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(with an Addendum by Ernst Pernicka)

Lower and Upper Egypt in the Chalcolithic Period. Evidence of the lithic industries: a view from Buto

Today the lithics of the Buto-Maadi culture are known by several articles (Rizkana & Seeher 1985; Schmidt 1986, 1989a, 1992, 1993) and a monograph of Rizkana & Seeher (1988; Schmidt in press). So there is no need to repeat details of the Buto-Maadi lithic industry which in general is a twisted blade and bladelet industry. It is represented in the early stage at Maadi, the later stage occure at Buto in layer I and II, at el-Tell el-Iswid in phase A and probably in Tell el-Farkha (Salvatori & Usai 1991) and in the Moerien sites of the Fayum (Ginter & Kozlowski 1986). At another site, Tell Ibrahim Awad, a Chalcolithic layer was only touched on by excavation; it is relatively certain that this layer could also contain Buto-Maadi material.

At the beginning of Buto layer III and Iswid phase B a deep break can been observed in the lithics, which marks the end of the chalcolithic tradition. After that a non-twisted blade industry with truncated rectangles as a main tool class exists. This change has so far been interpreted as the result of the expansion of the southern Naqada culture to the north.

New investigations on Upper Egyptian lithics have completely changed the picture of a lithic industry dominated by fishtails, bifacial knives and other "beautiful" objects (Holmes 1988, 1989, 1992a & b). The lithics of Upper Egypt were mainly based on flake and blade industries, the bifacials occurring only seldom, as a highlight in an otherwise relative modest inventory. There is not a specific Upper Egyptian industry but various regional traditions. The aim of this report will be to show that beside these regional traditions there are also certain traits which are observable all along the Egyptian Nile Valley, in Upper and in Lower Egypt. The question will be how this phenomenon fits into the existing picture of the development of Lower and Upper Egypt towards a homogenous culture. Unfortunately there is one serious problem in comparing both regions: the difficulty to date exactly the assemblages studied, especially in Upper Egypt, where only rough datings, mostly differentiating between the Amratian and the

Gerzean period, dominate. This makes it more difficult to understand, for example, the development of a distinct tool type.

The twisted bladelet industry

The twisted bladelet industry is, as mentioned above, one of the characteristic features of the Buto-Maadi culture. The Mostagedda industry of Northern Upper Egypt originally had not been characterized by this twist-pattern, but by another speciality of the "twisted" industry, namely the heat treatment of the cores and the resulting glossy bladelets (Holmes 1988, 1989). This heat treatment, at first not recognized at Maadi and Buto, is now also verified for this Lower Egyptian industry (Holmes 1992b: 313, postscript reports only on the Maadi industry). It should be added that nearly all the twisted bladelets of Buto and el-Tell el-Iswid are in fact "glossy".

The twist-pattern on the other hand does not seem to be so prevalent in the Mostagedda industry as in Lower Egypt, but certainly it is also existing (cf. Holmes, this volume). So, an important aspect of the primary production at the Mostagedda and Buto-Maadi sites is quite the same. Regarding the tools, the Mostagedda industry is also similar to Buto-Maadi. The differences outlined by Holmes (1992b: 311) are mainly due to comparing the Mostagedda industry to the site of Maadi alone, which does not represent the whole lifespan of this industry but only the earliest part of the Buto-Maadi culture. The settlement of Maadi is only in part contemporaneous with the post-Badarian sites of the Badari region. It is also partly contemporaneous with the Badarian culture itself. If we compare Buto layer I and II and Iswid phase A with Mostagedda, e.g. the careful shaping of tools highlighted by the blade knives (for truncated rectangles and sickles see below), some of the pronounced differences do not exist. The Mostagedda industry can therefore be seen as a southern counterpart of the developed of the Buto-Maadi industry, which in its early phase seems to be older and ancestral to it.

The existence of a "glossy bladelet" industry in southern Upper Egypt had been unknown until now. Today this characteristic industry has been recognized to form also a certain part of Late Amratian and Gerzean lithic assemblages of the Hierakonpolis region. At site HK-29-17L13 (Late Amratian) glossy bladelet tools are listed with 6,4%, at Gerzean HK-29A with 4,5% of the tools (Holmes, this volume). The amount of the percentages and the diminution in time corresponds well with Buto: in layer Ia there are 5, 4% glossy bladelet tools, in Ib - 4, 9%, IIa - 3, 6%, IIb - 2, 3% and IIIa 1,5%. Looking in detail we can also find some hints for this special industry in the Naqada region (Holmes 1989: 278). So we can conclude that the twisted and heat treated bladelets of Lower Egypt became during the Chalcolithic times a common Egyptian trait. Later, at the end of the Chalcolithic, they disappear quickly, both in Lower and in Upper Egypt.

The blade knives

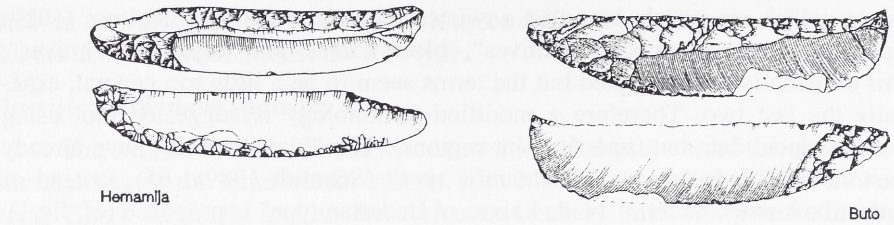
An important tool class of the period under consideration are the blade

knives, which are mainly based on a twisted primary production. Holmes (1989) separated 3 groups: "truncation knives", "blade knives" and "other blade knives". This division is well accepted but the terms seem to be a little too general, especially the last two. Therefore a modified terminology is suggested, not using morphological data but type sites (or regions). The "blade knives" have already been called "blade knives of Hemamija type" (Schmidt 1989a: 85). Instead of truncation knives the term "blade knives of Badarian type" is proposed (cf. fig.1). So only the group of "other blade knives" is left without special name until now.

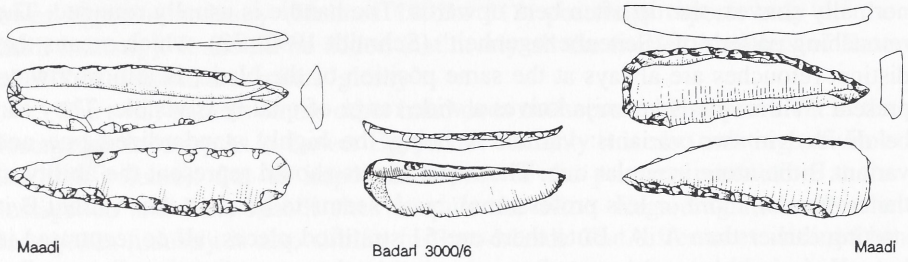
The Hemamija knives are of the typical Gerzean type. The main characteristics are the form of the back which is straight and the cutting edge which is normally convex, the tip often bent upwards. The handle is usually rounded. The retouching pattern of "Seitenbezogenheit" (Schmidt 1992: 32), which means that distinct retouches are always at the same position of the blade, is almost always present. Within the Hemamija knives a wide range of quality is visible. They can be divided in two variants: variant A being the highly standardized one and variant B the more irregular one. The two variants should represent the ability of the craftsman, more or less professional, but it seems to be clear that variant B is starting earlier than A. At Buto there are 51 stratified pieces, all concentrated in layer II; variant A is represented two times, the others are of variant B type. But there is no variant A at Maadi, where variant B can be found in certain numbers within the group of endscrapers on blades (Rizkana & Seeher 1988: 27).

At Hemamija 6 of 8 pieces are stratified, one from Badarian level, one from Amratian and 4 from the so called "upper levels", which should be Gerzean (Holmes 1989: 75). In the Badarian region there are 10 pieces, all from the Mostagedda industry (Holmes 1989: 154). In the Naqada and Hierakonpolis collections studied by Holmes the blade knives are missing, but there are several pieces known from the Gerzean cemeteries of that region (Holmes 1989: 278). So the Hemamija knives are a tool type with its roots in the early phase of the Buto-Maadi culture and known in Gerzean times from Lower to Upper Egypt.

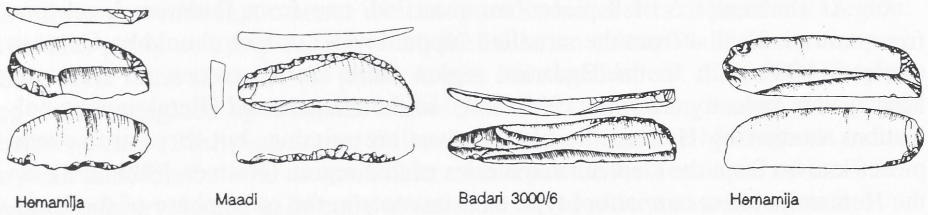
The analysis of the Badari knives, which seem to belong to the beginning of the Mostagedda industry, shows no sharp differences compared with the Hemamija knives. The main differences are the outlines of the back and the cutting edge, but among the Hemamija knives of variant B there are intermediate forms. Interesting is the observation of a beginning of "Seitenbezogenheit" in the Badari knives too. At Hemamija there are 10 examples, 8 from Badarian/Amratian transition, 1 from Amratian/Gerzean transition and 1 from Gerzean (Holmes 1989: 68). The relation between basal and terminal truncation is 7:3. From the Badarian region there are again 10 pieces, all from "Predynastic" sites (Holmes 1989: 145). The relation is 7:2, one piece is not determinable. It is the marked tendency towards a standardized pattern with the tip at the basal, the handle at the terminal part of the blade, which is highly developed in the group of Hemamija knives. The chronological situation, with all its uncertainties, supports a parallel dating of Badari and early Hemamija B knives. The Badari knives



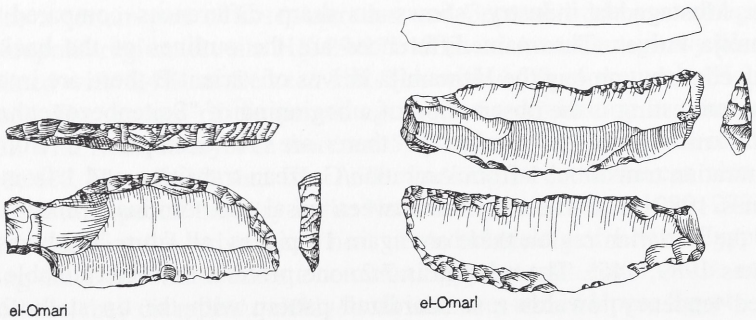
Type Hemamija variant A



Type Hemamija variant B



Type Badari (truncation knives)



Type el-Omari

Fig. 1. Different types of Egyptian blade knives.

should be a counterpart of the early Hemamija knives of Lower Egypt. This view is supported by Maadi, where we have Hemamija knives variant B, and also some pieces which are very close to the Badari knives (Rizkana & Seeher 1988: pl. 34, 3.4; 35, 4: 37, 9). And there is no Hemamija variant A at Maadi.

In this context we should look also to another type of blade knives known from the Late Neolithic settlement of el-Omari (Debono & Mortensen 1990: 47). These pieces are formed by convex backing, their cutting edge is straight, forming with the back a beak-like tip similar to the tips of the Badari knives. A special feature is the separated handle. Consequently these knives should be called knives of el-Omari type. So we can state that as early as in Late Neolithic we have in Lower Egypt blade knives which seem to be related to the Hemamija knives. These are chronologically later and of a more elaborated form. In the early Chalcolithic there are related forms of blade knives in both Lower and in Northern Upper Egypt, but certainly not yet in the south. There we have little proof for the existence of Badari knives or any blade knives before the Gerzean period. From the Nagada and Hierakonpolis region there are only 2 fragmented pieces, which could have been truncation knives (Holmes 1989: 226). It is quite clear that the blade knife technology reached this region with the developed stage of the Hemamija knives. In Gerzean times they form a standardized and common tool type all over Egypt. At the end of the Chalcolithic they disappear suddenly.

Truncated rectangles, sickles

The almost entire absence of sickle implements is another item of the Buto-Maadi industry. The numerous appearance of sickle implements is connected with the truncated rectangles, which appear in certain numbers suddenly with Buto layer III and Iswid phase B (Schmidt 1989a: 91; 1989b: 301; 1992: 33). Looking to Predynastic Upper Egypt the situation is at first not very clear. Truncated rectangles are existing but not common in Predynastic assemblages. In the Naqada region they are missing with the exception of some pieces from South Town, dated to the Gerzean. At the Amratian sites of Hierakonpolis there are almost no sickles and no rectangles (Holmes 1989: 201, 292), maybe with some exceptions at HK-11C (Holmes, this volume). At Gerzean HK-29A there is little change, sickles have a portion of 0,2%.

Only in the Predynastic sites of the Badari region, in the Mostagedda industry, sickles are numerous (Holmes 1989: 148). They include rectangles of the (small) type of Buto III/Iswid B, but also bitruncated blades of larger dimensions, which should be regarded as a different type, and simple truncated blades of ogival form. They are accompanied by the glossy bladelet industry. This would be the earliest occurrence of (small) truncated rectangles in Egypt. But there are some doubts if this type is represented during the whole lifespan of the Mostagedda industry or if it occurs, similar to the situation at Buto, only at the end of this time. The other two types occur sporadically also in Lower Egypt (Schmidt 1989a: fig.19, 4-5; 20, 9). A detailed analysis of Egyptian sickle types

is missing until now, but these pieces could represent sickle types of the time before Buto III. This question can not be answered until now because of the uncertain lifespan of the Badari sites. But the hypothesis of a chronological sequence of a Gerzean phase without rectangles and a later phase with rectangles is supported by an observation in Tarif. The 1979 published assemblage of series B (Ginter et al. 1979: 54), which is dated "Nagadian", contained many rectangles, mostly used as sickles blades. The new investigation in Tarif yielded a "Nagadian" assemblage without rectangles. And at Armant Huzayyin (1937: 219, 221) had already recognized the late dating of these tools.

To summarize the situation in Upper Egypt, it is obvious that the rectangles are little or not at all known in the Amratian times. It is supposed to be the same in Gerzean, but exact datings are missing until now. The rectangles seem to be introduced to Upper Egypt at the end of the Gerzean. If we accept this view, the situation in Upper Egypt corresponds again very closely with Lower Egypt, where rectangles appear as late as Buto III and Iswid phase B. From this time onwards they are the basic form of the Egyptian sickle implement until the end of the Old Kingdom.

In accordance with Ginter et al. (1979: 69) the rectangles should be regarded as an Near Eastern element. In Palestine rectangles are starting as early as the Neolithic. They are represented in the Late Neolithic Wadi Rabbah phase (Gopher-Orelle 1989), in the Qatifian and the Early Chalcolithic Besor Phase, which is pre-Ghassulian (Gilead 1990). In this phase they appear together with twisted bladelets. Both types continue during the Ghassulian. According to the general view the rectangles are replaced by the Canaanean blades in Palestine in EBA I. Rectangles in EBA layers are determined as intrusive or "Egyptian import" (cf. Tel `Erani, Rosen 1988). This is somehow curious: the rectangles would disappear in Palestine before they start in certain numbers in Egypt. But in fact the replacement is not very sudden nor complete. First, the Canaanean technology, which seems to be produced by professionals (cf. the hoard of Canaanean blade cores from Hassek Höyük, Behm-Blancke 1992), could not replace all the non-Canaanean blade industries in Palestine (cf. Rosen 1989: 215 tab.2). Especially in southern Palestine, the Canaanean industry is of little importance. And second, the EBA I Period in Palestine is divided into 4 stages with a span from Naqada IIb to the beginning of 1st Dynasty. At the time of the appearance of the rectangles in certain numbers in Egypt - at Buto IIIa and Naqada IId2, which corresponds with the beginning of "EBA Ib middle" in Palestine - the rectangles are predominant in southern Palestine and not the Canaanean blades. So it seems quite sure that the Egyptian rectangles are of Palestinian origin. The rectangles of Tel `Erani on the other hand indeed could be Egyptian. They belong to "EBA Ib late", the time of the Protodynastic Egyptian presence in south Palestine, when the rectangles are an Egyptian type and the Canaanean industry becomes dominating in Palestine.

Conclusions

The three groups mentioned: the twisted bladelet industry, the blade knives and the truncated rectangles, show strong similarities in their development in Lower and Upper Egypt. Other groups could be added, such as burins, bifacials or arrowheads. It seems obvious that in early Chacolithic times we have several regional traditions, but also some traits, which are common all over Egypt. During the Chalcolithic, at a time before the supposed expansion of the Naqada Culture into the Delta, the development of a larger uniformity can be observed, which seems to have its starting point in the North of Egypt.

At the time of Nagada IId1/2 there is a deep change within the lithics of Buto and el-Tell el-Iswid, which at first had been explained by the expansion of the Naqada culture. But now we can see that the situation in Upper Egypt is very similar. After the spread of the Lower Egyptian blade technology to the South during the Chalcolithic we have a similar change in lithic materials all over Egypt at the end of the Chalcolithic period. So we found in the lithics of Buto and Iswid not an expanding Naqada Culture but a common Egyptian event. But what exactly was this event?

The relative rapid change in the lithic assemblages seems to reflect the existence of social and political structures before the time of Naqada IId2, which enabled new ideas to spread quickly. It is not surprising that in the field of ceramics very similar observations have been made (cf. Adams & Friedman 1992: 327; Köhler this volume). The source of this new ideas could be within Egypt itself or the long discussed Eastern elements arriving in Egypt from Naqada IIc onwards (cf. Moorey 1990). With the rectangles also in the crude field of the lithics we can see the importance of Near Eastern influence at the dawn of the Protodynastic Age.

Addendum

In Schmidt 1989a: 91 footnote 78 there had been the announcement that the analysis of an obsidian knife would be published by Pernicka in 1992, but in fact did not appear. Therefore this analysis and a short comment are given below.

E. Pernicka

Analyse eines prädynastischen Obsidianmessers aus Unterägypten

Die Analyse eines bifazial flächenretuschierten Obsidianmessers von el-Tell el-Iswid im nordöstlichen Nildelta (Schmidt 1989a: Fig. 15, 11) mittels instrumenteller Neutronenaktivierung (zur Methode siehe Pernicka 1992) ist in Tabelle 1 zusammengefaßt. Es handelt sich um eine sogenannte alkalische Obsidiansorte, die durch ein Molverhältnis von (Na + K) / Al > 1 definiert ist, aber im allgemeinen auch ein deutlich verschiedenes Spurenelementmuster im Vergleich zu den im östlichen Mittelmeerraum viel häufigeren kalkalkalischen Obsidianvorkommen (z.B. mehr Eisen und Zirkonium, weniger Barium) aufweist. Im östlichen Mittelmeerraum sind bisher nur zwei alkalische Obsidianvorkommen bekannt, nämlich Nemrut Dag und Bingöl, beide in der Nähe des Van-Sees gelegen. Zum Vergleich ist das Spurenelementmuster beider Vorkommen, im selben Labor und mit der selben Methode bestimmt, angeführt. Vom Nemrut Dag standen drei Obsidianproben von Prof. J. Keller, Universität Freiburg und sechs Proben von Dr. G. Schneider, Freie Universität Berlin zur Verfügung. Beide Gebiete umfassen mehrere verschiedene Obsidianflüsse, die unterschiedliche Zusammensetzung aufweisen (Blackman 1984; Cauvin et al. 1986). Deshalb ist die angegebene Streubreite für beide Gebiete sicher nicht repräsentativ. Dennoch zeigt ein Vergleich, daß Nemrut Dag das wahrscheinlichere Ursprungsgebiet im Vergleich zu Bingöl ist (Bingöl B kann aufgrund der völlig verschiedenen Zusammensetzung ausgeschieden werden), weil Bingöl A einen relativ engen Streubereich aufweist (Cauvin et al. 1986) und einige Elemente im Messer am Rand oder außerhalb dieses Streubereichs liegen.

Es sei aber darauf hingewiesen werden, daß praktisch alle ostafrikanischen Obsidianvorkommen einschließlich der von Südarabien und dem Tibestigebirge alkalisch sind und deshalb ähnliche Elementmuster wie Nemrut Dag und Bingöl A haben können. Die Emissionsspektralanalysen von Cann und Renfrew (1964) sind zu wenig genau, um zu entscheiden, ob eine Differenzierung möglich ist. Nur die Vorkommen von Kenya scheiden wohl wegen ihres deutlich höheren Bariumgehaltes als Ursprungsgebiet aus. Aufgrund der wesentlich umfangreicheren Untersuchungen mittels Röntgenfluoreszenzanalyse von Francaviglia (1990) lassen sich auch die Obsidianvorkommen im Jemen und die von Tibesti ausschließen. Von den noch unvollständig erforschten äthiopischen Vorkommen sind zwei in der Provinz Choa (Aulito und Koka-See) den anatolischen ähnlich. Ob sie als Ausgangsmaterial für das Messer von el-Tell el-Iswid in Frage kommen, kann derzeit wegen der unterschiedlichen Analysemethoden nicht beurteilt werden.

		Messer el-Tell el-Iswid	Nemrut Dag	Bingöl A
Na	[%]	4,18	3,64 - 4,77	4,09 - 4,26
K	[%]	3,08	3,56 - 3,77	3,34 - 3,70
Sc	[ppm]	0,27	0,51 - 0,76	0,14 - 0,16
Cr	[ppm]	5,67	5,28 - 8,58	4,49 - 8,21
Fe	[%]	3,10	1,52 - 4,98	2,87 - 3,07
Co	[ppm]	0,33	0,20 - 0,26	0,16 - 0,57
As	[ppm]	31,5	17,3 - 26,0	38,3 - 45,8
Rb	[ppm]	230	185 - 236	207 - 234
Zr	[ppm]	840	510 - 1095	760 - 887
Sb	[ppm]	1,62	1,25 - 1,29	1,98 - 2,67
Cs	[ppm]	15,6	11,1 - 14,7	15,3 - 16,8
Ba	[ppm]	184	54 - 75	58 - 80
La	[ppm]	92,9	66 - 113	89,9 - 93,1
Ce	[ppm]	200	141 - 242	182 - 207
Sm	[ppm]	20,0	14,1 - 25,9	19,2 - 20,9
Eu	[ppm]	0,67	0,30 - 1,62	0,74 - 0,82
Tb	[ppm]	3,21	2,47 - 4,14	3,04 - 3,93
Yb	[ppm]	13,2	10,9 - 16,3	13,1 - 14,5
Lu	[ppm]	1,05	1,52 - 2,26	1,79 - 1,98
Hf	[ppm]	26,1	16,7 - 30,8	24,9 - 30,0
Ta	[ppm]	4,73	4,66 - 5,91	4,50 - 5,28
Th	[ppm]	30,2	25,3 - 33,6	31,4 - 32,9
U	[ppm]	5,49	9,00 - 11,5	11,4 - 13,1

Table 1. Spurenelementmuster des prädynatischen Obsidianmessers von el-Tell el-Iswid und von alkalischen Obsidianvorkommen im Gebiet des Van-Sees.

References

ADAMS, B. & R. F. FRIEDMAN. 1992. Imports and Influences in the Predynastic and Protodynastic Settlement and Funerary Assemblages at Hierakonpolis. In: van den Brink (ed.): 317-338.

BEHM-BLANCKE, M. R. 1992. Der Depotfund von Großklingenkernsteinen in Raum 29. In: Behm-Blancke (ed.): 216-218.

BEHM-BLANCKE M. R. (ed.). Hassek Höyük. Naturwissenschaftliche Untersuchungen und lithische Industrie. Istanbuler Forschungen 38. Tübingen: Wasmuth Verlag.

BLACKMAN, M. J. 1984. Provenance Studies of Middle Eastern Obsidian from Sites in Highland Iran. In: J. B. Lambert (ed.), Archaeological Chemistry III. Advances of Chemistry Series 205: 19-50.

CANN, J. R. & C. RENFREW. 1964. The Characterization of Obsidian and its Application to the Mediterranean Region. Proceedings of the Prehistoric Society 30: 111-133.

CAUVIN, M.-C., N. BALKAN, Y. BESNUS & F. SAROGLU. 1986. Origine de l'obsidienne de Cafer Höyük (Turquie): Premiers resultats. Paléorient 12/2: 89-97.

DEBONO, F. & B. MORTENSEN 1990. El Omari. A Neolithic Settlement and Other Sites in the Vicinity of Wadi Hof, Helwan. Archäologische Veröffentlichungen des Deutschen Archäologischen Instituts Abteilung Kairo 82. Mainz: Philipp von Zabern.

FRANCAVIGLIA, V. M. 1990. Les gisements d'obsidienne hyperalcaline dans l'ancien monde: étude comparative. Revue d'Archéométrie 14: 43-64.

GILEAD, I. 1990. The Neolithic-Chalcolithic Transition and the Qatifian of the Northern Negev and Sinai. Levant 22: 47-63.

GINTER, B., J. K. KOZLOWSKI & B. DROBNIEWICZ. 1979. Silexindustrien von el Târif. Ein Beitrag zur Entwicklung der prädynastischen Kulturen in Oberägypten. Archäologische Veröffentlichungen des Deutschen Archäologischen Instituts Abteilung Kairo 26. Mainz am Rhein: Philipp von Zabern.

GINTER, B. & J. K. KOZLOWSKI. 1986. Kulturelle und paläoklimatische Sequenz in der Fayum Depression - eine zusammenfassende Darstellung der Forschungsarbeiten in den Jahren 1979-1981. Mitteilungen des Deutschen Archäologischen Instituts Abteilung Kairo 42: 9-23.

GOPHER, A. & E. ORRELLE. 1989. The Flint Industry of Nahal Żehora I, a Wadi Raba Site in the Menashe Hills. Bulletin of the American School of Oriental Research 276: 67-76.

HOLMES, D. L. 1988. The Predynastic Lithic Industries of Badari, Middle Egypt: New Perspectives and Inter-Regional Relations. World Archaeology 20: 70-86.

HOLMES, D. L. 1989. The Predynastic Lithic Industries of Upper Egypt. A Comparative Study of the Lithic Traditions of Badari, Naqada and Hierakonpolis. British Archaeological Reports. International Series 469, Cambridge Monograph of African Archaeology 33. Oxford.

HOLMES, D. L. 1992a. Chipped Stone-Working Craftsmen, Hierakonpolis and the Rise of Civilization in Egypt. In: R. Friedman & B. Adams (eds), The Followers of Horus. Studies Dedicated to Michael Allen Hoffman 1944-1990. Egyptian Studies Association Publication No. 2, Oxbow Monograph 20: 37-44.

HOLMES, D. L. 1992b. The Evidence and Nature of Contacts Between Upper and Lower Egypt During the Predynastic: a View from Upper Egypt. In: van den Brink (ed.): 301-316.

HUZAYYIN, S. A. 1937. The Flint Industry. In: R. Mond & O. H. Myers, Cemeteries of Armant I. The Egypt Exploration Society 42: 191-253. London.

MOOREY, P. R. S. 1990. From Gulf to Delta in the Fourth Millennium BCE: The Syrian Connection. Eretz-Israel 21: 62-69.

PERNICKA, E. 1992. Herkunftsbestimmung späturukzeitlicher Obsidianfunde vom Hassek Höyük. In: Behm-Blancke (ed.): 124-131.

RIZKANA, I. & J. SEEHER. 1985. The Chipped Stones at Maadi: Preliminary Reassessment of a Predynastic Industry and its Long-Distance Relations. Mitteilungen des Deutschen Archäologischen Instituts Abteilung Kairo 41: 235-255.

RIZKANA, I. & J. SEEHER. 1988. Maadi II. The Lithic Industries of the Predynastic Settlement. Archäologische Veröffentlichungen des Deutschen Archäologischen Instituts Abteilung Kairo 65. Mainz: Philipp von Zabern.

ROSEN, S. A. 1988. A Preliminary Note on the Egyptian Component of the Chipped Stone Assemblage from Tel ᶜErani. Israel Exploration Journal 38: 105-116.

ROSEN, S. A. 1989. The Analysis of Early Bronze Age Chipped Stone Industries: a Summary Statement. In: P. de Miroschedji (ed.), L'urbanisation de la Palestine à l'âge du Bronze ancien, Colloque d'Emmaüs 1986: 199-222. British Archaeological Reports, International Series 527. Oxford.

SALVATORI, S. & D. USAI. 1991. Chipped Stone Industry from Tell el-Farkha (Eastern Delta, Egypt). 1988-1989: Fresh Evidence from a Pre, Proto and Early Dynastic Site. Rivista di Archeologia 15: 34-45.

SCHMIDT, K. 1986. Die lithischen Kleinfunde. In: Th. von der Way, Tell el-Faraᶜin-Buto. 1. Bericht. Mitteilungen des Deutschen Archäologischen Instituts Abteilung Kairo 42: 201-208.

SCHMIDT, K. 1989a. Die lithischen Kleinfunde. In: E. C. M. van den Brink, A Transitional Late Predynastic - Early Dynastic Settlement Site in the Northeastern Nile Delta, Egypt, Mitteilungen des Deutschen Archäologischen Instituts Abteilung Kairo 45: 82-94.

SCHMIDT, K. 1989b. Die lithischen Kleinfunde. In: Th. von der Way, Tell el-Faraᶜin - Buto. 4. Bericht. Mitteilungen des Deutschen Archäologischen Instituts Abteilung Kairo 45: 300-307.

SCHMIDT, K. 1992. Tell el-Faraᶜin/Buto and el-Tell el-Iswid (South): the Lithic Industries from the Chalcolithic to the Early Old Kingdom. In: van den Brink (ed.): 31-41.

SCHMIDT, K. 1993. Comments to the Lithic Industry of the Buto-Maadi culture in Lower Egypt. In: L. Krzyzaniak, M. Kobusiewicz & J. Alexander (eds), Environmental Change and Human Culture in the Nile Basin and Northern Africa until 2nd Millenium B.C.: 267-278. Poznan: Poznan Archaeological Museum.

SCHMIDT, K. In press. Buto II.

E. M. C. VAN DEN BRINK (ed.). The Nile Delta in Transition: 4th. - 3rd· Millennium B.C., Proceedings of the Seminar held in Cairo, 21.-24. October 1990, at the Netherlands Institute of Archaeology and Arabic Studies. Tel Aviv.