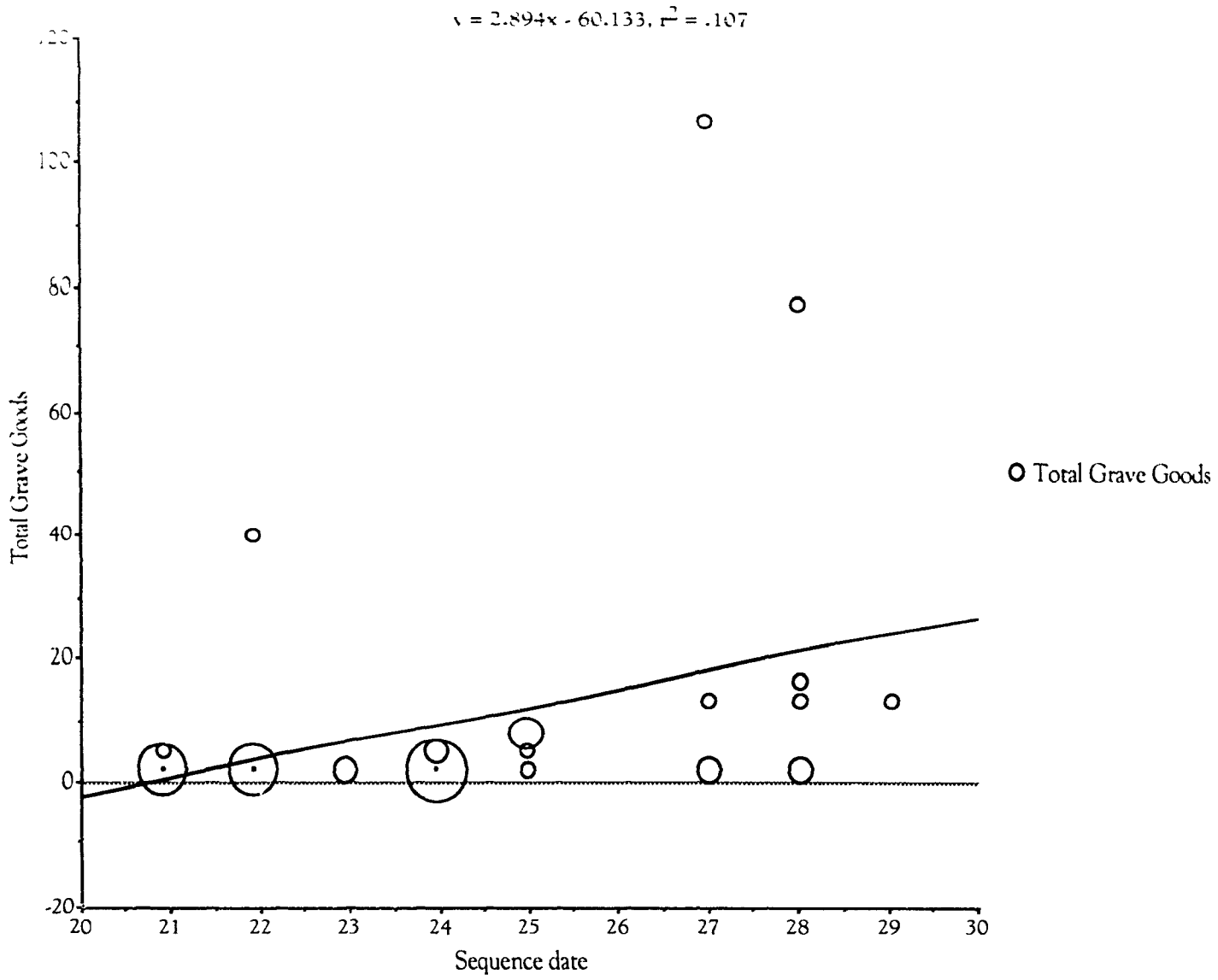

Figure 18 Regression of Total Grave Goods from "Dated" Graves on Sequence Date

Appendix A

Testing for randomness of distribution of grave goods among graves: theoretical assumptions.

We have a cemetery with f grave goods distributed among n graves and we wish to test the hypothesis

H_0 : the grave goods are distributed at random among the graves.

"Distributed at random" will be interpreted to mean that

- a given individual grave good has equal probability $1/n$ of occurring in any given grave.
- the grave goods are independently distributed. That is, for example, the placement of the ith individual grave good has no bearing on the placement of the j th individual grave good, for any i and j.

For practical purposes of the statistical analysis which follows, the graves will be divided into r groups of possibly unequal size. Let

X_i = number of grave goods falling into the ith group, $i = 1, \ldots, r$.

Then by (i) and (ii) above, the joint distribution of $X_1, \ldots, X_r$ is *multinomial*; that is, the f grave goods are distributed among the r groups according to the formula

$$\Pr\{X_1 = x_1, \ldots, X_r = x_r\} = \frac{f!}{x_1! \cdots x_r!} p_1^{x_1} \cdots p_r^{x_r} \tag{1}$$

where

$$x_1 + \cdots + x_r = f$$

and where

$$p_i = \frac{1}{n} \times \text{ (number of graves in group } i), \quad i = 1, \ldots, r.$$

Then the hypothesis H_0 is equivalent to the following hypothesis

$$H_0' : X_1, \quad ., X_r \text{ have the multinomial distribution given in (1)}$$

and rejecting (or accepting) H_0' is equivalent to rejecting (or accepting) H_0.

We can test the hypothesis H_0' (and therefore the hypothesis H_0) as follows: Let

f_i = observed number of grave goods falling into group i,

e_i = expected number of grave goods falling into group $i = f \cdot p_i$,

where $i = 1, \ldots, r$. Define

$$\chi^2 = \sum_{i=1}^{r} \frac{(f_i - e_i)^2}{e_i}. \tag{2}$$

Then χ^2 will have (approximately) a chi-square distribution with $r - 1$ degrees of freedom. The approximation can be considered "good"provided r is at least 5, and provided all the e_i's are at least 5. We can reject H_0' if

$$\chi^2 \geq \chi^2_{\alpha, r-1}.$$

Appendix B

Methodology of the Goodness of Fit Test.

1. Determine restrictions for particular test e.g. "undisturbed children's graves"
2. Determine descriptive statistics: grave goods count (f) and grave count (n)
3. Divide n into at least 5 groups
4. Count the number of grave goods f_i that fall into each group
5. Calculate the expected frequencies $p_i \times f$ for each group
6. Using the formula in (2) for χ^2, substitute values of f_i and e_i to calculate χ^2
7. Determine the critical value of χ^2 from the tables. For example, $\chi^2_{05,4} = 9.48773$ and $\chi^2_{05,5} = 11.07$
8. Theory: if the calculated χ^2 is larger than the critical value reject the null hypothesis that the distribution of grave goods is random

Appendix C

Goodness of Fit Test for the random distribution of grave goods among the undisturbed graves in all the Badarian cemeteries.

1. Badari—Total Grave Goods in Undisturbed Graves of Adult Males. There are $n = 55$ such graves. These were divided into $r = 5$ groups by placing the first 11 male adult undisturbed graves into group 1, the next 11 into group 2, and so on. There were a total of $f = 1117$ grave goods found among these 55 graves. The following information was obtained:

Group(i)	No. in Group	p_i	f_i	e_i	Contribution to χ^2
1	11	11/55	10	229.1	209.83
2	11	11/55	15	229.1	200.38
3	11	11/55	518	229.1	363.07
4	11	11/55	585	229.1	551.23
5	11	11/55	19	229.1	192.97

Using (2), we find $\chi^2 = 209.83 + 200.38 + 363.07 + 551.23 + 192.97 = 1517.48$.

Since this is larger than $\chi^2_{.05,4} = 9.48773$, we reject the hypothesis H_0' (and therefore H_0) at level .05. That is, the probability that we are making an error in so doing is .05.

2. Badari—Total Grave Goods in Undisturbed Graves of Adult Females. There are $n = 25$ such graves and a total of $f = 173$ grave goods was found among them. The following information was obtained:

Group(i)	No. in Group	p_i	f_i	e_i	Contribution to χ^2
1	5	1/5	17	34.6	8.95
2	5	1/5	3	34.6	28.86
3	5	1/5	70	34.6	36.21
4	5	1/5	80	34.6	59.57
5	5	1/5	3	34.6	28.86

Using (2), we find $\chi^2 = 162.45$, which is significant at level .05

3. Badari—Total Grave Goods in Undisturbed Children's Graves. There are $n = 29$ such graves, with a total of $f = 629$ grave goods found among them. The following information was obtained:

Group(i)	No. in Group	p_i	f_i	e_i	Contribution to χ^2
1	6	6/29	10	119.79	100.62
2	6	6/29	66	119.79	24.15
3	6	6/29	232	119.79	105.11
4	6	6/29	298	119.79	265.12
5	5	5/29	23	99.83	78.2

Using (2), we find $\chi^2 = 573.20$, which is significant at level .05

4. Mostagedda—Total Grave Goods in Undisturbed Graves of Adult Males. There are $n = 55$ such graves. A total of $f = 747$ grave goods was found among them. The following information was obtained:

Group(i)	No. in Group	p_i	f_i	e_i	Contribution to χ^2
1	11	1/5	9	149.4	131.94
2	11	1/5	75	149.4	37.05
3	11	1/5	520	149.4	919.31
4	11	1/5	56	149.4	58.39
5	11	1/5	87	149.4	26.06

Using (2), we find $\chi^2 = 1172.75$, which is significant at level .05.

5. Mostagedda—Total Grave Goods in Undisturbed Graves of Adult Females. There are $n = 38$ such graves. These were divided into $r = 5$ groups as shown in the table below. There were a total of $f = 540$ grave goods found among these 38 graves. The following information was obtained:

Group(i)	No. in Group	p_i	f_i	e_i	Contribution to χ^2
1	8	8/38	82	113.68	8.82
2	8	8/38	17	113.68	82.22
3	8	8/38	303	113.68	315.29
4	7	7/38	109	99.47	0.91
5	7	7/38	29	99.47	49.92

Using (2), we find $\chi^2 = 457.16$. Since this is larger than $\chi^2_{.05,4} = 9.48773$, we reject the hypothesis H_0' (and therefore H_0) at level .05. That is, the probability that we are making an error in so doing is .05.

6. Mostagedda—Total Grave Goods in Undisturbed Children's Graves. There are $n = 86$ such graves. The graves were divided into $r = 5$ groups as shown in the table below. There were a total of $f = 1117$ grave goods found among these 86 graves. The following information was obtained:

Group(i)	No. in Group	p_i	f_i	e_i	Contribution to χ^2
1	17	17/86	271	220.8	12.82
2	17	17/86	130	220.8	37.34
3	18	18/86	111	233.8	61.38
4	17	17/86	327	220.8	51.08
5	17	17/86	272	220.8	11.87

Using (2), we find $\chi^2 = 174.5$, which is significant at level .05.

7. Matmar—Total Grave Goods in Undisturbed Graves. There are $n = 43$ such graves which were divided into $r = 5$ groups as shown in the table below. There were a total of $f = 692$ grave goods found among these 13 graves. The following information was obtained:

Group(i)	No. in Group	p_i	f_i	e_i	Contribution to χ^2
1	9	9/43	58	111.81	52.07
2	9	9/43	135	111 81	0.67
3	9	9/43	117	111.81	5 35
4	8	8/43	263	128.71	96.39
5	8	8/43	119	128.74	1 61

Using (2), we find $\chi^2 = 159.09$, which is significant at level .05.

Appendix D

Badari: Goodness of Fit Test for the random distribution of grave goods among the undisturbed graves at individual Badarian cemeteries.

1. Badari West — Total Grave Goods in Undisturbed Graves of Adult Males. There are $n = 24$ such graves. The graves were divided into $r = 5$ groups as shown below. There were a total of $f = 1115$ artefacts found among these 24 graves. The following information was obtained:

Group(i)	No. in Group	p_i	f_i	e_i	Contribution to χ^2
1	5	5/24	561	232.3	473.63
2	5	5/24	527	232.3	373.86
3	5	5/24	8	232.3	216.57
4	5	5/24	13	232.3	207.03
5	4	4/24	3	185.8	179.85

Using (2), we find $\chi^2 = 1450.94$, which is significant at level .05.

2. Badari West — Total Grave Goods in Undisturbed Graves of Adult Females. There are $n = 10$ such graves. A total of $f = 150$ artefacts was found among them. The following information was obtained:

Group(i)	No. in Group	p_i	f_i	e_i	Contribution to χ^2
1	2	1/5	69	30	50.7
2	2	1/5	1	30	28.03
3	2	1/5	78	30	76.8
4	2	1/5	2	30	26.13
5	2	1/5	0	30	30

Using (2), we find $\chi^2 = 211.66$, which is significant at level .05.

3. Badari West — Total Grave Goods in Undisturbed Graves of Children. There are $n = 15$ such graves. There were a total of $f = 483$ artefacts found among these 15 graves. The graves were divided into $r = 5$ groups as shown, and the following information was obtained:

Group(i)	No. in Group	p_i	f_i	e_i	Contribution to χ^2
1	3	1/5	59	96.6	11 64
2	3	1/5	115	96.6	3 50
3	3	1/5	278	96 6	340.61
4	3	1/5	11	96.6	75.82
5	3	1/5	20	96.6	60.74

Using (2), we find $\chi^2 = 495.34$. Since this is larger than $\chi^2_{05,4} = 9.48773$, we reject the hypothesis H_0' (and therefore H_0) at level .05. That is, the probability that we are making an error in so doing is .05.

4. Badari North — Total Grave Goods in Undisturbed Graves of Adult Males. There are $n = 26$ such graves. The graves were divided into $r = 5$ groups as shown in the table below. There were a total of $f = 28$ artefacts found among these 26 graves. The following information was obtained.

Group(i)	No. in Group	p_i	f_i	e_i	Contribution to χ^2
1	5	5/26	6	5.38	.07
2	5	5/26	4	5.38	.35
3	5	5/26	4	5 38	.35
4	5	5/26	10	5.38	3.96
5	6	6/26	4	6 46	.94

Using (2), we find $\chi^2 = 5.67$. Since this is less than $\chi^2_{.05,4} = 9.48773$, we do not reject the hypothesis H_0' (and therefore H_0) at level .05. That is, the hypothesis of random distribution is not here contradicted by the evidence.

5. Badari North — Total Grave Goods in Undisturbed Graves of Adult Females. There are $n = 10$ such graves. The graves were divided into $r = 5$ groups as shown in the table below. There were a total of $f = 17$ artefacts found among these 10 graves. The following information was obtained:

Group(i)	No. in Group	p_i	f_i	e_i	Contribution to χ^2
1	2	1/5	13	3.1	
2	2	1/5	1	3.1	
3	2	1/5	2	3.4	
4	2	1/5	0	3.4	
5	2	1/5	1	3.4	

The chi-square test could not be carried out here because the expected cell frequencies were less than 5.

6. Badari North — Total Grave Goods in Undisturbed Graves of Children. There are $n = 10$ such graves. The graves were divided into $r = 5$ groups as shown in the table below. There were a total of $f = 126$ artefacts found among these 10 graves. The following information was obtained:

Group(i)	No. in Group	p_i	f_i	e_i	Contribution to χ^2
1	2	1/5	2	25.2	21.35
2	2	1/5	2	25.2	21.35
3	2	1/5	61	25.2	50.86
4	2	1/5	3	25.2	19.56
5	2	1/5	58	25.2	42.69

Using (2), we find $\chi^2 = 155.81$, which is significant at level .05.

Appendix E

Mostagedda: Goodness of Fit Test for the random distribution of grave goods among the undisturbed graves at individual Badarian cemeteries.

1. Mostagedda West — Total Grave Goods in Undisturbed Graves of Adult Males. There are $n = 23$ such graves. A total of $f = 596$ artefacts was found among these 23 graves. The following information was obtained:

Group(i)	No. in Group	p_i	f_i	e_i	Contribution to χ^2
1	5	5/23	3	129.57	123.64
2	5	5/23	65	129.57	32.18
3	5	5/23	10	129.57	110.34
4	4	4/23	4	103.65	95.80
5	4	4/23	514	103.65	1624.57

Using (2), we find $\chi^2 = 1986.53$, which is significant at level .05

2. Mostagedda West — Total Grave Goods in Undisturbed Graves of Adult Females. There are $n = 12$ such graves. In them were a total of $f = 312$ artefacts. The following information was obtained:

Group(i)	No. in Group	p_i	f_i	e_i	Contribution to χ^2
1	3	3/12	10	78	59.28
2	3	3/12	3	78	72.12
3	2	2/12	105	52	54.02
4	2	2/12	1	52	50.02
5	2	2/12	193	52	382.33

Using (2), we find $\chi^2 = 617.77$, which is significant at level .05.

3. Mostagedda West — Total Grave Goods in Undisturbed Graves of Children. There are $n = 33$ such graves. In them were a total of $f = 329$ artefacts. The following information was obtained:

Group(i)	No. in Group	p_i	f_i	e_i	Contribution to χ^2
1	6	6/33	71	59.82	2.09
2	6	6/33	26	59.82	19.12
3	7	7/33	22	69.79	32.73
4	7	7/33	101	69.79	16.77
5	7	7/33	106	69.79	18.79

Using (2), we find $\chi^2 = 89.50$, which is significant at level .05.

4. Mostagedda East — Total Grave Goods in Undisturbed Graves of Adult Males. There are $n = 20$ such graves. A total of $f = 137$ artefacts was found among them. The following information was obtained:

Group(i)	No in Group	p_i	f_i	e_i	Contribution to χ^2
1	4	1/5	3	27.4	21.73
2	4	1/5	2	27.4	23.55
3	4	1/5	52	27.4	22.09
4	4	1/5	2	27.4	23.55
5	4	1/5	78	27.4	93.14

Using (2), we find $\chi^2 = 184.36$, which is significant at level .05.

5. Mostagedda East — Total Grave Goods in Undisturbed Graves of Adult Females. There are $n = 10$ such graves. A total of $f = 113$ artefacts was found among these 10 graves. The following information was obtained.

Group(i)	No. in Group	p_i	f_i	e_i	Contribution to χ^2
1	2	1/5	4	22.6	15.31
2	2	1/5	4	22.6	15.31
3	2	1/5	1	22.6	20.61
4	2	1/5	74	22.6	116.90
5	2	1/5	30	22.6	2.12

Using (2), we find $\chi^2 = 170.58$, which is significant at level .05

6. Mostagedda East — Total Grave Goods in Undisturbed Graves of Children. There are $n = 32$ such graves. A total of $f = 380$ artefacts was found among them. The following information was obtained

Group(i)	No. in Group	p_i	f_i	e_i	Contribution to χ^2
1	6	6/32	7	71.25	57.91
2	6	6/32	1	71.25	69.26
3	6	6/32	106	71.25	16.95
4	7	7/32	215	83.13	209.19
5	7	7/32	51	83.13	12.12

Using (2), we find $\chi^2 = 365.76$, which is significant at level .05

7. Mostagedda North — Total Grave Goods in Undisturbed Graves of Adult Males. There are $n = 5$ such graves. The graves were divided into $r = 5$ groups. There were a total of $f = 5$ artefacts found among these 5 graves. As the expected cell frequencies were all less than 5, the test could not be carried out

8. Mostagedda North — Total Grave Goods in Undisturbed Graves of Adult Females. There are $n = 3$ such graves with a total of $f = 4$ artefacts. The data were insufficient to carry out the test.

9. Mostagedda North — Total Grave Goods in Undisturbed Graves of Children. There are $n = 6$ such graves in which a total of $f = 180$ artefacts was found. The following information was obtained

Group(i)	No. in Group	p_i	f_i	e_i	Contribution to χ^2
1	2	2/6	12	60	38.4
2	1	1/6	162	30	580.8
3	1	1/6	2	30	26.13
4	1	1/6	4	30	22.53
5	1	1/6	0	30	30.0

Using (2), we find $\chi^2 = 697.86$, which is significant at level .05.

10. Mostagedda Far-North — Total Grave Goods in Undisturbed Graves of Adult Males. There are only $n = 2$ such graves. The data were insufficient to carry out the test.

11. Mostagedda Far-North — Total Grave Goods in Undisturbed Graves of Adult Females. There are $n = 7$ such graves in which a total of $f = 82$ artefacts was found. The following information was obtained:

Group(i)	No. in Group	p_i	f_i	e_i	Contribution to χ^2
1	2	2/7	1	23.43	16.11
2	2	2/7	70	23.43	92.56
3	1	1/7	0	11.71	11.71
4	1	1/7	0	11.71	11.71
5	1	1/7	8	11.71	1.18

Using (2), we find $\chi^2 = 133.26$, which is significant at level .05.

12. Mostagedda Far-North — Total Grave Goods in Undisturbed Graves of Children. There is on $n = 1$ such grave. The data were insufficient to carry out the test.

Appendix F

Matmar: Goodness of Fit Test for the random distribution of grave goods among the undisturbed graves at individual Badarian cemeteries.

1. Matmar South — Total Grave Goods in Undisturbed Graves of Adult Males. There are only $n = 2$ such graves and a total of $f = 3$ artefacts found among them. The test could not be carried out

2. Matmar South — Total Grave Goods in Undisturbed Graves of Adult Females. There are only $n = 2$ such graves and a total of $f = 1$ artefacts found among them. The test could not be carried out

3. Matmar South — Total Grave Goods in Undisturbed Graves of Children. There is only $n = 1$ such grave and a total of $f = 4$ artefacts found in it The test could not be carried out.

Appendix G

Goodness of Fit Test for the random distribution of grave goods among Badarian graves with not more than ten grave goods.

1. Badari West — Total Grave Goods in Graves with not more than Ten Grave Goods. There are $n = 48$ such graves, and a total of $f = 83$ artefacts in them. The following information was obtained

Group(i)	No in Group	p_i	f_i	e_i	Contribution to χ^2
1	8	1/6	19	13.83	1.93
2	8	1/6	20	13.83	2.75
3	8	1/6	19	13.83	1.93
4	8	1/6	12	13.83	0.24
5	8	1/6	8	13.83	2.16
6	8	1/6	5	13.83	5.61

Using (2), we find $\chi^2 = 14.95$. Since this is larger than $\chi^2_{.05,5} = 11.07$, we reject the hypothesis H_0' (and therefore H_0) at level .05. That is, the probability that we are making an error in so doing is .05.

2. Badari West – Total Grave Goods in Undisturbed Graves of Adult Males with not more than Ten Grave Goods . There are $n = 19$ such graves A total of $f = 20$ artefacts was found among them The following information was obtained:

Group(i)	No. in Group	p_i	f_i	e_i	Contribution to χ^2
1	4	1/19	4	4.21	0 01
2	4	4/19	8	4.21	3 11
3	4	4/19	3	4.21	0 35
4	4	4/19	3	4.21	0 35
5	3	3/19	2	3.16	0 13

Using (2), we find $\chi^2 = 4.55$. Since this is less than $\chi^2_{05,4} = 9.18773$, we do not reject the hypothesis H_0' (and therefore H_0) at level 05. That is, the hypothesis of random distribution is not contradicted by the evidence.

3. Badari West — Total Grave Goods in Undisturbed Graves of Children with not more than Ten Grave Goods . There are $n = 9$ such graves The graves were divided into $r = 5$ groups as shown in the table below There were a total of $f = 36$ artefacts found among these 9 graves. The following information was obtained:

Group(i)	No in Group	p_i	f_i	e_i	Contribution to χ^2
1	2	2/9	9	8	0 125
2	2	2/9	12	8	2 0
3	2	2/9	9	8	0 125
4	2	2/9	3	8	3 13
5	1	1/9	3	1	0 25

Using (2), we find $\chi^2 = 5.63$. Since this is less than $\chi^2_{05,4} = 9\ 18773$, we do not reject the hypothesis H_0' (and therefore H_0) at level 05 That is, the hypothesis of random distribution is not contradicted by the evidence

4. Mostagedda West — Total Grave Goods in Undisturbed Graves of Adult Males with not more than Ten Grave Goods . There are $n = 21$ such graves The graves were divided into $r = 5$ groups as shown in the table below There were a total of $f = 21$ artefacts found among these 21 graves The following information was obtained:

Group(i)	No. in Group	p_i	f_i	e_i	Contribution to χ^2
1	4	4/21	3	4.57	0.54
2	4	4/21	3	4.57	0.54
3	4	4/21	8	4.57	2.57
4	4	4/21	2	4.57	1.45
5	5	5/21	8	5.71	0.92

Using (2), we find $\chi^2 = 6.02$. Since this is less than $\chi^2_{.05,4} = 9.48773$, we do not reject the hypothesis H_0' (and therefore H_0) at level .05. That is, the hypothesis of random distribution is not contradicted by the evidence.

5. Mostagedda West — Total Grave Goods in Undisturbed Graves of Children with not more than Ten Grave Goods . There are $n = 26$ such graves. A total of $f = 41$ artefacts was found among them. The following information was obtained:

Group(i)	No. in Group	p_i	f_i	e_i	Contribution to χ^2
1	5	5/26	6	8.46	0.72
2	5	5/26	25	8.46	32.31
3	5	5/26	7	8.46	0.25
4	5	5/26	2	8.46	1.91
5	6	6/26	4	10.15	3.72

Using (2), we find $\chi^2 = 11.97$, which is significant at level .05.

6. Mostagedda West — Total Grave Goods in Undisturbed Graves with not more than Ten Grave Goods . There are $n = 62$ such graves. A total of $f = 90$ artefacts found among them. The following information was obtained:

Group(i)	No. in Group	p_i	f_i	e_i	Contribution to χ^2
1	12	12/62	35	17.12	17.74
2	12	12/62	18	17.12	0.02
3	12	12/62	13	17.12	1.12
4	13	13/62	13	18.88	1.83
5	13	13/62	11	18.88	3.29

Using (2), we find $\chi^2 = 24.00$, which is significant at level .05.

Appendix H

Goodness of Fit Test for the random distribution of ivory artefacts among all graves in all the Badarian cemeteries.

1. Ivory in all Graves. There are $n = 725$ such graves, and a total of $I = 111$ ivory artefacts was found among them. The following information was obtained

Group(i)	No. in Group	p_i	I_i	e_i	Contribution to χ^2
1	145	1/5	17	22.2	27.70
2	145	1/5	33	22.2	5.25
3	145	1/5	11	22.2	5.65
4	145	1/5	12	22.2	4.69
5	145	1/5	8	22.2	9.08

Using (2), we find $\chi^2 = 52.37$, which is significant at level .05

DF:	9
Total Chi-square:	39 805
p.	0 0001
Contingency coefficient.	0 228

	Cell frequencies	Pots=0	Pots=1	Pots=2	Pots≥3	Totals
Undisturbed	Observed	155	177	32	6	370
	Expected	162.8	157.7	35 72	13 78	370
Plundered	Observed	90	80	28	15	213
	Expected	93.72	90 78	20 57	7.93	213
Disturbed	Observed	30	38	9	3	80
	Expected	35.2	31 1	7 72	2.98	80
Unknown	Observed	11	11	1	3	62
	Expected	27.28	26 12	5 99	2.31	62

Table II 1 Badari, Mostagedda and Matmar cemeteries: Grave condition and total pottery

Table II.2: Sequence dates assigned by Flinders Petrie to pottery from Badarian burials near Badari [adapted from Brunton and Caton Thompson 1928]

Grave number and condition	Sequence date	Badari location	Grave area in sq metres	Total grave goods	Total luxury goods
5108 (plundered)	21	south	1 31	2	0
5114 (plundered)	21	south	1 25	3	0
5399 (plundered)	21	north	3 10	1	2
5319 (undisturbed)	21	north	0 77	2	0
5753 (undisturbed)	21	west	1 01	1	0
5112 (disturbed)	22	south	3 25	10	17
5362 (undisturbed)	22	north	1 03	1	0
5363 (undisturbed)	22	north	0.62	1	0
5419 (disturbed)	22	north	2.32	3	0
5713 (undisturbed)	22	west	-	2	0
5351 (undisturbed)	23	north	0 90	1	0
5129 (plundered)	23	north	2 60	3	1
5115 (undisturbed)	21	south	0 31	3	0
5351 (undisturbed)	24	north	0 74	2	0
5365 (undisturbed)	24	north	0 70	2	0
5111 (plundered)	21	north	1 60	6	0
5126 (disturbed)	21	north	1 03	2	0
5131 (plundered)	21	north	-	5	0
5459	21	north	-	-	-
5761 (undisturbed)	24	west	0.77	3	1
5810	24	west	-		
5140 (plundered)	25	south	2 67	7	5
5374 (undisturbed)	25	north	0 90	9	2
5709 (undisturbed)	25	west	1.03	3	0
5737 (undisturbed)	25	west	0.26	8	1
5769 (unknown)	25	west	0 26	8	4
5155 (plundered)	27	south	2.70	14	10
5373 (undisturbed)	27	north	1 03	1	0
5397 (plundered)	27	north	2 58	106	104
5117 (disturbed)	27	north	1 87	1	0
5121 (plundered)	28	south	1 01	1	0
5103 (plundered)	28	north	3 51	77	70
5405 (undisturbed)	28	north	0.98	2	0
5406 (plundered)	28	north	1.91	16	5
5712 (undisturbed)	28	west	0 88	12	0
5390 (undisturbed)	29	north	1 03	12	6
5136	29	north	-		

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