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石器製作技術の復元的研究：細石刃剝離方法の同定研究

大沼　克彦*・久保田正寿**

はじめに

ユーラシアにおける中石器文化[1]，或いは，続旧石器（Epi-Palaeolithic）文化[2]は，更新世から完新世への移行期に，旧石器時代とは異なる環境下に出現する。その終焉は地域によって多様である。

中石器時代は，それ以前同様，群棲大形動物を重要な食料源とした。しかし，後期旧石器時代の集中的狩猟による大形動物の減少は，狩猟対象を牛，赤鹿，エルク鹿，猪，ビーバーなど森林動物に変え，結果的に，狩猟方法を修正したと考えられている〔The Trustees of the British Museum 1968：p. 70〕。

ヨーロッパの中石器時代の生活用具には，それまで見られなかったものや環境の変化を示すものがある。木を伐採するための斧，獲物の中の特定標的を狙うための（投槍具に比べてはるかに正確な狩猟具である）骨鏃，鏃として使用されたと思われる台形細石器，（後期旧石器時代の洞穴芸術では描かれたことのない）ボート，釣り針，そして，漁網などである[3]。

なかでも，細石器作りの盛行には目を見張るものがある。そして，細石器を製作するためのマイクロ・ビュラン技法[4]や細石刃剝離が盛行する。幾何学形に整形された細石器や二次加工を施されるか未加工の細石刃は，木製・骨角製の柄にはめこまれ，組み合わせ道具・武器の刃部として使用された[5]。

このような技術的革新については，（遺跡の急増から推定されている）人口増加を支えるために生じたものであるとする解釈，或いは，技術革新が逆に人口増加をもたらしたとする解釈がある〔Mellaart 1975：p. 22〕。

藤本強は最近の論文〔1990〕に於いて，中石器時代の遺跡の急増について，それが人口の急増を示すものではなく，むしろ，（増加した遺跡各々の小規模化が暗示する）より移動的な社会を反映するものであると述べている〔pp. 7-8〕。

藤本は，また，細石器を，それが幾何学形のものであれ二次加工を施された細石刃であれ，有効刃の多量生産と組み合わせ道具刃部の部分的交換という効率性，及び，移動性の強い社会を支えるための石器の軽量化という諸点で特徴づけている〔1990：pp. 7-8〕。

レヴァント地方のケバラン，トルコ・Antalya 地方の Belbasi 遺跡文化，ザグロス地方のザルジアンなど，紀元前20,000年から16,000年に年代づけられる続旧石器文化に見られる後期旧石器との連続性，そして，ザグロス後期旧石器・パラドスティアンにおける若干の細石器の存在やレヴァント後期オーリニャシアンでの石器の小形化傾向は，中近東諸地域の中石器文化が同地の後期旧石器文化に由来したことを示している〔Mellaart 1975：p. 19〕。

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イラクの中石器遺跡と先土器新石器遺跡

イラク地方の中石器時代遺跡としてはザルジ遺跡（Zarzi）〔Garrod 1930〕が有名である。そして，中石器時代と新石器時代にまたがる先土器新石器遺跡と考えられるものには，ザーウィ・チェミ・シャニダール遺跡（Zawi Chemi Shanidar）〔Solecki 1981〕，カリム・シャヒル遺跡（Karim Shahir）〔Braidwood et al. (eds.) 1983〕，ムレファート遺跡（M'lefaat）〔Braidwood et al. (eds.) 1983〕，ネムリク・9遺跡（Nemrik 9）〔Kozlowski (ed.) 1990〕，ケルメツ・デーレ遺跡（Qermez Dere）〔Watkins et al. 1991〕，及び，デール・ハル遺跡（Der Hall）〔Matsumoto and Yagi 1987〕がある。これらの遺跡は北イラク地方のザグロス山麓（Zagros flanks）に位置している（図1）。

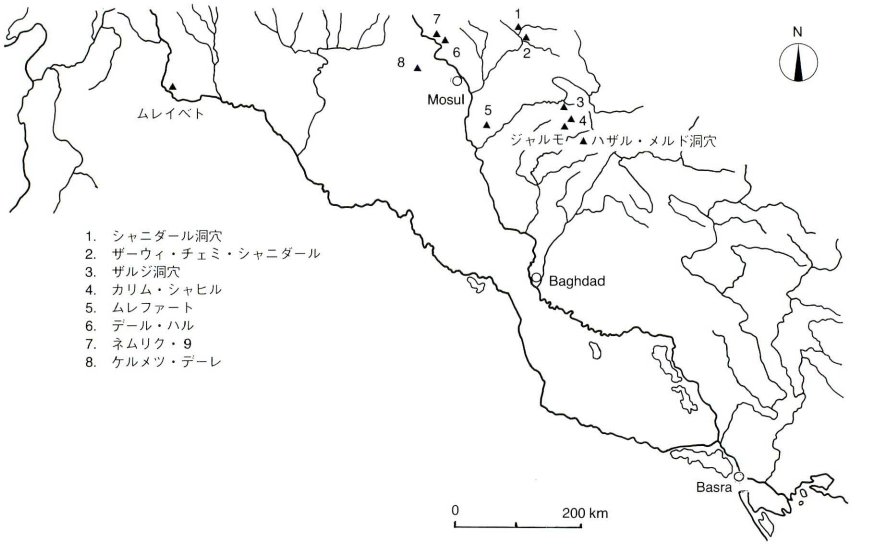

図1　イラクの中石器遺跡と先土器新石器遺跡

ザルジ遺跡はスレマニヤ市の北西50 km・チャム・タビン渓谷のザルジ村にある洞穴遺跡である。ザルジ村はチャム・タビン渓谷と小ザブ川の合流点から20 km程上流の地点にある。この遺跡のB層は単一インダストリーとして記述されている。同時に，B層の上部で縦長三角形の幾何学形細石器が初現することが述べられており，少なくとも，B層上部の中石器的性格については異論がないようである。B層に一貫して見られる石器は全体的に小形である。そして，グラヴェット型ポイント，刃潰し石刃（backed blades），鋸歯縁石器・抉り入り石器，彫器，エンド・スクレイパー，及び，各種スクレイパーなどから成る。石刃と細石刃は細身である。石器製作にはフリント質素材が使用されている。出土動物骨は数少なく，狐，ガゼル，山羊，亀のものである〔Garrod 1930：pp. 13–23；Bate 1930〕。

ザーウィ・チェミ・シャニダール遺跡は，北イラク・ザグロス山地・シャニダール渓谷のティグリス川の一支流・大ザブ川の左岸段丘上にある開地遺跡である。B層は紀元前8,920±300年に年代づけられているが，ここから中石器的石器組成が出土している。大小の石や石器破片で作られた（直径2 m程の）壁をもつ円形遺構がB層

に伴っている。出土石器には，刃潰し石刃，鋸歯縁石器，抉り入り石器，截断石器，錐形石器，サイド・スクレイパー，ピエス・エスキーユ，そして，殆どが三日月形をした幾何学形細石器（図2-2～7）がある。鎌光沢（sickle sheen）を示す石器はない。マイクロ・ビュランは報告されていない。石核は単一打面か二打面である。石核の写真からみる限り，石刃や細石刃の剝離に際して押圧剝離が採用されたとは思われない。石斧は全打製のものと刃部磨製のものがほぼ半数づつを占めるが，極僅かながら全磨製のものもある。数種の磨り石，石皿・石臼，つつき石（pecking stone）などの石製品も出土している。石英岩製大形浅鉢（碗）の一部と思われる破片が1点ある。動物骨については，（おそらく野生の）羊と山羊，そして，鳥類の骨が出土している〔Solecki 1981〕。

カリム・シャヒル遺跡はキルクーク州・チェムチェマル村の東方にある開地遺跡である。50-60 m^2 の敷石状礫群とピットから成る単一生活面から多量の石器が出土している。この遺跡は紀元前8,900年から8,600年に年代づけられている。出土石器は，刃潰し石刃，錐形石器，エンド・スクレイパー，サイド・スクレイパー，各種スクレイパー，斜截断石器，抉り入り石器などを主体とする。このうち，抉り入り石器が極めて多量である。出土したマイクロ・ビュランについては，“真正”幾何学形細石器の欠如から，幾何学形細石器の製作ではなく斜截断石器の製作過程の副産物として記述されている。極めて稀に鎌光沢を示す石器がある。石刃・細石刃石核の殆どは円錐形である。石核のみかけから判断する限り押圧剝離が存在したようである（図2-12, 13, 15, 16）。以上の石器はフリント質素材で製作されている。出土石斧のほぼ半数は全磨製であるが，いくつかのものは刃部磨製である。石皿・石臼，磨り石などの石製品も出土している。出土動物骨の47%は羊と山羊のものであるが，猪，鹿，ガゼル，野生牛，狐，兎，亀，鳥類などの骨も出土している。羊と山羊は飼育されたものではなく狩猟によるものとされている〔Howe 1983〕。

ムレファート遺跡は，モースル平野の東方，ティグリス川と大ザブ川の合流地点から北東の Khazir 川西岸にある開地遺跡である。紀元前8,900年から8,600年に年代づけられる〔Howe 1983：pp. 130-131〕4×3 m 程の敷石床面が三枚確認されている。出土石器には，抉り入り石器，（使用痕である）微細なリタッチを持つ細石刃，各種スクレイパー，錐形石器などがある。幾何学形細石器とマイクロ・ビュランは出土していない。細石刃は非常に薄身である。細石刃石核には円錐形のものがある。石器の報告者 M. Dittemore は，細石刃に見られる非常に平行した稜線と側辺，そして，斉一的な幅を根拠に，押圧剝離による細石刃剝離を暗示している（図2-11）。石器は極僅かの黒曜石製のものを除きフリント質素材で作られている。石斧は全磨製か局部磨製である。石皿・石臼，乳棒などの石製品もある〔Dittemore 1983〕。出土動物骨の半分程は羊とガゼルのものである。これらとともに，狼，狐，野生猫，猪，野生牛，もぐら，兎，そして，鴨や雁など鳥類の骨も出土している。羊が飼育されていたかどうかは不明である〔Turnbull 1983〕。

ネムリク・9遺跡はドホーク州（Dohuk）南部の開地遺跡で，モースル市から北北西へ 48 km，ティグリス川の北方約 1.5 km の地点にある。初期新石器時代に属する三枚の生活面（phases）が確認されている。C^{14} 年代測定値により，最古の生活面が紀元前9千年紀，次の生活面が紀元前8千年紀，そして，最後の生活面が紀元前8千年紀末から7千年紀前半に年代づけられている〔Kozlowski and Kempisty 1990：pp. 349-350〕。これら三枚の生活面と関係する建物遺構は，*tauf* 壁を持つ円形プランの小屋状遺構→日乾煉瓦壁と木屋根を持つ円形プランの家屋→日乾煉瓦壁と泥灰岩製柱を持つ矩形プランの家屋という変遷を示している。出土石器の内訳はすべての生活面で変わらず，主に，刃づけされた石刃（retouched blades），エンド・スクレイパー，各種スクレイパー，錐形石器，（刃潰し細石刃などの）小形石器，有舌ポイントなどである。幾何学形細石器とマイクロ・ビュランは

ない。鎌光沢を示す石器が若干ある〔Kozlowski 1990〕。出土剝片，石刃，細石刃，石核のうち，細石刃と円錐形石核（図 2-17）は規則的な剝離痕を示し，押圧剝離による細石刃剝離が推定されている。また，最古生活面でのパンチ使用の間接打法と後の生活面における押圧剝離の採用が述べられている〔Kozlowski and Kempisty 1990：p. 350〕。石器はフリント質素材で作られている〔Kozlowski (ed.) 1990；Kozlowski and Szymczak 1990〕。石斧は磨製である。石皿・石臼，各種磨り石，棍棒頭などの石製品もある〔Mazurowski 1990a〕。石皿・石臼とは異なる石製容器の破片が4点出土している。これらは，大理石，砂岩，石灰岩などを素材とし，各種鉢（碗）の破片とされている〔Mazurowski 1990b〕。出土動物骨は，牛，豚，羊，山羊，水牛，赤鹿，馬，アンテロープなどのものである。このうち，牛，豚，羊，山羊の飼育が確認されている〔Lasota-Moskalewska 1990〕。

ケルメツ・デーレ遺跡はモースル市の西方 60 km，テル・アファル町（Tell Afar）の北西郊外にある開地遺跡である。この遺跡から囲いのある家屋遺構が三例出土している。これらの家屋は半地下式か全地下式で，卵形の床を持つ部屋を一つだけ持っている。床面積は 18 m^2 から 24 m^2 である。これらの遺構から，三段階（stages）に分けられる七枚の生活面が明らかにされている。古い順に，7－6生活面，5－4生活面，3－2生活面である。これらの生活面は続旧石器（中石器）時代の終末から無土器新石器時代の初期（early aceramic Neolithic）に位置づけられている。出土石器は，最古段階に見られる幾何学形細石器とその副産物であるマイクロ・ビュラン，及び，4生活面以後に出現し報告者が“Nemrik point”と呼ぶ（石刃基部と先端部に二側辺の腹面加工（bilateral inverse retouch）を施された）有舌ポイントを除けば，すべての生活面で同様な内訳を示し，抉り入り石器，鋸歯縁石器，そして，基部付近の抉りと二側辺・腹面加工で整形された先端部で特徴づけられ，細石刃を素材とした Khiam point を主体とする。刃潰し石刃，スクレイパー，彫器などは少量である。鎌光沢を持つ石刃が唯一例ある。石刃と細石刃に比べて剝片が多い。石核は単一打面を持つものを主体とする。石核図面（図 2-14）からみる限り，石刃・細石刃剝離のための押圧剝離が存在したようである。以上の石器はチャート質素材で作られている。これらの他，石皿・石臼と磨り石が極僅か出土している。出土動物骨のうち最も多いものはガゼルである。これに，狐，羊，山羊，兎などが続き，野生猫，アナグマ，鳥類の骨もある。羊と山羊は野生のものとされている〔Watkins et al. 1991〕。

国士舘大学イラク古代文化研究所は，1983年11月から1984年1月にかけて，モースル市の北北西 40 km，ティグリス川左岸上に位置するデール・ハル開地遺跡を調査した〔Matsumoto and Yagi 1987〕。この遺跡の6層は無土器層である。同層からは建物遺構，床面のいずれも未発見である。出土石器には，鋸歯縁石器，抉り入り石器，そのすべてが三日月形を呈している幾何学形細石器，少量の石刃，そして，多量の剝片と細石刃などがある。鎌光沢を持つ石器は皆無である。三日月形細石器はマイクロ・ビュラン技法で製作されている。石核には様々の形態があり，そのほとんどが細石刃石核である。大沼は，石核のみかけ上の様態を根拠に，この層の細石刃剝離には押圧剝離が採用されなかったことを推定したことがある（図 2-10）。石器はフリント質素材で作られている。刃部磨製石斧が唯一例出土している。石皿・石臼などの石製品は未発見である〔Ohnuma and Matsumoto 1988〕。出土動物骨としては，羊，山羊，鹿などのものがある。羊と山羊が飼育されていたかどうかは不明である〔Abe 1988〕。

以上のイラクの遺跡は，中石器時代のザルジ遺跡を除き，中石器時代と新石器時代にまたがる遺跡で，紀元前9,000年から7,000年の間に年代づけられている。

今日までのところ，これらの遺跡で羊や山羊が飼育されていたという確証は極めて稀である。そして，emmer

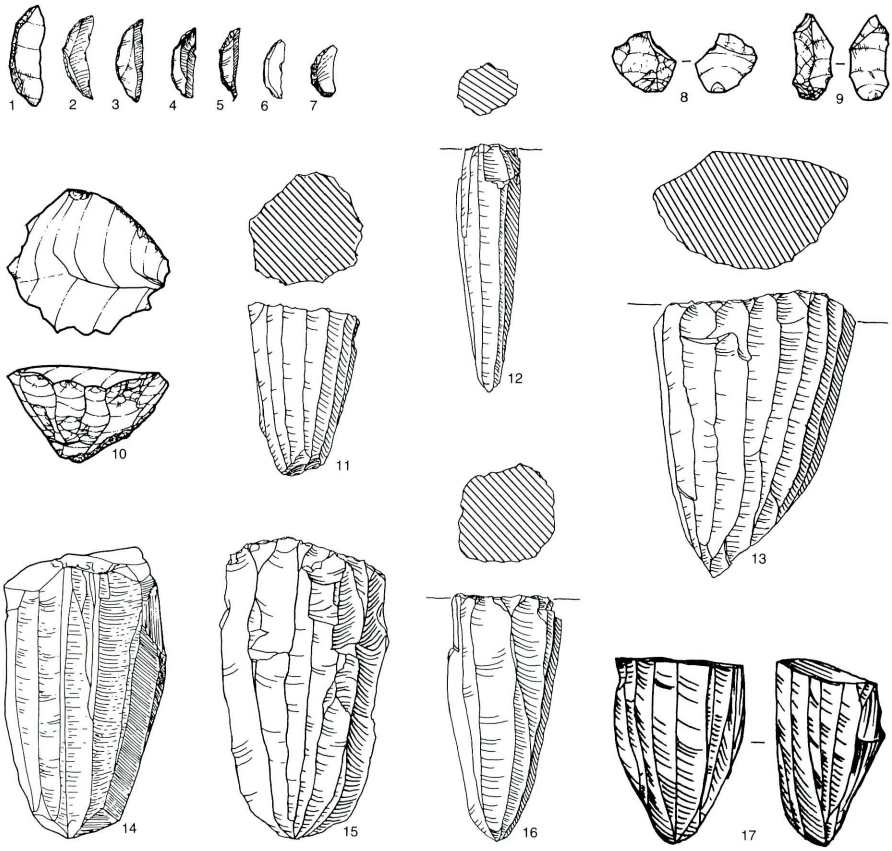

図2　イラクの先土器新石器遺跡出土石器（縮尺：1/1）
1～7．三日月形細石器　8～9．マイクロ・ビュラン　10～17．細石刃石核（1, 8, 9, 10. デール・ハル遺跡；2～7．ザーウィ・チェミ・シャンダール遺跡；11. ムレファート遺跡；12, 13, 15, 16. カムリ・シャヒル遺跡；14. ケルメツ・デーレ遺跡；17. ネムリク・9遺跡）

小麦〔Cole 1970：p. 8〕のような特定栽培穀物の存在を示す痕跡を欠いている。しかしながら，これら遺跡に於いては，出土動物骨の（特に羊と山羊の）偏りが認められ，また，ほぼ例外なく，石皿・石臼や磨り石など（穀物処理に関連したと思われる）石製品が出土している。

この事実，更に，紀元前7,300年から5,800年の間に年代づけられているジャルモ遺跡（Jarmo）〔Braidwood 1983〕では山羊と羊が飼育され〔Stampfli 1983〕，また，einkorn 小麦と emmer 小麦が栽培されていた〔Watson 1983〕ことから，先ジャルモ遺跡とも言える（羊・山羊・穀物を中軸的食料源とした）上記遺跡群は，食料源としての穀物や家畜を計画的に生産した穀物栽培社会や家畜飼育社会の出現の黎明期に位置づけられている。

とはいうものの，中石器時代と新石器時代の移行過程に位置づけられている上記遺跡群の石器内容は一様でない。細石刃の剝離方法に関しても，（直接的や間接的な）打撃剝離と押圧剝離の二種が採用されていたようである。この相違は，地域的な差異に由来する異なる環境を示し得るものであると同時に，時間的な差異に由来する

異なる石器内容・技術を示し得るものでもある。このうち，時間差による相違は，もしそれを証明することが出来るならば，移行過程の内実を遺跡単位で具体的に跡づけることになるだろう。

押圧剥離は圧力による剥離であり，瞬間的衝撃による打割の直接打法や間接打法とは全く異なる，極めて特異な，剥離概念である。そこで，この剥離方法が容易に多元的に起源したものではない〔Inizan et al. 1990〕と考えることも可能である。

押圧剥離がシベリア・モンゴル方面で起源し，その後，東西に伝播した〔Inizan et al. 1990〕にせよ，或いは，それとは別に，中近東の或る地域でも考案されたにせよ，上記イラク遺跡石器群における押圧剥離の出現は，一つの時代的区切りになると思われる。これら石器群における押圧剥離の同定は，遺跡各々の時間的前後関係を解明するためにも非常に重要であると考えられるのである。

ところで，藤本は，農耕等に基づく定住生活の出現が反比例的に幾何学形細石器や細石刃を急減させたという卓見を述べている〔1990：pp. 1-2〕。

このことが直ちに上記イラク遺跡群にあてはまるかどうかは，遺跡各々の定住性の程度差が明らかでない現状に於いては断言出来ない。しかしながら，カリム・シャヒル，ムレファート，そして，ネムリク・9の三遺跡に於いて幾何学形細石器が欠如していることは，これら三遺跡でのより進行した定住生活，或いは，他遺跡よりも新しい年代を示す証であるかもしれず興味深い。

剥片剥離方法に関わる民族誌的研究と復元的研究

ここで，石器製作・剥片剥離方法に関する民族誌的研究と復元的研究[6]の若干例を見ることにする。

今日まで，石器時代の剥離方法として，直接打法，間接打法，台石剥離法，押圧剥離法などが考えられてきた。直接打法とは，石，角，木などのハンマーで原石を直接打ち割る方法である。間接打法は，ハンマーと割られるべき原石との間に媒介物（パンチ）を固定しながら打ち割る方法とされている。台石剥離法とは，あらかじめ固定した石に割りたい原石を打ち当てる方法である。押圧剥離法は圧力による剥離方法である。

鹿角ハンマー〔Bordes 1974〕と石のハンマー（敲石・たたきいし）は遺跡から実際に発見されている。台石についても，それらしいものの報告例がある〔Alimen 1963〕。アメリカ大陸に於いては，原住民 Yahi 部族の Ishi による敲石使用の直接打法と角先使用の押圧剥離が観察されている〔Kroeber 1976：pp. 188-189〕。オーストラリア大陸に於いても，原住民による敲石使用直接打法と木棒使用の押圧剥離が観察されている〔Elkin 1948〕。

押圧剥離は細かく規則的な剥離に適しているので，細石刃剥離や石鏃製作などに採用されたと考えられている。

遺物としての確実なパンチの報告例はないようである。ただ，間接打法で石刃を製作する中米原住民マヤ・Lacandon 部族に関する観察がある〔Clark 1980〕。

F. H. S. Knowles〔1953〕は，民族誌を引用しながら，北米大陸のアリュート，エスキモー，インディアン諸部族の石器製作道具を記述している。それらの具体的な使用方法は割愛するが，Knowles により記述されている剥離具は，直接打法のための敲石，間接打法のパンチとして用いられた鹿角，鯨歯，硬骨，石，そして，押圧剥離に用いるトナカイ角，海象牙と歯，鯨の切歯，木棒，棒状鹿角，縦長石などである〔pp. 82-89〕。

D. E. Crabtree の石器復元製作にかかわる概説書，*An Introduction to Flintworking*〔1972〕，及び，*Notes on Experiments in Flintknapping: 4: Tools Used for Making Flaked Stone Artifact*〔1967〕と *Mesoamerican Polyhedral Cores and Prismatic Blades*〔1968〕の二論文，そして，J. Tixier や J. Pelegrin 等フランスの研究者による

Préhistoire de la pierre taillée: 2: économie du débitage laminaire〔C.R.E.P. 1984〕は，石器の復元的研究，とりわけ，押圧剝離の復元的研究にとり不可欠な業績である。

これらの研究は，写真や図面を駆使しながら，直接打法，間接打法，そして，押圧剝離による復元製作の方法や工程を具体的且つ詳細に記述している。また，製作された剝片・石核の諸特徴を記述している。特に，Crabtree の1968年論文は，極めて規則的な剝離を示す中米の石刃に関わる，チェスト・クラッチ（chest crutch）使用による，復元押圧剝離の報告である。

しかし，上記研究書・論文のどれとして，考古遺物の中に如何にして直接打法，間接打法，押圧剝離という異なる剝離方法を見い出すかについての体系的方法は提示していないのである。

例えば，Tixier は，押圧剝離の特徴として，平行且つ直線的な側辺と稜線を持つ剝片，滑らかで凹凸のない剝片腹面，剝片に残る狭い圧面（butt），剝片上の短く目立つ打瘤，一貫して薄味である剝片，（薄味の剝片が剝がされた結果として残る）石核上の目立つ打瘤痕，そして，極めて規則的な石核上剝離痕などを挙げているものの，このうちのいずれとして押圧剝離の同定基準にはならないとも述べている。ただ，鈍角な剝離角（剝片背面と打圧面とが作る角度）については，それが押圧剝離による以外は考えられないということを述べている〔1984：p. 66〕。

過去人にも採用されたであろうこれら異種剝離方法を同定する体系的試みとしては，J. B. Sollberger と L. W. Patterson による論文・*Prismatic Blade Replication*〔1976〕を挙げることが出来る。

Sollberger らは，石英敲石と鹿角ハンマーを用いた直接打法，ヘラ鹿の角のパンチによる間接打法，そして，鹿角を用いた押圧剝離によって石刃と細石刃を剝離した。これら石刃・細石刃の分析は，ほとんどの計測値的属性が異なる剝離方法に対応する違いを見せないなかで，幅にかなりの違いがあることを示している。この幅の違いを重視した Sollberger らは，これを拠り所として，テキサス州のパレオ・インディアンによる石刃が直接打法で剝離されたこと，また，後の時代には間接打法と押圧剝離が採用されたという見解を述べている。復元製作に使用された石材はフリント質岩石である。

日本人研究者による復元的考古学研究は少なくない[7]が，ここでは，石器製作技術に関する大沼の研究例を紹介する。

大沼〔Ohnuma and Bergman 1982〕は，“テスト”による剝片剝離具（ハード・ハンマー（石英岩の敲石）とソフト・ハンマー（鹿角ハンマー））の同定研究をおこなった。即ち，英国・ブランドン産の良質フリントを用いて自ら剝離した200のフリント剝片の打面と腹面の諸特徴を分析し，それら特徴の組み合わせにより以下の五つの基準を確立した。1）打面と腹面の接線に唇状の張り出しを持ち（lipped），且つ，打瘤の盛り上がりが顕著でない剝片は100%鹿角ハンマーによる。2）打面と腹面の接線に唇状張り出しを持たず，同時に，顕著に盛り上がった打瘤を持つ剝片は100%敲石による。3）打点と円錐状裂痕がともに明瞭な剝片は100%敲石による。4）打瘤上に明瞭な貝殻状裂痕を持つ剝片は100%敲石による。5）打点と円錐状裂痕が不明瞭か皆無で，同時に，打瘤の盛り上がりが顕著でない剝片は87%鹿角ハンマーによる。

これらの基準を用い，大沼と C. Bergman は，M. Newcomer と Bergman が剝片剝離に際して用いた剝離具を同定した。そして，それぞれ90%以上という高い正解率を得た〔Ohnuma and Bergman 1982〕。

これら五基準を発掘遺物に応用することの有効性は，シリア国・Hummal 遺跡 Ia 層の先ムステリアン石刃群の分析〔Bergman and Ohnuma 1983〕，及び，レバノン国・クサル・アキル遺跡の25層から14層の都合12にのぼ

る後期旧石器組成群の分析で確認されている〔Ohnuma 1988〕。

Hummal Ia 層の石刃については，その7割がハード・ハンマー（石核より硬い敲石）で，3割が（石核より軟らかい石，角，骨，木などの）ソフト・ハンマーで剝離されたことが確認され〔Bergman and Ohnuma 1983：p. 173〕，また，クサル・アキルの後期旧石器文化層群については，上層になるにつれソフト・ハンマー剝離がハード・ハンマー剝離の減少に反比例しながら増加することが確認されたのである〔Ohnuma 1988〕。

言うまでもなく，上記研究はすべて“技術復元の限界”から逃れることが出来ない。現代人は，物質文化史研究の一分野である生活用具の復元製作にあたり，発掘資料の観察に基づきながら，民族誌から推定される製作具や製作方法・工程などを採用しているのであり，決して，過去人のとった行動をそのまま複写しているわけではないからである。

細石刃の復元剝離

中石器石器群の一大特徴である幾何学形細石器や細石刃，特に，細石刃の属性については，アムール川中流盆地・Ust' Ulma 遺跡2・3層出土細石刃に関わる，幅，厚さ，そして，二次加工と使用痕を重視した藤本の分析がある〔1990〕。この分析結果を北海道緑丘遺跡出土資料の分析結果と比較した藤本は，Ust' Ulma，緑丘両遺跡出土の細石刃の幅計測値が互いに近似することを述べながら，幅を細石刃の使用方法に関わる重要な属性として強調している〔1990：p. 18〕。

細石刃に関して言われる石材の有効利用と有効刃の効率的多量生産〔藤本 1990：p. 7；他〕については，特に押圧剝離の場合に関し，P. D. Sheets と G. R. Muto が実験的に確認している。Sheets らは，820 g の黒曜石石核から 746 g にのぼる83点の石刃を押圧剝離で剝がしたが，それらの鋭利な刃部の総延長は 17.32 m に達し，残核は原重量の6％（50 g）にすぎない〔1972：pp. 632–634〕。この研究からも明らかなように，押圧剝離は石材を極めて効率的に利用するのである。

押圧剝離は，薄い剝片を剝ぐことが出来る，或いは，薄くしか剝がせないということによって特徴づけられるだろう。また，規格に沿った同様な剝片を連続的に剝がすことが出来るという点も押圧剝離の大きな特徴であるだろう。このことは，特に石材に乏しい場所に於いて，押圧剝離が軽量石器である細石刃の効率的連続剝離にとり有利であったことを推定させるのである。しかし，細石刃剝離イコール押圧剝離ではなく〔Inizan et al. 1990〕，細石刃と押圧剝離の関係，特に，押圧剝離の出現に果たした細石刃剝離の役割，或いは，細石刃の出現に果たした押圧剝離の役割を解明するためには，細石刃出土遺跡の年代測定とそれら遺跡の内実と立地環境の研究，そして，何よりも先ず，遺物の分析や復元製作に基づく細石刃剝離方法の研究，など様々な研究の蓄積を待たねばならないのである。

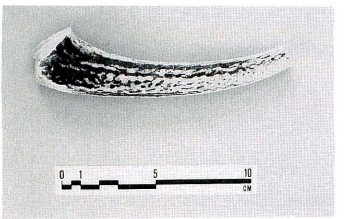

図3　直接打法に使用した鹿角ハンマー

先にも述べたように，細石刃剝離で採用された異種剝離方法の同定は，ともに細石刃を出土しながら年代差の明らかでない複数遺跡の比較研究にとり，特にそれらの時間的先後関係を明らかにし得るという点で，重要である。

この観点から，異種剝離方法（直接打法，間接打法，押圧剝離）の同定が一研究課題として浮上した。

そこで，大沼はこれら三種剝離方法で細石刃を剝離し，各剝離

図4　直接打法による細石刃剝離

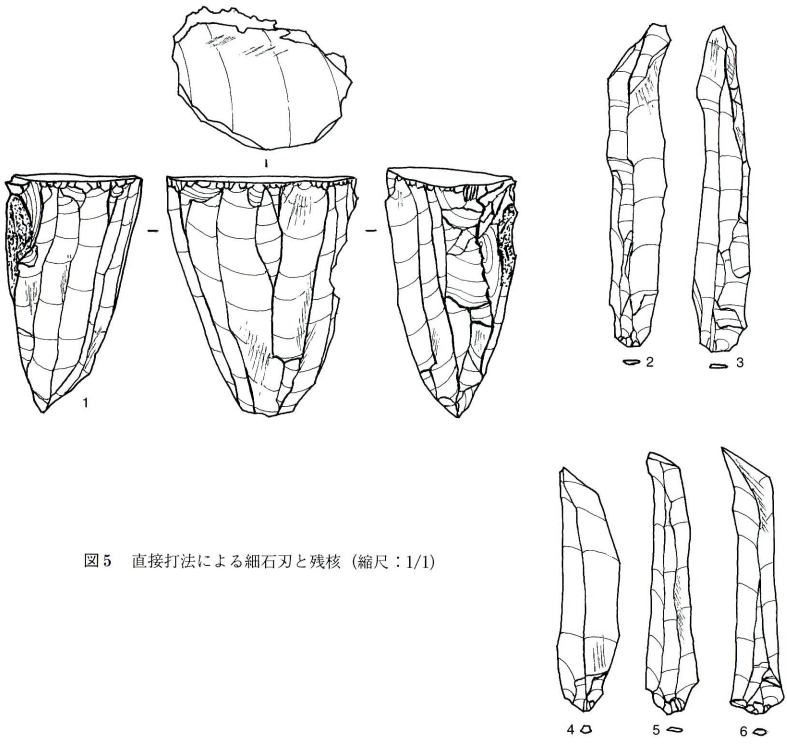

図5　直接打法による細石刃と残核（縮尺：1/1）

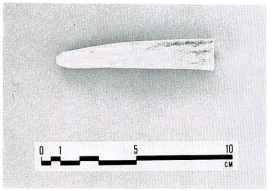

図6　間接打法に使用した鹿角先パンチ

図7　間接打法による細石刃剝離

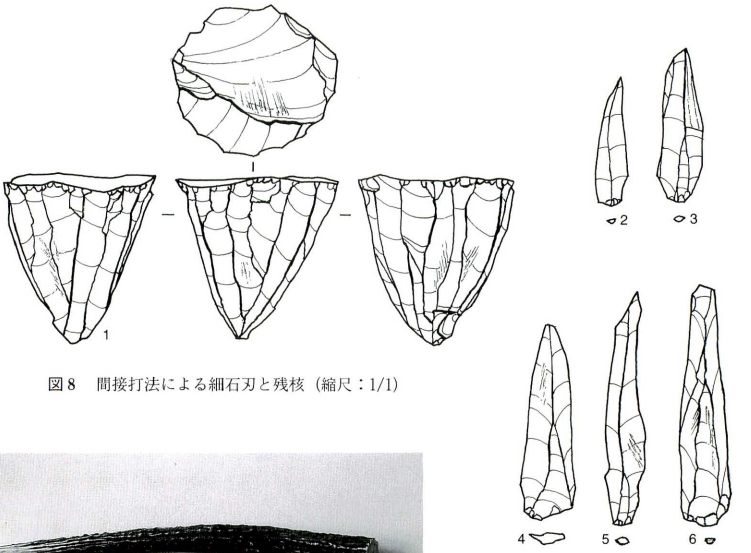

図8　間接打法による細石刃と残核（縮尺：1/1）

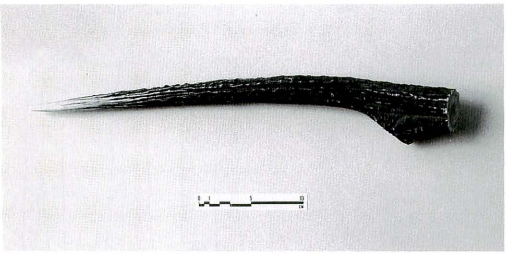

図9　押圧剝離に使用した鹿角剝離具

図10　押圧剝離による細石刃剝離

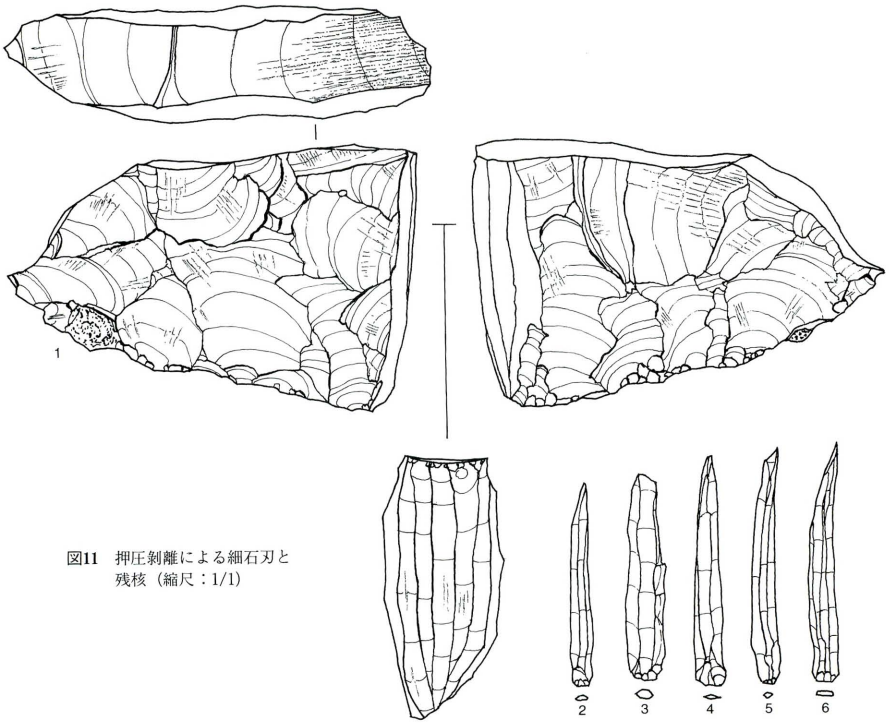

図11　押圧剝離による細石刃と残核（縮尺：1/1）

方法に由来する細石刃群の特徴を整理した。

この復元剥離で使用した石材は北海道紋別郡白滝村原産の黒色黒曜石である。石核の荒削り段階で時折石のハンマーを用いた以外，石核の調整・修正段階では鹿角ハンマーを使用した。最終段階の細石刃剥離には鹿角各部による剥離具を使用した。

以下，細石刃剥離に関わる剥離具と剥離方法を記述する。

直接打法に使用した鹿角ハンマーは長さ 13 cm・重量 60 g のエゾ鹿角先である（図 3）。剥離方法については，石核を左掌に持ち，ハンマーを打面の縁辺部・稜線直下をこするように斜角に振り下ろした（図 4，図 5）。石核の打面と剥離面が形成する剥離角は 90度以下，ほぼ 80度を理想に設定した。

間接打法には長さ 8 cm・重量 20 g のエゾ鹿角先パンチ（図 6）を使用した。石核については，それを左手親指と人差し指の付け根部分にはさみ，中指を打面の一部に添えて固定した。次いで，石核底部から打面縁辺部に延びた左手親指と人差し指でパンチの先を，打面に対して鋭角に，稜線直下に固定しながら，上記鹿角ハンマーをパンチ上面に軽く打ちあてた（図 7，図 8）。剥離角については直接打法の場合同様である。この剥離方法は久保田によって考案されたものである。類似の剥離方法は中米原住民マヤ・Lacandon 部族に於いて観察されている〔Clark 1980〕。

押圧剥離に際しては，東南アジア鹿の角を切断し，その先端部側を使用した。その長さは 40 cm，重量は 330 g である（図 9）。石核の一側面を岩石の自然の裂け目にあて，左掌を石核側面と押圧面，及び，岩石裂け目上方平坦部の三者に押しかぶせながら石核を固定し，押圧面上の稜線直下に鹿角の先端を置き，右胸部に固定した角の他端を身体全体の力で押しながら細石刃を剥離した[8]（図10，図11）。剥離角については上記二剥離方法の場合同様である。必要に応じて，珪質頁岩片の自然面で石核押圧面を強く擦り，剥離の際のすべりどめを施した[9]。このすべりどめについては，各細石刃剥離直前の擦りは石核縁辺の破壊につながるので，予め広範囲に擦っておくほうが良いようである。より小形の石核に関しては掌上での固定が単純，且つ，容易である（図12，図13）。

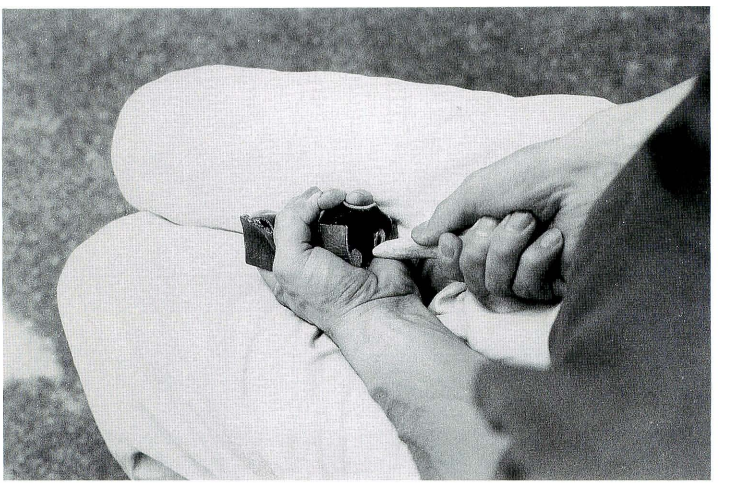

図12　掌上押圧剥離による細石刃剥離

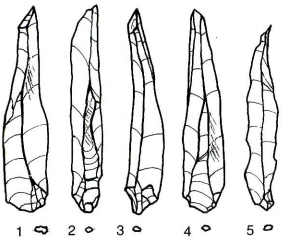

図13　掌上押圧剝離による細石刃と残核（縮尺：1/1）

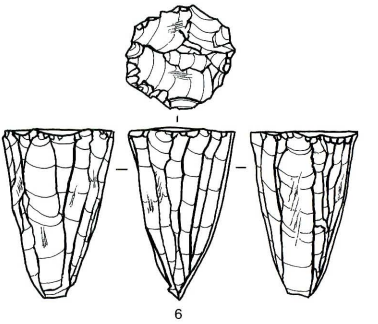

図14　自然木枝の掌上石核固定具

図15　掌上押圧剝離に使用した鹿角先剝離具

この場合，掌は軟らかく，剝離の際の石核の動きを避けられない。それ故，石核を支える掌上固定具[10]を必要とする。掌上固定具としては自然木の分枝部（図14）が格好な素材である。自然木枝は獲得容易であり，過去人も固定具として採用した可能性が高い。掌上細石刃剝離の押圧具は，胸部から押される長めの角，手握りの短めの角先（長さ 13 cm・重量 60 g）（図15）のいずれでも良い。

復元剝離細石刃の分析

三種剝離方法で剝離した細石刃を各グループの中から100点づつ分析用サンプルとして選別し，打面・押圧面（打圧面）に関わる形態的・非計測値的特徴，及び，細石刃自体の計測値的特徴につき分析した。ほぼ全ての分析サンプルは，厳密に細石刃と呼べるもの，即ち，長さとは無関係に幅が 1.2 cm 未満の石刃（長さが幅の２倍以上ある剝片）[11]である。

打圧面については，その殆どが平坦剝離面で，微細剝離（facet）で調整されたものは極僅かである。そして，打圧面はその形で分類された。この打圧面形はハンマーや押圧具が剝離の瞬間に細石刃腹面に顕著な打点・押圧点（打圧点）を残すか否かにより規程されるようである。顕著に突出する打圧点の存在を示す角（かど）を持った三角形，菱形などの打圧面，そして，明瞭な打圧点を残さず，それ故，顕著な角を持たないなめらかな打圧面の二つである（図16）。

打圧面形以外の非計測値的分析項目は，細石刃腹面における顕著な打圧点の有無，そして，打圧面と腹面とが

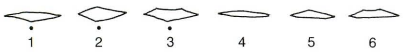

図16　打圧面の形態：1～3．打圧点（•）の存在による三角形，菱形などの打圧面；4～6．打圧点が明瞭でないなめらかな打圧面

接する部分の唇状張り出し（lip）の有無である。

計測値と計算値は，打圧面と細石刃背面のなす剥離角，打圧点直上での打圧面最大厚，細石刃の最大長，細石刃の最大幅，（plunging 部分を除く）細石刃の最大厚などの値，そして，細石刃最大長／（対）細石刃最大幅，細石刃最大厚／（対）打圧面最大厚，及び，細石刃最大幅／（対）打圧面最大厚などの比率である。

以下は三種剥離方法毎の分析結果である。

1)　直接打法

打面形：角を持つ打面 25（32.1%）；角を持たない打面 53（67.9%）；微細すぎて形の不明な打面 22

打点：認められるもの 75（75%）；認められないもの 25（25%）

唇状張り出し：認められるもの 100（100%）

剥離角（計測サンプル 6 点）：最大値 86°；最小値 70°；平均値 77°；標準偏差 7°

打面最大厚（計測サンプル100点）：最大値 2.9 mm；最小値 0.4 mm；平均値 1.0 mm；標準偏差 0.4 mm

最大長（計測サンプル97点）：最大値 55.6 mm；最小値 15.2 mm；平均値 30.7 mm；標準偏差 7.8 mm

最大幅（計測サンプル100点）：最大値 14.3 mm；最小値 4.1 mm；平均値 9.1 mm；標準偏差 2.3 mm

最大厚（計測サンプル100点）：最大値 4.5 mm；最小値 0.5 mm；平均値 2.0 mm；標準偏差 0.7 mm

最大長／最大幅（計算サンプル97点）：最大値 7.85；最小値 1.97；平均値 3.51；標準偏差 1.07

最大厚／打面最大厚（計算サンプル100点）：最大値 5.63；最小値 0.80；平均値 2.19；標準偏差 0.74

最大幅／打面最大厚（計算サンプル100点）：最大値 26.00；最小値 3.73；平均値 10.11；標準偏差 4.08

2)　間接打法

打面形：角を持つ打面 79（79.8%）；角を持たない打面 20（20.2%）；微細すぎて形の不明な打面 1

打点：認められるもの 91（91%）；認められないもの 9（9%）

唇状張り出し：認められるもの 93（93%）；認められないもの 7（7%）

剥離角（計測サンプル45点）：最大値 84°；最小値 55°；平均値 75°；標準偏差 5°

打面最大厚（計測サンプル100点）：最大値 3.8 mm；最小値 0.6 mm；平均値 1.6 mm；標準偏差 0.7 mm

最大長（計測サンプル89点）：最大値 47.0 mm；最小値 19.2 mm；平均値 31.4 mm；標準偏差 6.4 mm

最大幅（計測サンプル100点）：最大値 18.0 mm；最小値 4.3 mm；平均値 10.0 mm；標準偏差 2.7 mm

最大厚（計測サンプル100点）：最大値 4.6 mm；最小値 1.0 mm；平均値 2.6 mm；標準偏差 0.8 mm

最大長／最大幅（計算サンプル89点）：最大値 7.03；最小値 1.78；平均値 3.31；標準偏差 0.96

最大厚／打面最大厚（計算サンプル100点）：最大値 3.22；最小値 0.90；平均値 1.72；標準偏差 0.56

最大幅／打面最大厚（計算サンプル100点）：最大値 14.44；最小値 2.69；平均値 6.80；標準偏差 2.51

3)　押圧剥離

押圧面形：角を持つ押圧面 55（56.1%）；角を持たない押圧面 43（43.9%）；微細すぎて形の不明な押圧面 2

押圧点：認められるもの 90（90%）；認められないもの 10（10%）

唇状張り出し：認められるもの 98（98%）；認められないもの 2（2%）

剥離角（計測サンプル12点）：最大値 86°；最小値 74°；平均値 82°；標準偏差 4°

押圧面最大厚（計測サンプル100点）：最大値 3.0 mm；最小値 0.6 mm；平均値 1.4 mm；標準偏差 0.5 mm

最大長（計測サンプル86点）：最大値 63.2 mm；最小値 17.8 mm；平均値 33.8 mm；標準偏差 11.7 mm

最大幅（計測サンプル100点）：最大値 11.5 mm；最小値 3.6 mm；平均値 6.9 mm；標準偏差 1.6 mm

最大厚（計測サンプル100点）：最大値 2.8 mm；最小値 0.8 mm；平均値 1.5 mm；標準偏差 0.5 mm

最大長／最大幅（計算サンプル86点）：最大値 10.49；最小値 2.53；平均値 5.08；標準偏差 1.57

最大厚／押圧面最大厚（計算サンプル100点）：最大値 2.80；最小値 0.50；平均値 1.17；標準偏差 0.40

最大幅／押圧面最大厚（計算サンプル100点）：最大値 10.29；最小値 2.57；平均値 5.36；標準偏差 1.86

以上，分析結果を述べたが，三種剝離方法による細石刃グループ間には，打圧点と唇状張り出しの有無，そして，剝離角と最大長の平均値に於いては顕著な違いが認められない。しかし，打圧面最大厚に於いては直接打法の細石刃の平均値が他よりも小さく，また，最大幅平均値については押圧剝離のそれが他よりも小さい。また，最大厚平均値に関しては，押圧剝離，直接打法，間接打法の順に大きくなるという傾向を認めることが出来る。しかし，この三つの傾向を異種剝離方法による細石刃の識別基準としてそれぞれ単独で用いることは出来ないと思われる。というのも，打圧面厚は剝離具を石核縁辺部に打撃・固定する際の選択的位置ぎめに規定されるものである。また，最大幅や最大厚は打圧面厚と密接な関連を持ち，同一剝離方法内の個人癖・多様性を反映すると思われるからである。

分析結果に於いて明らかな違いを示し，個人癖の影響を超越する“割れ力学”的特徴を示すと思われ，且つ，異種剝離方法による細石刃のグループ同定に有効な基準と思われたものは下記の四項である（表1）。

1)　打圧面の形：これは直接打法と間接打法・押圧剝離という二つのグループの同定に有効である。

2)　最大長／最大幅の比率：これは直接・間接打法と押圧剝離の二つのグループの同定に有効である。

3)　最大厚／打圧面最大厚の比率：これは直接打法と押圧剝離の二つのグループの同定に有効である。

4)　最大幅／打圧面最大厚の比率：これは直接打法と押圧剝離の二つのグループの同定に有効である。

以上の四基準のうち，1) 直接打法による細石刃グループを間接打法と押圧剝離によるものから分離させる打

表1　三種剝離方法による細石刃のグループ同定に有効と思われた四基準

1)　打圧面形	三角形・菱形打圧面		なめらかな打圧面
直接打法	32.1%		67.9%
間接打法	79.8%		20.2%
押圧剝離	56.1%		43.9%
2)　最大長／最大幅		平均値	標準偏差
直接打法		3.51	1.07
間接打法		3.31	0.96
押圧剝離		5.08	1.57
3)　最大厚／打圧面最大厚		平均値	標準偏差
直接打法		2.19	0.74
押圧剝離 （間接打法：平均値 1.72；標準偏差 0.56）		1.17	0.40
4)　最大幅／打圧面最大厚		平均値	標準偏差
直接打法		10.11	4.08
押圧剝離 （間接打法：平均値 6.80；標準偏差 2.51）		5.36	1.86

圧面形，及び，2) 間接打法による細石刃グループを押圧剝離によるものから分離させる最大長／最大幅の比率という二つの基準は，それらの併用により，三種剝離方法による細石刃のグループ同定の強力な基準になると思われた。また，最大厚／打圧面最大厚と最大幅／打圧面最大厚という二つの比率は有効な補助的基準になると思われた。

この推論を実証するためには，先ず，第三者による同様な復元製作の助けを必要とした。

そこで，大沼は，同様な剝離方法による細石刃剝離を久保田に依頼し，久保田の剝離した細石刃を“テスト”によりグループ同定した。

“テスト”による復元剝離細石刃のグループ同定

久保田の細石刃剝離における剝離具と剝離方法の詳細は大沼の場合と同様である。

久保田は三グループ（A，B，C）の細石刃を剝離した。各グループから分析用に選別された50点づつのサンプルは，ほぼすべてが細石刃の厳密な定義〔Tixier 1963：pp. 36-39〕に適うものである。

分析項目は同定に有効と思われるものに限定された。即ち，打圧面形，打圧面最大厚，細石刃の最大長，細石刃の最大幅，細石刃の最大厚，そして，細石刃最大長／細石刃最大幅，細石刃最大厚／打圧面最大厚，細石刃最大幅／打圧面最大厚などの比率である。

以下はグループ毎の分析結果である。

1)　グループA

打圧面形：三角形・菱形打圧面 8 (22.9%)； なめらかな打圧面 27 (77.1%)； 微細すぎて形の不明な打圧面 15

打圧面最大厚（計測サンプル50点）：最大値 3.3 mm； 最小値 0.3 mm； 平均値 1.1 mm； 標準偏差 0.6 mm

最大長（計測サンプル47点）：最大値 53.1 mm； 最小値 25.5 mm； 平均値 36.7 mm； 標準偏差 5.2 mm

最大幅（計測サンプル50点）：最大値 13.5 mm； 最小値 4.6 mm； 平均値 9.6 mm； 標準偏差 2.2 mm

最大厚（計測サンプル50点）：最大値 4.2 mm； 最小値 0.7 mm； 平均値 2.4 mm； 標準偏差 0.8 mm

最大長／最大幅（計算サンプル47点）：最大値 7.35； 最小値 2.72； 平均値 4.06； 標準偏差 0.96

最大厚／打圧面最大厚（計算サンプル50点）：最大値 7.50； 最小値 0.67； 平均値 2.74； 標準偏差 1.41

最大幅／打圧面最大厚（計算サンプル50点）：最大値 26.00； 最小値 2.18； 平均値 10.94； 標準偏差 4.94

2)　グループB

打圧面形：三角形・菱形打圧面 32 (74.4%)； なめらかな打圧面 11 (25.6%)； 微細すぎて形の不明な打圧面 7

打圧面最大厚（計測サンプル50点）：最大値 2.7 mm； 最小値 0.5 mm； 平均値 1.3 mm； 標準偏差 0.6 mm

最大長（計測サンプル47点）：最大値 36.3 mm； 最小値 21.6 mm； 平均値 29.5 mm； 標準偏差 3.7 mm

最大幅（計測サンプル50点）：最大値 10.9 mm； 最小値 4.8 mm； 平均値 7.8 mm； 標準偏差 1.5 mm

最大厚（計測サンプル50点）：最大値 3.3 mm； 最小値 0.8 mm； 平均値 2.1 mm； 標準偏差 0.5 mm

最大長／最大幅（計算サンプル47点）：最大値 7.44； 最小値 2.64； 平均値 3.90； 標準偏差 0.85

最大厚／打圧面最大厚（計算サンプル50点）：最大値 6.20； 最小値 0.82； 平均値 1.90； 標準偏差 0.98

最大幅／打圧面最大厚（計算サンプル50点）：最大値 15.33； 最小値 3.00； 平均値 7.13； 標準偏差 2.78

3)　グループC

打圧面形：三角形・菱形打圧面 25 (59.5%)； なめらかな打圧面 17 (40.5%)； 微細すぎて形の不明な打圧面 8

打圧面最大厚（計測サンプル50点）：最大値 2.5 mm；最小値 0.7 mm；平均値 1.3 mm；標準偏差 0.4 mm

最大長（計測サンプル48点）：最大値 39.2 mm；最小値 26.0 mm；平均値 30.7 mm；標準偏差 2.9 mm

最大幅（計測サンプル50点）：最大値 11.1 mm；最小値 3.7 mm；平均値 7.6 mm；標準偏差 1.5 mm

最大厚（計測サンプル50点）：最大値 4.0 mm；最小値 0.7 mm；平均値 1.6 mm；標準偏差 0.6 mm

最大長／最大幅（計算サンプル48点）：最大値 7.03；最小値 2.68；平均値 4.21；標準偏差 0.86

最大厚／打圧面最大厚（計算サンプル50点）：最大値 3.00；最小値 0.50；平均値 1.35；標準偏差 0.52

最大幅／打圧面最大厚（計算サンプル50点）：最大値 12.00；最小値 3.43；平均値 6.39；標準偏差 1.69

以上の分析結果を先述した四つの同定基準（打圧面形，最大長／最大幅，最大厚／打圧面最大厚，最大幅／打圧面最大厚）で検討した（表２）。

表２　グループ同定四基準と“テスト”サンプルの分析結果

1)　打圧面形	三角形・菱形打圧面	なめらかな打圧面
直接打法	32.1%（大沼）：22.9%（久保田・A）	67.9%（大沼）：77.1%（久保田・A）
間接打法	79.8%（大沼）：74.4%（久保田・B）	20.2%（大沼）：25.6%（久保田・B）
押圧剝離	56.1%（大沼）：59.5%（久保田・C）	43.9%（大沼）：40.5%（久保田・C）

2)　最大長／最大幅	大沼　平均値：標準偏差	久保田　平均値：標準偏差
直接打法	3.51：1.07	（A）　4.06：0.96
間接打法	3.31：0.96	（B）　3.90：0.85
押圧剝離	5.08：1.57	（C）　4.21：0.86

3)　最大厚／打圧面最大厚	大沼　平均値：標準偏差	久保田　平均値：標準偏差
直接打法	2.19：0.74	（A）　2.74：1.41
押圧剝離	1.17：0.40	（C）　1.35：0.52
間接打法	1.72：0.56	（B）　1.90：0.98

4)　最大幅／打圧面最大厚	大沼　平均値：標準偏差	久保田　平均値：標準偏差
直接打法	10.11：4.08	（A）　10.94：4.94
押圧剝離	5.36：1.86	（C）　6.39：1.69
間接打法	6.80：2.51	（B）　7.13：2.78

その結果，グループＡについては，打圧面の形から直接打法によるものと推定し正解を得た。グループＢとグループＣは最大長／最大幅の比率によっても分離されなかった。そこで，四基準を総合的に考慮し，グループＢを間接打法によるもの，グループＣを押圧剝離によるものと推定し，正解を得た。

以下に述べるのは，“テスト”の過程そのものと結果が示唆した同定基準の有効性と無効性である。

1)　打圧面形は同一剝離方法内の個人癖・多様性を超越する。

2)　最大長は石核剝離面の長さに規定される。

3)　最大幅は，稜線と剝離点との位置関係，そして，石核打圧面から見た剝離面の角度に，鋭角の剝離面からは狭身の細石刃・鈍角の剝離面からは幅広の細石刃というように，規定される。

4)　最大厚は打圧面最大厚の大小に，そのしかたは剝離方法の違いに応じて異なるにせよ，比例する。しかし，最大長や最大幅にはあまり影響されない。

5)　以上の四点から，最大長／最大幅，最大幅／打圧面最大厚の二比率を有効な同定基準と言うことは出来

ず，一方，打圧面形，及び，最大厚／打圧面最大厚の比率の二者は極めて有効な同定基準であると言うことが出来る。

“テスト”終了の後，考古遺物を分析する機会を得た。つぎに，その分析結果を紹介する。

白滝服部台遺跡出土細石刃の分析

白滝服部台遺跡は北海道紋別郡白滝村にある。同遺跡は，昭和36年７月，明治大学により発掘調査された。単一文化層から出土した石器は，細刃器（細石刃），細刃器用石核（細石刃石核），スキー状削片，石核用両面調整素材，尖頭器，有茎尖頭器，掻器，削器，彫器，彫器削片，船底形石器，刃器（石刃），剝片，砕片，及び，石核である〔杉原・戸沢 1975〕（図17）。

大沼と久保田が今回分析したサンプルは，明治大学考古学博物館保管の黒色黒曜石製細石刃中の50点である。分析は同博物館に於いて平成４年３月９日に行われた。

分析項目は“テスト”で使用されたもの同様である。

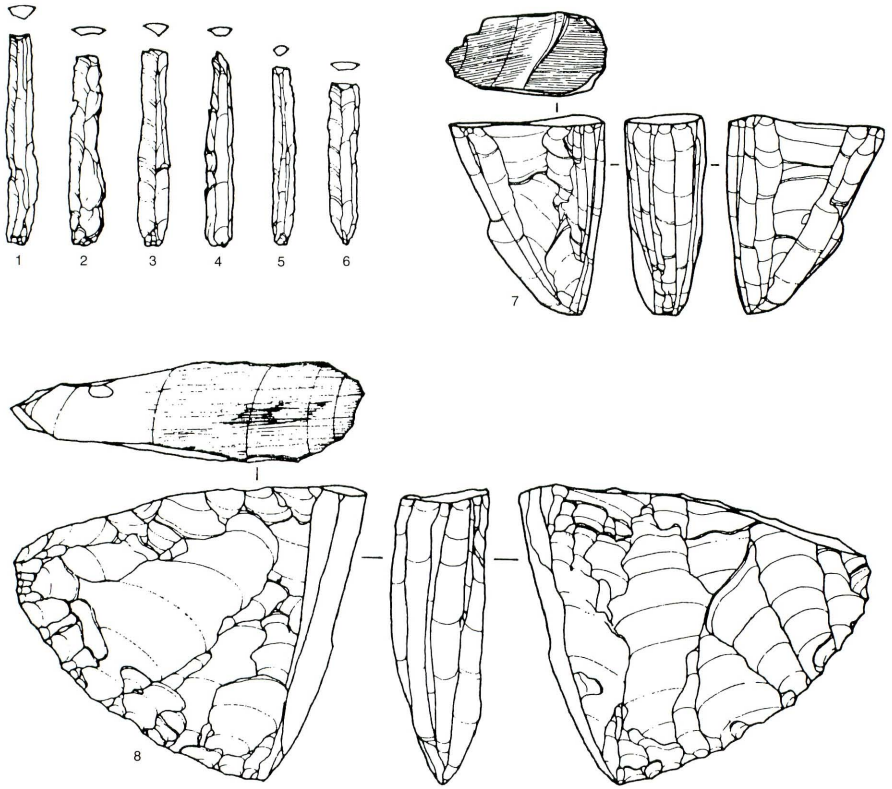

図17　北海道白滝服部台遺跡出土の細石刃と細石刃石核（縮尺：1/1）
（細石刃についてはその下方が打圧面）

分析サンプルの全ては細石刃の厳密な定義〔Tixier 1963：pp. 36–39〕に適い，また，“目的剝片”と推定されたものである。

以下は分析の結果である。

打圧面形：三角形・菱形打圧面 28 (65.1%)；なめらかな打圧面 15 (34.9%)；微細すぎて形の不明な打圧面 7

打圧面最大厚（計測サンプル50点）：最大値 2.0 mm；最小値 0.4 mm；平均値 1.1 mm；標準偏差 0.3 mm

最大長（計測サンプル10点）：最大値 44.3 mm；最小値 21.4 mm；平均値 31.3 mm；標準偏差 7.1 mm

最大幅（計測サンプル50点）：最大値 9.3 mm；最小値 4.2 mm；平均値 5.9 mm；標準偏差 1.0 mm

最大厚（計測サンプル50点）：最大値 2.6 mm；最小値 0.8 mm；平均値 1.4 mm；標準偏差 0.4 mm

最大長／最大幅（計算サンプル10点）：最大値 7.91；最小値 3.02；平均値 5.33；標準偏差 1.57

最大厚／打圧面最大厚（計算サンプル50点）：最大値 2.25；最小値 0.75；平均値 1.31；標準偏差 0.38

最大幅／打圧面最大厚（計算サンプル50点）：最大値 15.25；最小値 3.20；平均値 5.58；標準偏差 2.03

以上の分析結果をそれまでの結果と比較し検討した（表３）。

比較検討の結果，白滝服部台遺跡出土細石刃の剝離方法は押圧剝離であった可能性が高いという結論に到達した（図18，図19，図20）。

この結論は服部台遺跡出土細石刃に関わる推論である。そして，それが他遺跡出土細石刃すべてに関わるものでないことは勿論である。

我が国に於いては，麻生優が佐世保市の久村貞男・下川達弥両氏の鉄製釘による復元製作を紹介しながら，押圧剝離による細石刃剝離の可能性を述べている〔1965：p. 168〕。また，吉崎昌一は湧別技法の工程の記述の中

表３　白滝服部台遺跡出土細石刃の分析結果

1)　打圧面形	三角形・菱形打圧面	なめらかな打圧面
直接打法	32.1%（大沼）：22.9%（久保田・A）	67.9%（大沼）：77.1%（久保田・A）
間接打法	79.8%（大沼）：74.4%（久保田・B）	20.2%（大沼）：25.6%（久保田・B）
押圧剝離	56.1%（大沼）：59.5%（久保田・C）	43.9%（大沼）：40.5%（久保田・C）
	※ 65.1%	※ 34.9%
2)　最大長／最大幅	大沼　平均値：標準偏差	久保田　平均値：標準偏差
直接打法	3.51：1.07	（A）　4.06：0.96
間接打法	3.31：0.96	（B）　3.90：0.85
押圧剝離	5.08：1.57	（C）　4.21：0.86
	※ 5.33：1.57	
3)　最大厚／打圧面最大厚	大沼　平均値：標準偏差	久保田　平均値：標準偏差
直接打法	2.19：0.74	（A）　2.74：1.41
押圧剝離	1.17：0.40	（C）　1.35：0.52
	※ 1.31：0.38	
間接打法	1.72：0.56	（B）　1.90：0.98
4)　最大幅／打圧面最大厚	大沼　平均値：標準偏差	久保田　平均値：標準偏差
直接打法	10.11：4.08	（A）10.94：4.94
押圧剝離	5.36：1.86	（C）　6.39：1.69
	※ 5.58：2.03	
間接打法	6.80：2.51	（B）　7.13：2.78

※：白滝服部台遺跡出土細石刃の分析結果

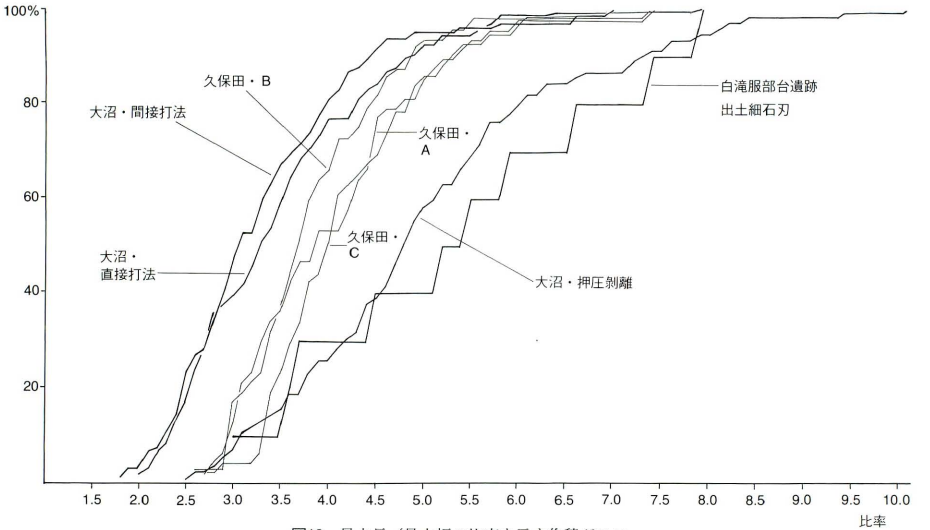

図18　最大長／最大幅の比率を示す集積グラフ

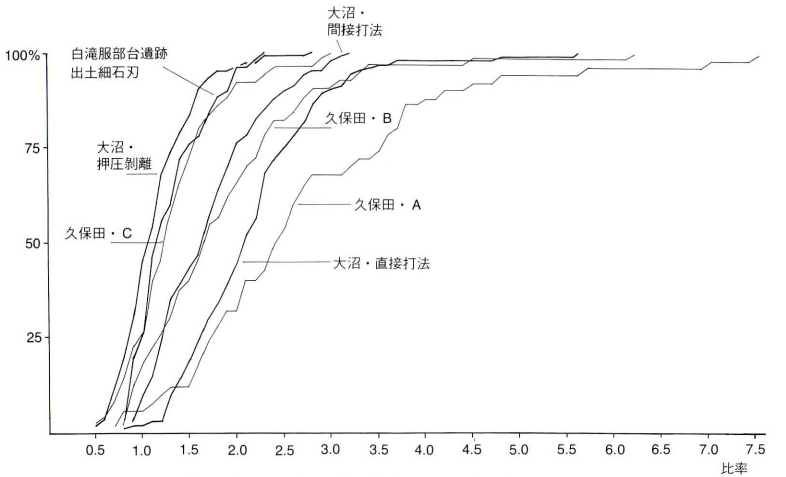

図19　最大厚／打圧面最大厚の比率を示す集積グラフ

で，同技法による細石刃剝離が鹿角製道具を用いた押圧剝離であったと述べている〔1961：pp. 15–19；渡辺（編）1977：p. 314〕。一方，松沢亜生は，細石刃が（直接的，或いは，間接的な）打撃剝離と押圧剝離のいずれによっても剝離され得ることを述べている〔1988：p. 14〕。

過去人の押圧剝離の採用・不採用については，同剝離に適した石材の有無，そして，剝離具となり得る素材の有無という極めて根本的な問題が絡むと思われる。それ故，細石刃剝離イコール押圧剝離という直線的図式は成立しないと思われる。

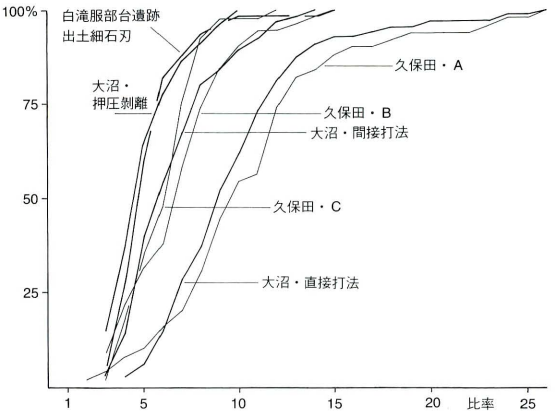

図20　最大幅／打圧面最大厚の比率を示す集積グラフ

おわりに

本研究はイラク・デール・ハル遺跡６層出土石器の分析にその根源を持っている。

北イラク地方・ザグロス山麓の中石器時代と新石器時代にまたがる所謂先ジャルモ遺跡に於いては，他地方同様に幾何学形細石器作りが盛行し，そのための細石刃剝離が盛行した。

この先ジャルモ遺跡群は紀元前9,000年から7,000年に年代づけられ，大雑把に，穀物栽培社会，或いは，家畜飼育社会の出現期の中に位置づけられている。

しかしながら，これら遺跡群における石器内容は一様でない。例を挙げれば，幾何学形細石器の製作はマイクロ・ビュラン技法による場合とよらない場合があり，また，細石刃の剝離については，（直接・間接の）打撃剝離と押圧剝離の二者が採用されていたようである。

これら遺跡相互の年代差に関しては，今日まで，鎌光沢を持つ石器の存在が唯一引き合いに出されてきたと言っても過言ではない。

鎌光沢を持つ石器の存在は言うまでもなく，マイクロ・ビュラン技法や押圧剝離の有無も，また，遺跡の年代差を解明する鍵となり得るものである。

マイクロ・ビュラン技法と押圧剝離という二つの技術要素は，遺跡相互の年代差を示すというよりは，むしろ，ザグロス山麓と西方レヴァント地域（マイクロ・ビュラン技法）或いは東方シベリア・モンゴル地域（押圧剝離）との間に存在した文化接触の多少に起因する地域的差異を示すものであるかもしれない。しかし，この二者は，幾何学形細石器製作のための特異な細石刃分割概念（マイクロ・ビュラン技法）であり，また，極めて特異な石片剝離の概念（押圧剝離）である。それ故，この二者を先ジャルモ遺跡群の年代差を解明し得る技術要素として見ることも可能である。

このようにして，先ジャルモ遺跡群における押圧剝離の有無，そして，細石刃剝離方法の内実の解明が今回の研究課題として浮上したのである。

しかし，上述の研究目的を踏まえるならば，本研究における復元製作は，先ジャルモ遺跡群で使用されていた細石刃素材（フリント質岩石）に類似したチャートや頁岩質岩石などを用いたものでなければならず，また，考古遺物自体の分析は，本来，先ジャルモ遺跡群出土細石刃そのものになされるべきであったと言わねばならない。

とはいえ，諸般の事情から，本研究は黒曜石による復元研究と北海道白滝服部台遺跡出土細石刃の分析から構成されている。

この点については，大沼は三種剝離方法を用いて珪質頁岩の細石刃を製作し，その分析も行っている。それ故，先ジャルモ遺跡の細石刃剝離方法に関しては別の機会で論じるつもりである。

最後に，以下の諸点で本論を結ぶことにする。

1) 細石刃の打圧面形は個人癖や技術的熟練度を超越し，直接打法による細石刃グループを間接打法と押圧剝離によるグループから分離させる。
2) 細石刃の最大厚は，そのしかたが剝離方法の違いに対応しながら異なるにせよ，打圧面最大厚の大小に比例する。それ故，最大厚／打圧面最大厚の比率における三種剝離方法毎の比例の度合い差は，細石刃のグループ同定に極めて有効な基準である。この比例変異幅もまた個人癖・技術的熟練度を超越する。
3) 種々の同定基準，特に上記二項の基準に基づく限り，白滝服部台遺跡出土細石刃は押圧剝離で剝離された可能性が極めて高いと言うことが出来る。

注

1) 中石器文化の概要については角田文衛〔1979〕を参照されたい。
2) 角田の訳〔1979：p. 699〕による。
3) ロンドン大学考古学研究所・M. H. Newcomer のゼミナール〔1978/79〕による。
4) マイクロ・ビュラン技法の工程については Tixier〔1963：pp. 39-42〕の復元研究がある。
5) 細石器の概要については藤本〔1979〕を参照されたい。
6) 実験考古学全般を扱った概説書としては J. Coles の *Experimental Archaeology*〔1979〕がある。また，実験製作に基づく石器研究については L. L. Johnson の研究史〔1978〕が詳しい。
7) 石器研究とは甚だ分野を異にするが，久保田は，明らかに焼成遺構が出土している土師器を対象とした焼成実験をおこなっている〔1989〕。これまで焼成遺構は全国で52遺跡から500余りの報告例があり，その形状は，底部に被熱部分を伴う直径 1.5 から 2.0 m 前後の椀状をなすものが多い。しかし，これらの遺構に於いては，多量の木炭や破損品の出土が極めて希で，周辺に粘土採掘坑や工房跡を伴っているということのみで焼成遺構と判断されてきた。それ故，焼成方法や，如何なる熱空間中での焼成であったかという研究はなされてこなかったのである。そこで，これら焼成遺構の分析と民族事例を参考にしながら実験を重ねた結果，久保田は，少量の薪，藁，そして上部を藁灰で覆った「覆い焼き」という方法が最も合理的であるという結論に達した。「覆い焼き」では，燃料の薪はすべて燃焼し木炭は殆ど残らず，唯一残る藁灰は次の焼成のためすべて回収される。その結果，焼成地点には底面に被熱による赤色部が生じるだけで，まさに出土遺構と同様な所見となるのである。焼成温度についても，上部を覆った灰により上昇はいわゆる野焼きに比べてはるかに緩やかであり，しかも 700度前後の温度が長時間保持されることが明らかとなった。この雰囲気のなかで，土器は破損することなく，土師器の斎一性を持った色調に焼き上がるのである。この実験により，灰を取り去るといった，考古学資料では検出できない人間の行為を介在させて遺構を考察することが可能となり，焼成遺構には木炭や破損品が出土するものであるとか，土器の焼成温度は縄文，弥生，土師器と時代が下るにしたがって上昇してゆくといった，これまでの一般的な考え方を再検討する極めて有効な手段を提示することが出来たのである。
8) Crabtree は，胸部・肩部から押される押圧具使用の細石刃剝離を記述している〔1967：pp. 68-69〕。松沢亜生氏の教示によれば，同様な方法は Pelegrin によっても採用されている。しかしながら，Crabtree と Pelegrin のいずれに於いても，石核固定具は人工のものであり，岩石の自然の裂け目や窪みを利用することはないようである。
9) これまでの大沼の押圧剝離の経験からは，黒曜石のすべてが押圧剝離における圧面の擦りに利点を見いだすのか，或いは，この利点が特定岩質黒曜石に限られるのかについて断言することは出来ない。しかし，圧面を擦ってすべり止めを施

さない限り押圧剝離し難い黒曜石のあることは事実である。山田晃弘は，湧別技法による舟底形石核の甲板面に見られる擦痕について，同石核に由来する細石刃の打面・押圧面の分析から，“擦痕が着けられるのは，細石刃剝離直前から剝離作業中である。〔1986：p. 387〕”と述べ，この擦痕が剝離の際のすべり止めであった可能性を強く示唆している。

10) Bergman は，剝離される細石刃が抜けるためのV字形空間を挟り込まれた木製石核固定具を左掌に持ち，右手で握った角先で細石刃を剝離する。松沢亜生氏の教示によると，同様な方法は Pelegrin によっても採用されている。ただ，Pelegrin は（胸部から押される）長めの押圧具と手握り角先の二者を用いるようである。

11) Tixier の定義〔1963：pp. 36-39〕による。

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石器図の出典

図 2-1.　Ohnuma and Matsumoto〔1988：Fig. 5-5〕.
　-2.　Solecki〔1981：Fig. 10-z〕.
　-3.　Solecki〔1981：Fig. 10-x〕.
　-4.　Solecki〔1981：Fig. 10-w〕.
　-5.　Solecki〔1981：Fig. 10-v〕.
　-6.　Solecki〔1981：Fig. 10-y〕.
　-7.　Solecki〔1981：Fig. 10-u〕.
　-8.　Ohnuma and Matsumoto〔1988：Fig. 5-3〕.
　-9.　Ohnuma and Matsumoto〔1988：Fig. 8-7〕.
　-10.　Ohnuma and Matsumoto〔1988：Fig. 4-1〕.
　-11.　Dittemore〔1983：Fig. 240-1〕.
　-12.　Howe〔1983：Fig. 21-4〕.
　-13.　Howe〔1983：Fig. 20-4〕.
　-14.　Watkins et al.〔1991：Fig. 8-4〕.
　-15.　Howe〔1983：Fig. 20-2〕.
　-16.　Howe〔1983：Fig. 21-3〕.
　-17.　Kozlowski and Szymczak〔1990：Fig. 26〕.
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　-2.　杉原・戸沢〔1975：Fig. 12-4〕.
　-3.　杉原・戸沢〔1975：Fig. 12-2〕.
　-4.　杉原・戸沢〔1975：Fig. 12-8〕.
　-5.　杉原・戸沢〔1975：Fig. 12-5〕.
　-6.　杉原・戸沢〔1975：Fig. 12-10〕.
　-7.　杉原・戸沢〔1975：Fig. 15-12〕.
　-8.　杉原・戸沢〔1975：Fig. 14-11〕.

ナヴィフォーム式石刃生産技術と北シリアの先土器新石器時代

西秋　良宏*

Ⅰ．はじめに

レヴァント地方の先土器新石器時代後半（PPNB）は，生業，社会組織，技術等の点で古拙な新石器文化が大きく発展を遂げた時期である。石器製作についていえば，この時期には両設打面から大形石刃を大量に生産する独特な技術が発達した。この技術は石核調整の工程に特徴があり，舟底形の石核を準備することからナヴィフォーム式技術（戦艦方式 Naviform method）と呼ばれている。この技術は PPNB 期にはレヴァント地方のほぼ全域で盛んに用いられた。しかしながら，次の土器新石器時代初頭には殆どの地域で放棄されてしまう。

本稿では，シリア，パルミラ近郊にある先土器新石器遺跡，ドゥアラ第２洞窟（図１：23）出土の石器群にみられるナヴィフォーム式技術を詳しく分析する。そして，この技術の工程，地理的変異，土器新石器時代に放棄されてしまう意味などについて考察してみたい。

なお，本稿で採用する年代観は，補正をしない C14 年代に基づいている。

Ⅱ．ナヴィフォーム式技術研究史

ナヴィフォーム式技術に特徴的な石核を初めて詳細に記載したのは，J. コヴァン〔J. Cauvin 1968〕である。彼は，レバノン海岸，テル=オーシで採集された PPNB 期の石器群を分析し，ナヴィフォーム型石核の定義をおこなった。即ち，それは両設打面をもつ細長い石核で，作業面には対向する剝離痕が残る。裏面には交互剝離でつくられた一本の稜が走る。全体の形状は舟底形である，というものである。

この石核が調整される工程を具体的に復元したのは，鈴木忠司と赤澤威である〔Suzuki and Akazawa 1971〕。彼らはパルミラ盆地一帯での表採資料の分析に基づいて，次の６段階を定義した（図２）。

第１工程：楕円形ないし洋梨形の両面体を製作する。

第２工程：稜付き石刃を剝離し，打撃面と作業面をつくる。

第３工程：小剝離と摩擦によって打撃面を調整する。

第４工程：石刃を剝離する。

第５工程：打撃の失敗。

第６工程：打撃面を再生する。

鈴木と赤澤はこのうち第４工程において興味深い特徴を報告している。即ち，作業面の長軸が，石核の長軸に対して反時計回りにずれていることを見いだし（図３），このことがパルミラ盆地 PPNB 石器群の最も重要な特徴の一つであると強調した〔Suzuki and Akazawa 1971：118，125〕。

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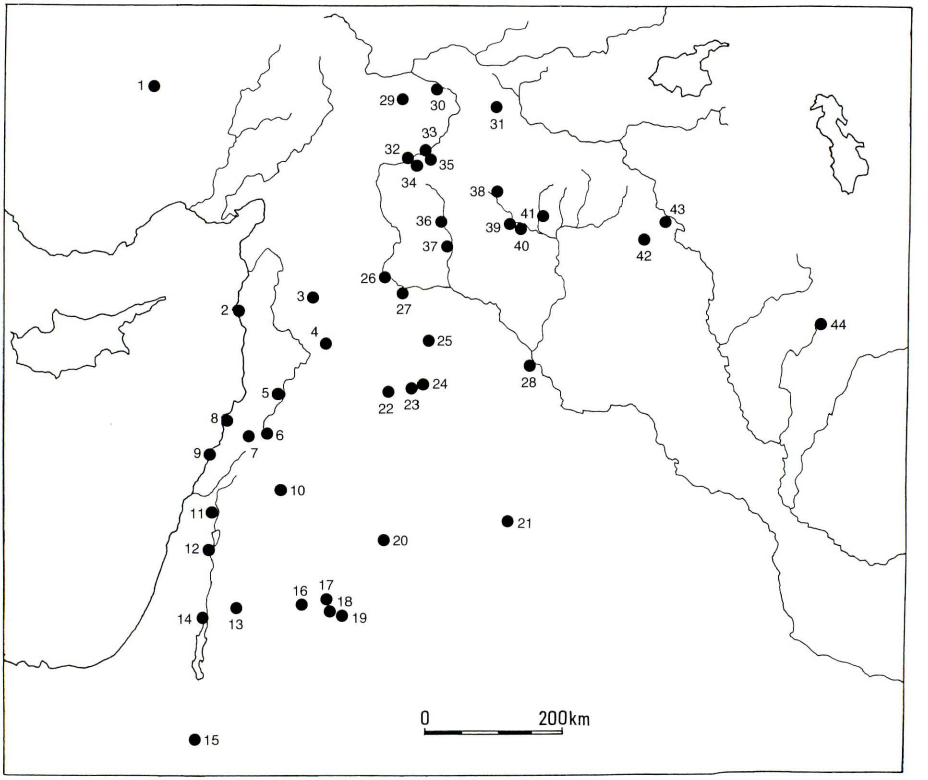

図1　本文中で言及した新石器時代遺跡

1：アシクル，2：ラス=シャムラ，3：クミナス，4：アパメア，5：ネビ=メンデ，6：ラブエ，7：サイダ，8：ビブロス，9：テル=オーシ，10：アスアド，11：ベイサムン，12：ムンハタ，13：アイン=ガザル，14：イェリコ，15：ベイダ，16：ウエイニド，17：メジャラ，18：ドゥエイラ，19：イブン=アルガッシ，20：H4，21：ルトバ，22：パルミラ盆地遺跡群，23：ドゥアラ第2洞窟，24：ドゥアラ盆地第35地点，25：クデイル1，26：ムレイベト，27：アブ=フレイラ，28：ボクラス，29：マラティヤ，30：ジャフェル=ホユック，31：チャヨヌ，32：ハヤズ，33：グリティル，34：クマル=テペ，35：ネヴァラ=ジョリ，36：アスワド，37：ダミシリヤ，38：ファカリーエ，39：シクル=アル=アヘイマル，40：フェイダ，41：カシュカショク2，42：マグザリヤ，43：ギニグ，44：ジャルモ

彼らは第1工程で石核素材として両面体を製作するとしているが，両面体そのものは彼らの表採資料中に含まれていなかった。しかし，後に赤澤〔Akazawa 1979〕はパルミラの北東ドゥアラ盆地の第35地点でそうした両面体を採集し，当初の推定の正しかったことを証明している。

J. クロウフォット=ペインはイェリコとアブ=フレイラの資料を検討し，鈴木らの第2工程の復元を修正している。即ち，鈴木らは素材に打撃面を一つ準備した後（図2：2のa）に作業面をつくり（図2：2のa', b, c），その後でもう一つの打撃面を製作する（図2：2のa'），としたのに対し，彼女は稜付き石刃の剝離によってまず両設打面をつくり，その後に作業面をつくったのではないかとみている〔Crowfoot-Payne 1983〕。

ドゥアラ盆地の北，約80 kmの地点にあるエル=コウム盆地，クデイル第1遺跡の採集品をS. カレイが詳細に分析している〔Calley 1986a〕。第2工程の手順については，彼女はクロウフォット=ペインの復元を支持して

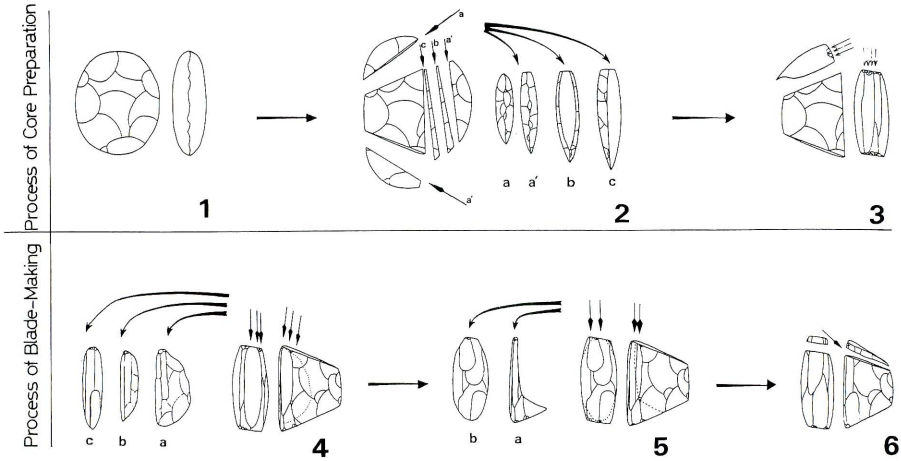

図2　鈴木と赤澤によるナヴィフォーム式技術工程復元図〔Suzuki and Akazawa 1971〕

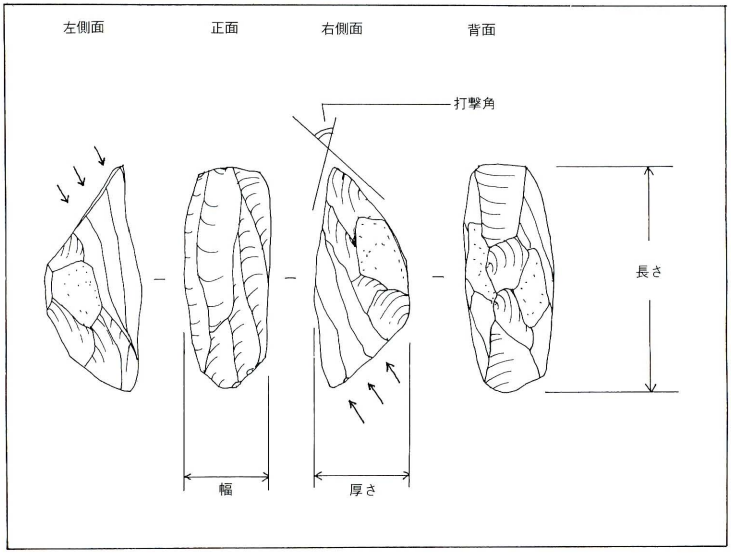

図3　パルミラ地域のナヴィフォーム式石核模式図
作業面が左側縁から右側縁によじれている点に注意。

いる（図4）。また，ナヴィフォーム式石核は剝離の進行にともなって，形状が変わることを指摘している。特に，作業面が石核の側面に移動していく例のあることを，クデイルの資料について述べている。彼女は鈴木と赤澤の研究を引用していないが，彼らがいう作業軸のずれと同様な現象を指摘しているものと思われる。

ナヴィフォーム式技術の工程について言及した主な研究は上記のとおりである。ナヴィフォーム式石核に多少

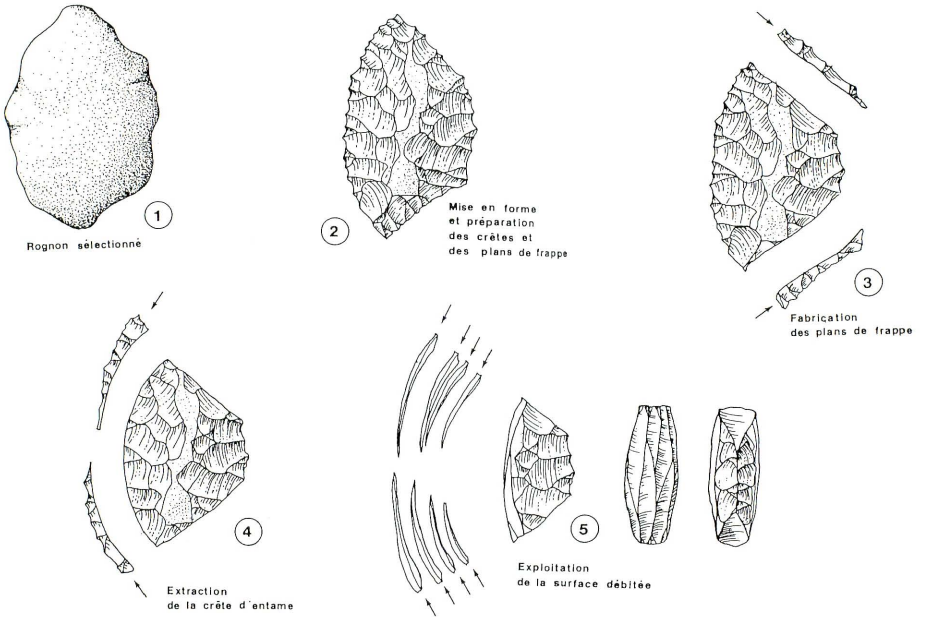

図4　S. カレイによるナヴィフォーム式技術工程復元図〔Calley 1986a〕

とも類似した石核は北はアナトリア〔Todd 1966〕，南はシナイ半島〔Bar-Yosef 1981〕，東はイラク領メソポタミア〔Bader 1989〕からも報告されている。年代的にはほぼ PPNB 初期から土器新石器期初頭に限られており，レヴァント地方各地を広くつなぐ重要な文化要素の一つとして理解されている〔Crowfoot-Payne 1983：705〕。ただ，これまでは各地の共通性が強調されすぎてきたように思われる。実際には各地で全く同じ「ナヴィフォーム式技術」が用いられていたというのではなく，むしろ，地域によって異なっていた可能性が高い。次章では，ドゥアラ第2洞窟出土資料を分析し，この洞窟のナヴィフォーム式技術を正確に定義する。次いで，これを各地の関連技術と比較し，このドゥアラ型の技術が北シリアに独特なものであったことを示したい。

Ⅲ．　ドゥアラ第2洞窟資料の分析

1．　遺　跡

ドゥアラ第2洞窟はパルミラの北東約 20 km にある。この地域はシリア砂漠の北端に位置し，年間降雨量が約 120 mm しかない乾燥地である。かんがい等によらない限り，恒常的な農耕を営むことはできない。パルミラ盆地一帯は東京大学洪積世人類遺跡調査団によって1967年以来，先史学的調査が実施されてきている。1967，74，84年には広範な分布調査がおこなわれ，100を超える旧石器，新石器時代遺跡が発見されている〔Suzuki and Kobori 1970；Hanihara and Akazawa 1979；Akazawa and Sakaguchi 1987〕。中でも先土器新石器遺跡がもっとも多く，この時期は現在よりも気候がよく人口も多かったことが示唆されている。ドゥアラ第2洞窟は1967年の調査で発見されたもので，表採資料のうちの数点が鈴木尚らの報告に図示されている〔Suzuki and Kobori 1970：

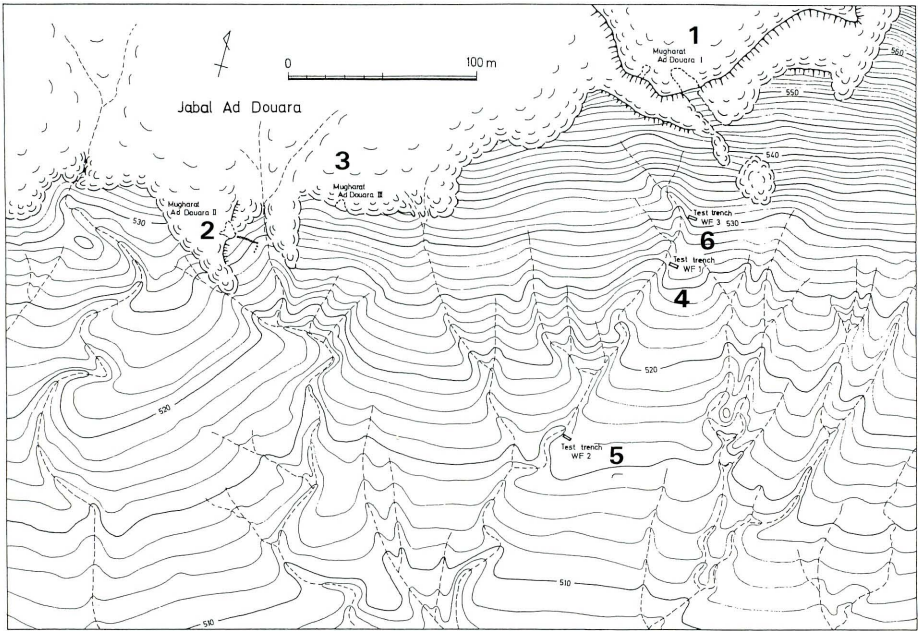

図5　ドゥアラ地区調査地点〔Endo et al. 1978 に加筆〕
1：ドゥアラ第1洞窟，2：同第2洞窟，3：同第3洞窟，4：地学トレンチ1，5：同2，6：同3

Figs. 48–52〕。

ドゥアラ第2洞窟はドゥアラ山南斜面に開口する八つの洞窟遺跡の一つである（図5：2）。開口部が10×3 m，奥行きが約6 m しかなく，洞窟というよりは岩陰に近い（図6）。最大の洞窟は第1洞窟で，1970，74，84年の三次にわたって発掘調査がおこなわれている。先土器新石器遺物も表土層，撹乱層からは見つかったが，居住層の大半は中部旧石器，続旧石器に属するものであった〔Akazawa and Sakaguchi 1987 参照〕。第2洞窟では1974年に表面採集と小規模な試掘とが行われた。残念ながら詳細な記載は残されていない。試掘の担当者，赤澤威（談）によると，試掘坑は表土下 50 cm に満たないような小規模なものであった。石器の密度は驚くほど高かったという。地山には到達していない。しかし，洞窟の奥，前庭部に岩盤が露出していることからみて遺物包含層層は本来，薄いものだったであろう。

2.　資　料

今回の分析対象としたのは，3584点のフリントである。これには表採品と試掘品とが混在している。黒曜石製品は見つかっていない。石器の保存状態は悪い。多くの標本が損傷を被っており，なかにはパティナを示すものもある。このことと遺物密度が非常に濃いことから判断すると，堆積物の多くは水によって流されてしまっているのではないかと推定される。ちなみに，第1洞窟前に地学トレンチを設け，土壌学的検討をおこなった遠藤〔Endo 1978〕（図5：4–6）は，続旧石器～先土器新石器期の堆積中に強い水流の痕跡を認めている。同様の現象

図6　ドゥアラ第2洞窟（筆者撮影，1984年）

がわずか250 m離れただけの第2洞窟にも起こっていたことは十分考えられよう。

従って今回の資料は必ずしも *in situ* なものではないが，パルミラ周辺で今日までに得られた唯一の組織的採集資料である点，貴重である。また，技術形態学的に他の時期の遺物が混入している形跡もなく，詳細な分析をする価値は十分にあると考えている。試掘ではフルイがけは行われなかったが，チップ等の小形遺物の回収にも意が払われている。

分析対象石器群の内訳は表1に掲げた。大半が石器製作途次に生じた石屑類であり，石器そのものは9.5%に

表1　ドゥアラ第2洞窟出土石器群構成

	数	%
石核（cores）	121	3.38
石核調整剝片（core trimming pieces）	270	7.53
原礫面付き剝片（cortex flakes）	62	1.73
部分的原礫面付き剝片（part-cortex flakes）	258	7.20
剝片（flakes）	814	22.71
部分的原礫面付き石刃（part-cortex blades）	229	6.39
石刃（blades）	1081	30.16
被二次加工石器（retouched tools）	341	9.51
二次加工削片（retouch flakes）	100	2.79
チップ（chips）	272	7.59
分類不能破片（fragments）	36	1.00
合　計	3584	100

過ぎない。石器の型式学的分析は本稿の意図するところではないが，簡単に述べておく。詳細な記載は別稿を参照されたい〔Nishiaki 1992a〕。341点の被二次加工石器は尖頭器（1.2%），彫器（19.1%），掻器（7.0%），穿孔器（0.3%），裁断石器（0.3%），棒状石器（0.9%），縦割石器（splintered pieces, 0.6%），二次加工のある石刃（61.3%），二次加工のある剝片（9.4%）である。二次加工のある石刃・剝片の大半は，腹面基端部に平坦彫器面をもつ一群である（図13：3, 6）。これはテル＝ボクラスでド＝コントンソンら〔de Contenson and van Liere 1966：183〕が記載して以来，北シリア PPNB 遺跡から頻繁に報告されている石器である。この加工を藤井〔Fujii 1986〕は「パルミラ式二次加工」とよび，コープランド〔Copeland in press〕は「PPNB 基端部剝離」とよんでいる。ただ，この技術は各種の石器型式にまたがって認められるため，その二次加工自体で一石器型式を代表するものではない。従って，そうした一群を除いてみると，ドゥアラ第２洞窟の石器組成は大半が彫器（65%）で占められることになる。

3.　ドゥアラ第２洞窟の石刃生産技術

石核は全部で121点，見つかっている。このうちの95点，約８割がナヴィフォーム式石核に相当する（表２）。その他の石核には，単打面石核（6.0%），複打面石核（6.9%），打面移動石核（5.2%）がある。それらの作業面には剝片を生産した剝離痕が残されている。こうした石核がナヴィフォーム式石核の消耗した形態なのか，それとも独立した技術を表しているのかは不明である。いずれにしても量的には僅かであり，当洞窟の中心的な石刃生産技術がナヴィフォーム式であったことには変わりはない。

ナヴィフォーム式技術による石刃生産過程をいくつかの段階にわけて復元してみよう。

（1）　原石獲得

ドゥアラ第２洞窟の北，直線距離で１km に満たないところにはドゥアラ盆地があり，良質フリントの大露頭がある（図７）。この盆地は下部旧石器以来，原石採取，石器製作の場として用いられており，PPNB 期の遺物散布地もいくつか知られている〔Akazawa 1979〕（図８）。第２洞窟の住人もこの盆地のフリントを用いていたことは殆ど疑いがないだろう。盆地採集の原石と洞窟出土品は肉眼でみても酷似している。共に細かい粒子をもつ

表２　ドゥアラ第２洞窟出土石核

	数	%
ナヴィフォーム式石核（Naviform cores）	95	81.90
1型	(0)	
2型	(3)	
3型	(1)	
4型	(35)	
5型	(26)	
6型	(11)	
7型	(12)	
分類不能破片	(7)	
単打面石核（single-platform cores）	7	6.03
複打面／片面石核（multi-platform/uniface cores）	5	4.31
複打面／両面石核（multi-platform/biface cores）	3	2.59
打面移動石核（change-of-orientation cores）	6	5.17
分類不能破片（core fragments）	5	Na
合　計	121	100

図7　ドゥアラ盆地（筆者撮影，1984年）

図8　ドゥアラ盆地第35地点石器散布状況（筆者撮影，1984年）

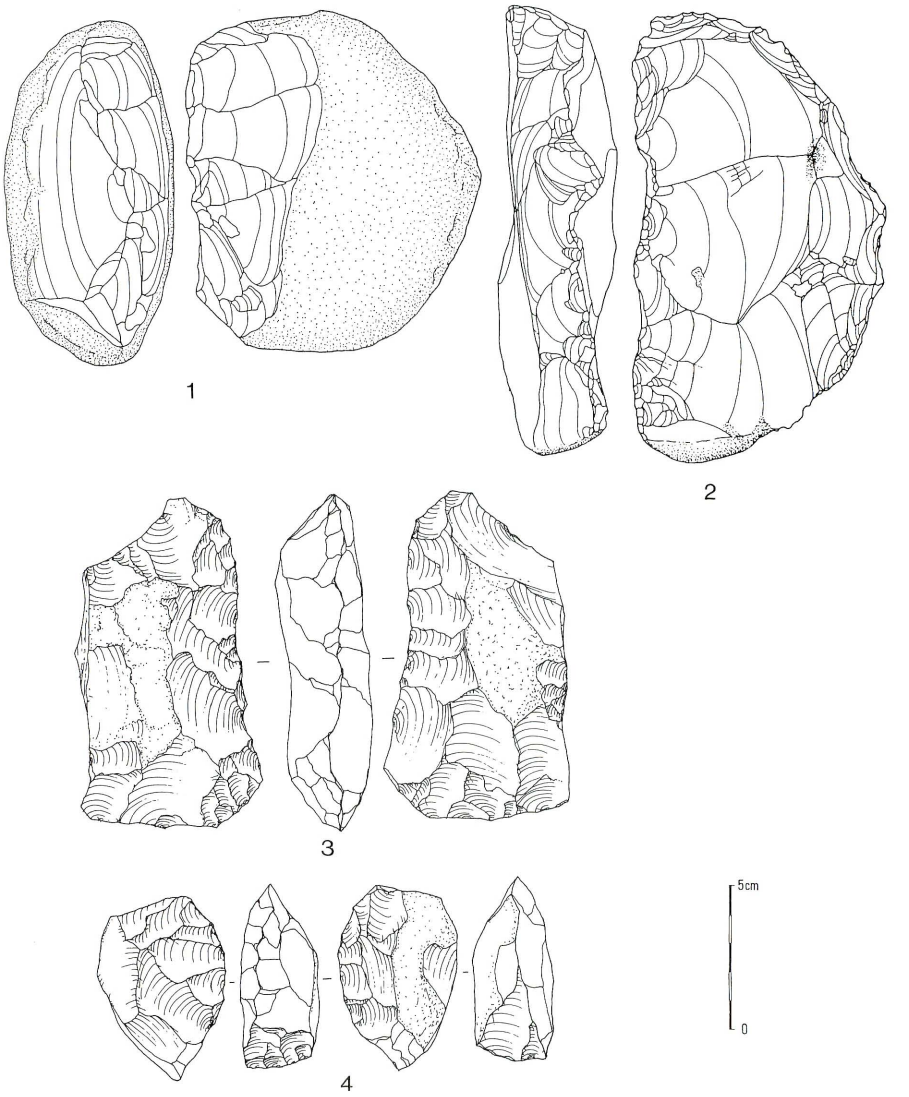

図9　ドゥアラ地区出土ナヴィフォーム式石核

1，2はドゥアラ盆地第35地点採集〔Akazawa 1979 より〕，3，4はドゥアラ第2洞窟出土。1：1型，2，3：2型，4：3型。

チョコレート色のフリントで，原礫面は白っぽい色を呈する。試みに，東京大学総合研究資料館岩石・鉱物部門でX線解析し両者の鉱物組成を調べたところ，全く識別できないという結果が得られている。

（2）　粗割

第2洞窟出土品には粗割を示す石核（semi-chipped core）は含まれていない。また，表1に示したように原礫面を残す剝片類がきわめて少ないことから，粗割や石質の良悪を調べる試し割りの作業が洞窟では実施されなかったことが明かである。この作業は，おそらく，盆地内の原石露頭でおこなわれたのであろう。実際，露頭にある石器製作址の一つ，第35地点では多数のチョッパー・チョッピング=トゥール状の粗割石核が採集されている〔Akazawa 1979〕（図9：1）。石核に残る剝離痕の打瘤が深いことから，その作業は硬質ハンマーで実施されたと推定される。

（3）　両面体製作（鈴木と赤澤の第1工程）

ドゥアラ第2洞窟の資料中には石核素材として製作されながらその後，剝離されずに放棄された両面体が3点含まれている。1点は肥厚な剝片製，他の2点は板状フリントに作られている（図9：3）。いずれも小形で最大長は15 cmに満たない。剝離痕は薄手で，軟質ハンマーの使用が推測される。出土剝片類の中には，ルヴァロワ的な剝片も含まれているが（図11：9），それは軟質ハンマーでハンド=アックスを製作した際に出る不要剝片に酷似している〔Newcomer 1970〕。

この段階に相当する素材両面体は第35遺跡から大量に採集されている〔Akazawa 1979〕（図9：2）。大形のものには30 cmに近いものがあり，洞窟出土品よりもはるかに大きい。洞窟のものは消耗石核や不要剝片を再利用したものなのかも知れない。

第2洞窟および第35遺跡の該当標本を検討してみると，素材石核の平面形は鈴木と赤澤が推定したような「楕円形ないし洋梨形」ではなく，左右非対称の楕円形ないし半月形を呈するものが多い。また，断面形にも特徴がある。ハンド=アックスとは違って，断面形も非対称の楕円形ないし長方形に仕上げられているのである。

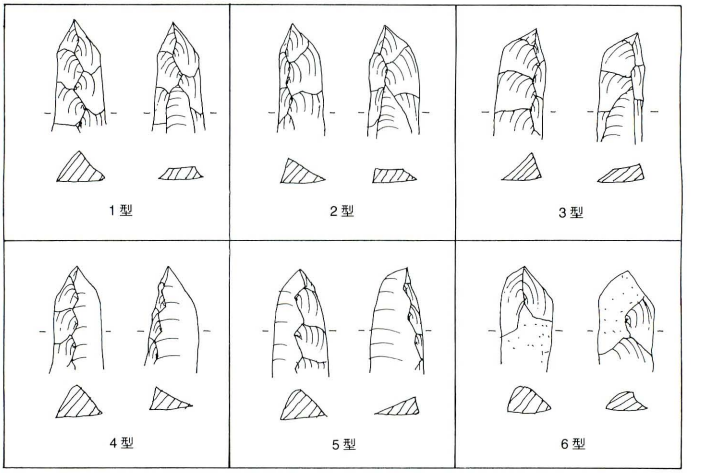

図10　ドゥアラ第2洞窟出土稜付き石刃分類模式図

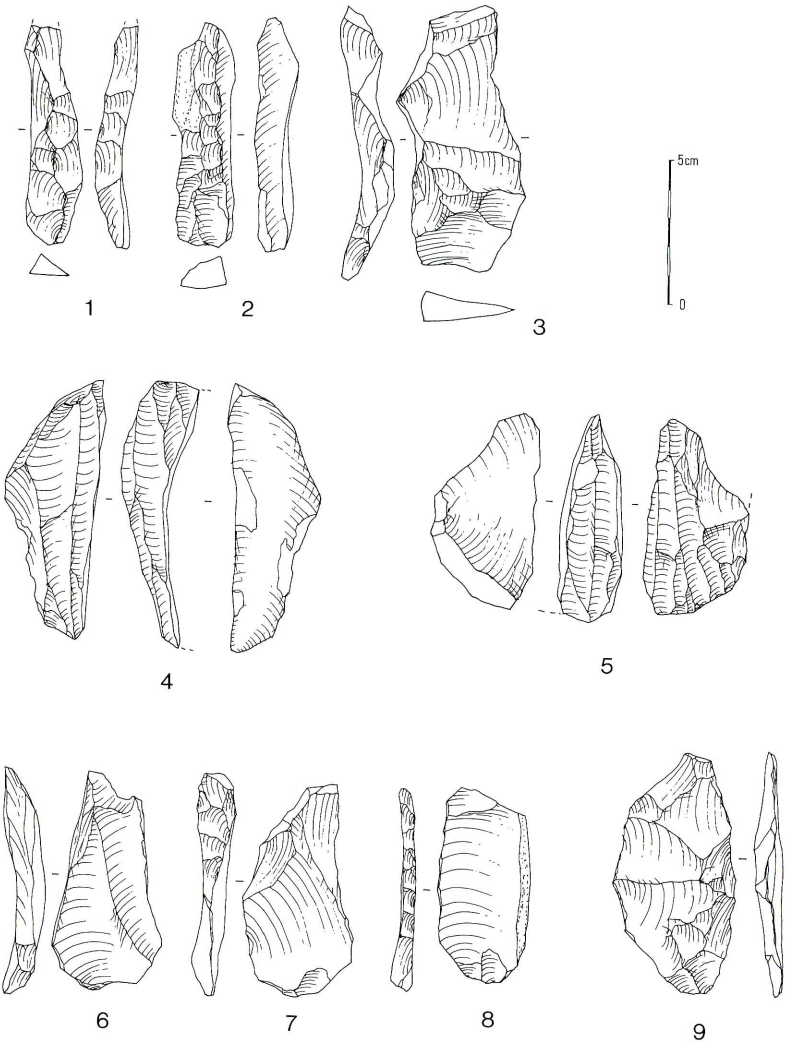

図11　ドゥアラ第２洞窟出土石核調整・再生剝片
１～３：稜付き石刃，４：石核端付き石刃，５：石核側縁付き剝片，６～８：打面再生剝片，９：両面体整形剝片

（4）　稜付き石刃の剝離（鈴木と赤澤の第２工程）

素材両面体から少なくとも３本の稜付き石刃を剝離し，打撃面と作業面とをつくる。素材の長軸に沿った直線的な一辺が作業面に利用されている。稜付き石刃の剝離順序について鈴木らの復元とは異論の出されていることは既に述べた。今回の分析では接合作業は実施していないが，順序の推定可能な未製石核（half-finished core）が一点ある（図９：4）。この石核は打撃面の一つと作業面から稜付き石刃が剝されているが，他の一方の打撃面は未剝離のままである。この順序は鈴木と赤澤の復元を支持するものである。しかし，第35地点の標本の中にはカレイやクロウフォット=ペインがいう剝離順序を示唆するものもあり，この剝離順序は必ずしも一般化できないもののように思われる。

表３　ドゥアラ第２洞窟出土稜付き石刃分類結果

	１型	２型	３型	４型	５型	６型	合計
数	62	48	24	16	11	2	163
%	38.0	29.5	14.7	9.8	6.8	1.2	100

表４　ドゥアラ第２洞窟出土石刃の主要形質（%）

(1) 原礫面位置	先端	左側	右側	基端	中央	なし	合計
L石刃（n=253）	0.0	28.1	0.0	0.8	0.4	70.8	100
M石刃（n=171）	2.3	7.0	1.2	2.9	0.0	86.6	100
R石刃（n=111）	1.8	0.0	22.5	0.0	0.0	75.7	100
破　片（n=701）	1.1	9.4	4.0	0.3	0.1	85.0	100
合　計（n=1236）	1.1	12.0	4.5	0.7	0.2	81.5	100
(2) 背面剝離痕	一方向	対方向	Y字	左交	右交	左右	合計
L石刃（n=67）	29.9	22.4	1.5	40.3	3.0	3.0	100
M石刃（n=76）	51.3	26.3	6.6	13.2	2.6	0.0	100
R石刃（n=66）	30.3	59.1	0.0	1.5	9.1	0.0	100
合　計（n=209）	37.8	35.4	2.9	18.2	4.8	1.0	100
(3) 打撃面	平滑	薄型	小形	IDB	二面	小剝離	原面	合計
L石刃（n=253）	5.9	6.7	0.0	87.4	0.0	0.0	0.0	100
M石刃（n=171）	50.9	37.4	8.2	0.0	2.3	0.6	0.6	100
R石刃（n=111）	47.8	45.1	1.8	0.0	3.6	0.0	1.8	100
合　計（n=535）	29.0	24.5	3.0	41.3	1.5	0.2	0.6	100
(4) 頭部調整				摩擦	剝離	なし	合計
L石刃（n=253）				91.3	2.8	5.9	100
M石刃（n=171）				59.1	14.6	26.3	100
R石刃（n=111）				73.9	6.3	19.8	100
合　計（n=535）				77.4	7.3	15.3	100
(5) 打面選択位置				右端	左端	中央	合計
L石刃（n=253）				4.0	89.3	6.7	100
M石刃（n=171）				5.9	37.4	56.7	100
R石刃（n=111）				1.8	27.0	71.2	100
合　計（n=535）				4.1	59.8	36.1	100
(6) 先端部形状	右曲	左曲	四角	Y字	丸形	尖形	原礫面	合計
L石刃（n=67）	49.3	7.5	23.9	1.5	10.5	7.5	0.0	100
M石刃（n=76）	15.8	7.9	29.0	6.6	18.4	22.4	0.0	100
R石刃（n=66）	33.3	19.7	16.7	0.0	7.6	22.7	0.0	100
先端部破片（n=242）	53.7	9.9	13.2	0.8	3.3	16.1	2.9	100
合　計（n=451）	43.7	10.6	18.0	1.8	7.5	16.9	1.6	100

第2洞窟資料中には多くの稜付き石刃が含まれている。それらは，図10に示すようにいくつかの型式に分類することができる。1型は中央にトサカ状の稜の走る一般的なもので（図11：1），基端部方向からの背面剝離痕をもつものと持たないものとがある。2型は稜が左側縁（図11：3），3型は右側縁に寄るものである。4型（図11：2），5型は稜がトサカ状でなく片面加工で作られているもので，それぞれ左側縁，右側縁に向けて加工がなされている。6型は不整形なものである。ドゥアラ第2洞窟で最も特徴的といえるのは，稜付き石刃の断面形が非対称の三角形を呈する2，3型が目だつ点である（表3）。右ないし左に歪んだ標本が主であり，断面対称の1型は約1/3に過ぎない。このことは，素材石核の断面形が対称ではなかったことのあらわれとみられる。

稜付き石刃の剝離によって石核の両端に打撃面が準備される。打撃面と作業面とがなす角度は，一般の石刃石核と比較するときわめて小さい。平均は61.8度，標準偏差が11.421である（計測打面数120）。

（5）　打撃面調整（鈴木と赤澤の第3工程）

石核の打撃面を観察すると，小剝離（faceting）によって調整されたものは殆どないことがわかる。一枚の大きな平坦な剝離で構成されたものが圧倒的に多い。ただ，中には剝離が交差するものもみられる。交差する剝離痕は左からのものである（図12：3，17：2参照）。これは後述するように，作業軸の石核軸からのずれと関係がある。

剝離された石刃の打撃面をみると，やはり小剝離による調整を示さないものが圧倒的に多い（表4の3）。小剝離付き打面は1％にも満たない。一方，打撃面上縁には頭部調整のはいったものが多い（表4の4）。そのような標本は約8割（414/535，77.4％）に達しており，打撃面調整は専ら摩擦によってなされていたといえる。

（6）　石刃剝離（鈴木と赤澤の第4工程）

＜石核分類＞

ドゥアラ地区のナヴィフォーム石核はいくつかに分類できる。

1型：粗割段階の素材両面体（図9：1）。

2型：素材両面体（図9：2，3）。

3型：未製石核（図9：4）。

4型：背面のほぼ中央を稜がはしる。比較的コヴァンの定義に近い石核である。断面は逆三角形を呈する（図12：1，2）。

5型：背面に横方向からの剝離があり，稜が右ないし左側縁に寄っている石核。断面は四角い（図12：3，4）。

6型：作業面が石核の平たい面にあるもので，幅よりも厚みが小さい石核。断面は平たい四角形を呈する（図12：5）。

7型：小形の消耗石核。両設打面を持つにも関わらず，主要な作業面上剝離痕は一方向にしかみられない（図12：6）。

以上の石核は，1－3型が剝離進行の早い段階，4－6型が中間，7型は最終段階に相当する。1型はドゥアラ第2洞窟では出土していない。4－6型が石刃剝離の痕跡をよくとどめた石核であるわけだが，作業面の設定位置に顕緒な特徴がある。鈴木と赤澤がパルミラ盆地の採集品について指摘したように，作業面が石核長軸に対して反時計方向にずれているのである（図3参照）。このことによって，独特な石刃が生み出される。

＜石刃分類＞

鈴木と赤澤は，生産された石刃類には3種類あったとみている。「不整形剝片（irregular flakes）」（図2：4のa），「両側平行剝片（parallel-sided flakes）」（図2：4のb），「真性石刃（true blades）」（図2：4のc）の三種であ

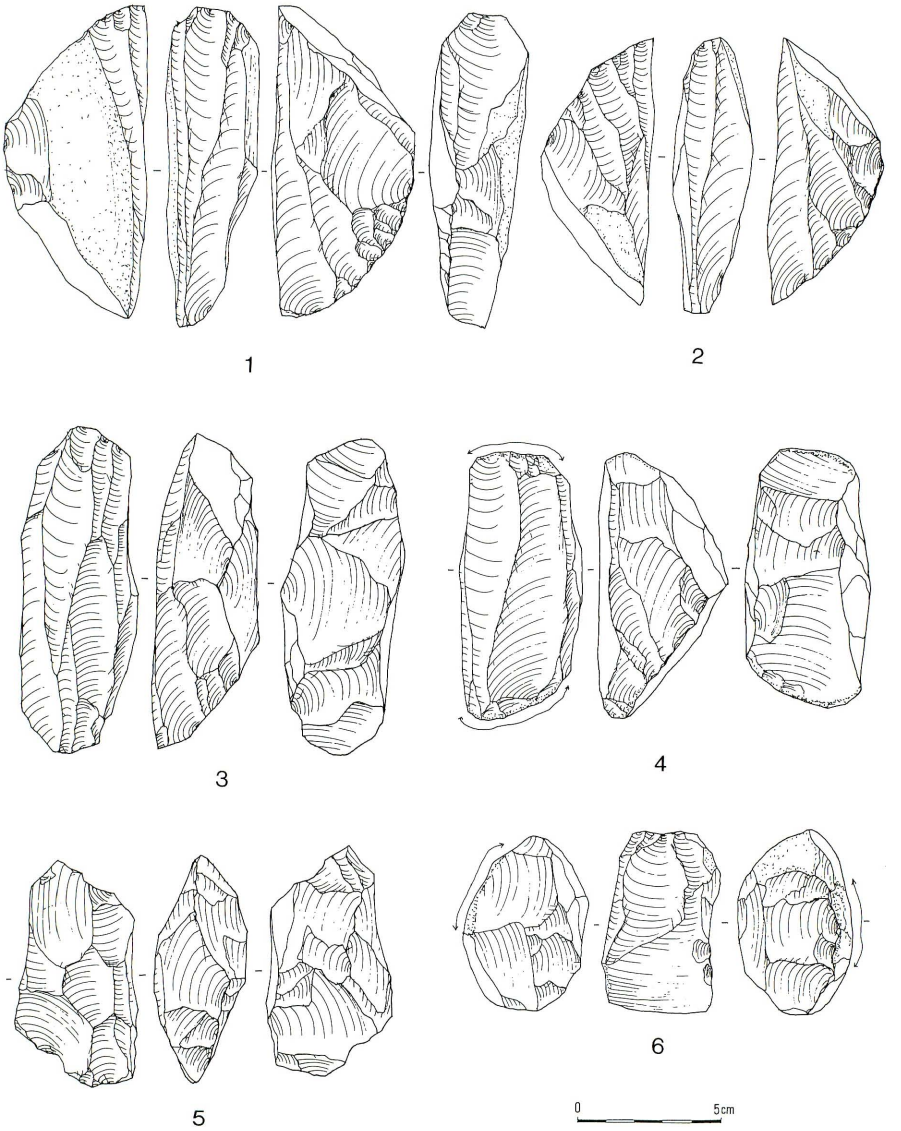

図12　ドゥアラ第２洞窟出土ナヴィフォーム式石核
1，2：４型，3，4：５型，５：６型，６：７型。４と６は叩き石として再利用されている。

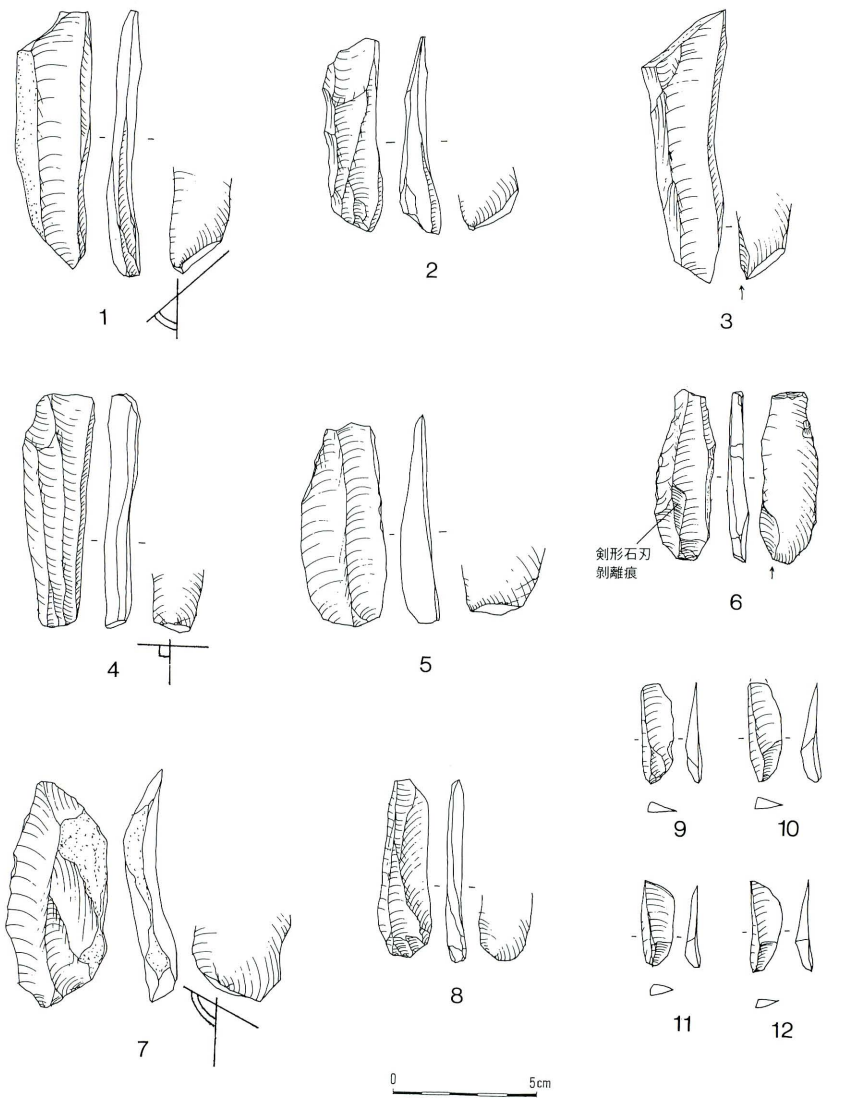

図13　ドゥアラ第２洞窟出土石刃類

1，2：L石刃，3：基端部剝離L石刃，4，5：M石刃，6：基端部剝離R石刃（背面に剣形石刃剝離痕が残っていることに注意），7，8：R石刃，9～12：剣形石刃。

る。「不整形剝片」は半月形に近い平面形をもち，背面剝離痕は長軸に平行するものとそれに交差するものとで構成されている。「両側平行剝片」は側縁が平行する長形剝片で，打撃面は一見，彫器に似る〔Suzuki and Akazawa 1971：120〕。これらの「剝片」は縦長の平面形をもつが鈴木らはあえて，「石刃」とはよんでいない。「真性石刃」は彼らの調べた遺跡では採集されなかったという。彼らはこのことを，「真性石刃」は石器製作のために遺跡から持ち去られてしまったせいではないかと解釈している〔Suzuki and Akazawa 1971：118〕。

ドゥアラ第2洞窟の資料中にも「不整形剝片」と「両側平行剝片」は多くみられるが，やはり「真性石刃」は含まれていない。しかし，筆者は，「真性石刃」は遺跡から持ち去られたのではなく，所与の技術体系からは本来，生産されなかったのだろうと解釈している。少なくともドゥアラ第2洞窟では，「不整形剝片」と「両側平行剝片」こそが目的的に生産された「石刃」であったと考えられるのである。この点を掘り下げるために，別の基準を設定して石刃を分類してみよう。

打撃面の形状と石刃長軸との関係に基づくと，次の4種類の石刃が定義できる。

剣形石刃（sword-shaped blades）：点状の打撃面をもつ（図13：9–12）。鈴木と赤澤はこの石刃についてふれていない。

L石刃（L blades）：打撃面と石刃長軸のなす角度が90度よりも小さい。打撃面と石刃側縁とが作る二面が彫器刃部と類似するものが目だつ（図13：1–3）。この種の基端部形状をもつ石刃は打角の小さい石核から生産され，しばしば旧石器遺跡でもみられる。レバノンのクサール=アキル洞窟からも出土しており，J. ティクシエらは「二面彫器に似た（imitating a dihedral burin）」打撃面と呼んでいる〔Tixer and Inizan 1981：361；Bergman 1987：11〕。本稿では，それをIDB打面とよんでおきたい。L石刃の9割近くはIDB型の打面をもっており（表4の3），鈴木と赤澤がいう両側平行剝片の大半がこの石刃に相当するとみられる。

M石刃（M blades）：打撃面と石刃長軸とのなす角度がほぼ直角に近い（図13：4，5）。

R石刃（R blades）：打撃面と石刃長軸のなす角度が90度よりも大きい（図13：6–8）。鈴木と赤澤の不整形剝片の多くがMないしR石刃に相当するとみられる。これらにはIDB打面はみられない。

こうした石刃群は石核の異なった部分から異なった技術で剝離された可能性が高い。

＜剣形石刃＞

剣形石刃は完形石刃ないし基端部破片の12.2%（74/605）をしめる。これらは非常に定形的な小形石刃で，点状打面をもつこと以外にも次のように独特な形態的特徴をもつ（図13：9–12）：(1)平面形が左右非対称であり，左辺が直線的で右辺が弧を描く；(2)基端部背面側に細かい剝離痕がみられる；(3)大きさは殆どが3×1 cm前後である；(4)側面観は基端部側が高くなる三角形を示す；(5)先端部は羽毛状（feathering）かあるいは壊れている。剣形石刃の剝離痕は石核の打撃面近くや大形石刃の基端部近くに認められる（図13：6）。

二次加工された石器を検討してみると，その中には剣形石刃を素材としたものが一点も含まれていない。従って，この石刃は素材用石刃ではなく，石核調整を目的に剝離されたものであると考えられる。剣形石刃の側面観は基端部側が盛り上がっている。このことは，この石刃を剝離する以前の石核は打撃面上縁角がかなり大きかったことを示している。一つの可能性のある説明は，剣形石刃の剝離によってこの角度を調整するというものである（図14）。もう一つの可能性はプランジングを防ぐというものである。即ち，この石刃を取ることによって，対方向からの剝離が石核を突き抜けないようにするというものである。いずれにしても，剣形石刃はきわめて定形的な石刃であり，意図的に剝されたものであることは確かであろう。当洞窟の技術の注目すべき特徴の一つと

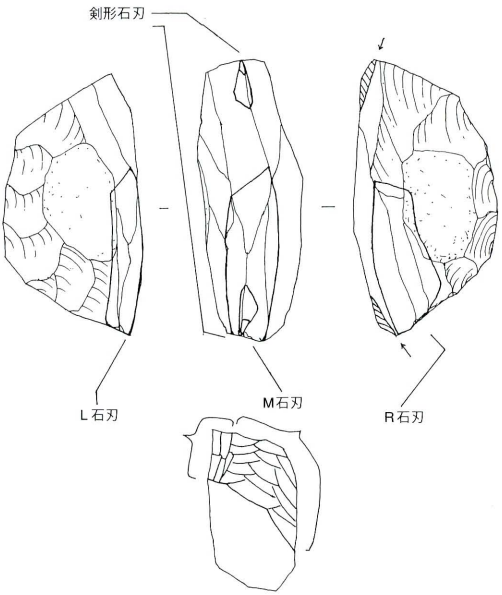

図14　ドゥアラ型ナヴィフォーム式技術による石刃剝離位置模式図

いえる。

＜LMR石刃＞

一方，他の三種類の石刃は石器素材として剝離されたものと思われる。

これらは打撃面と石刃長軸とのなす角度の違いによって定義されたものだが，各々，石核の異なる部分から剝された可能性が高い。図14に示したように，L石刃は石核の左側面から，M，R石刃はそれぞれ石核の正面，右側面から取られたものと考えられる。石核の打撃面と作業面とがなす角度がきわめて小さいこと，作業面軸が反時計回りにずれることから，こうした特徴のある石刃が生産されるのである。こうした解釈は石刃の形態的特徴からも示唆される。まず，原礫面付着位置の左右性をみると，L石刃にはすべて左側縁に付着している。一方，R石刃には右側縁であり，M石刃には両方にみられる（表4の1）。また，背面剝離痕にも同様の傾向が見られる。両面体の側面を覆っていた剝離痕は，L石刃の左，R石刃の右側縁にみられ，M石刃にはその両方に見られる（表4の2）。

さて，このようにドゥアラでは石刃が石核正面のみならず，右側面からも剝される。この現象をクデイル遺跡で認めたカレイ〔Calley 1986a〕は，剝離が進行したために作業面が横に移動したのだ解釈している。しかしながら，筆者は，これは意図的な作業であったのだと思う。即ち，石核正面と右側面を剝離することによって石核正面と左側縁とがなす角度を小さくし（図14），L石刃を生産しやすくしているのではないだろうか。L石刃はM，R石刃とは若干形態も異なるし，剝離技術も同一ではない。L石刃は鈴木と赤澤が「両側平行剝片」とよんだように，他の石刃よりも整った形状をもつ。それらは石核左側面をそぐように剝離されるのである。また図15，16に示すように，L石刃の打点は一般にM，R石刃よりも深いところに選ばれており，しっかりした基端部をつ

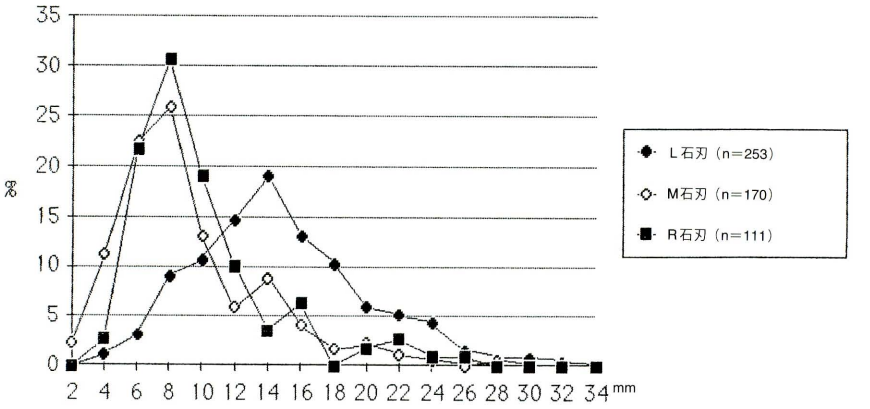

図15　ドゥアラ第2洞窟出土石刃の打撃面幅

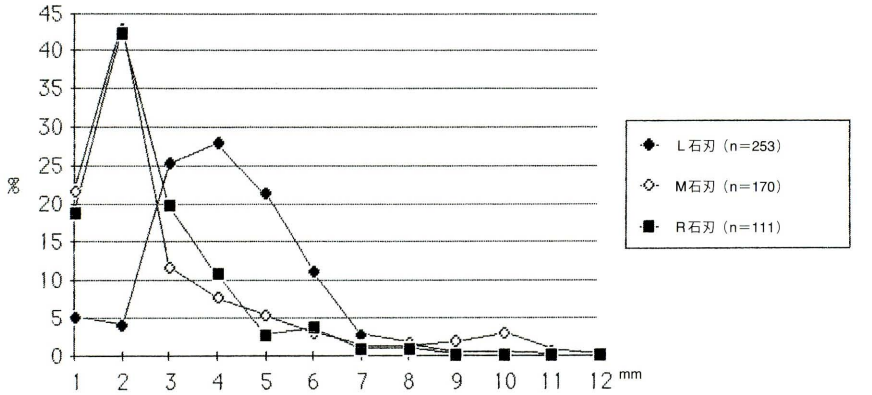

図16　ドゥアラ第2洞窟出土石刃の打撃面厚

くっている。さらに，摩擦によって頭部調整を施しているものがM，R石刃よりも多い（表4の4）。

こうした違いは，製作者にとってL石刃がM，R石刃とはおそらく違った意味を持っていたことを示唆している。石核にみられる作業面のずれは，実はL石刃を得るための意図的な戦略だったのではないかと思う。この仮説は将来，接合作業が実施できれば検証できるだろう。

＜その他＞

この他にも，ドゥアラ第2洞窟の石刃について興味深い点はいくつかある。先端部の形状が特徴的であることがその一つである（表4の6）。三石刃とも先端が右側に傾くものが目だつ（図13：1-3）。この歪みは，石核軸と作業軸とが一致しない当洞窟ナヴィフォーム式技術の結果の一つだといえる。先端が，左右対称形を示すものが少ないのである。いわゆるY字石刃（upsilon blades）はドゥアラ第2洞窟には非常に少ない（8/451，1.8%）。これは，対置する打撃面からの剝離痕によって背面の稜がY字形を示すもので，最近，トルコ領 PPNB 遺跡か

ら多く報告されているものである〔Roodenberg 1979-80；Ataman 1988, 1989-90；Calley 1988〕。この石刃がドゥアラに少ないのも，作業面のずれのせいであろう。

もう一つの注目すべき特徴は打点の選択位置にみられる。ドゥアラ第２洞窟では打点が（石刃の基端部を手前にして，裏返ししてにみた時）打撃面の左端にくるように選ばれることが多いのである（図13：1-3, 5, 6）。この傾向はＬ石刃に特に顕著である（表４の５）。石刃の多くが，打点を打撃面の中心にもたない。即ち，打撃面縁の一端を斜めにひっかくようにして，石刃が剝離されるのである。

こうした左右性に関して想起されるのは，既に述べた例の「パルミラ式二次加工」ないし「PPNB 基端部剝離」である。これは石刃基端部裏面の左側縁に加えられる彫器状加工をいう（図13：3, 6）。この加工に注目した研究者は多いが，なぜそれが左側縁に加えられるのかは説明されていない。筆者は，この加工は石刃左側縁の打点を除去し，石刃の歪みを矯正する意図があったのではないかと推定している。この二次加工はドゥアラ型のナヴィフォーム式技術と緊密に関わったものだった可能性があるのである。

（７）　剝離失敗（鈴木と赤澤の第５工程）

これは，「工程」というよりは剝離上の失敗であって，どの工程においても起こりうる可能性がある。代表的な失敗の一つは，打撃の突き抜け（plunging）である。鈴木と赤澤がいう「釣り針形剝片（fishhook-shaped flakes）」が当洞窟では14点，採集されている（図11：4）。また石核にも，一打面からの剝離が反対側の打撃面にまでおよんでしまっているものが約 1/7 認められる（22/155, 14.2%）。

別の失敗は蝶番状剝離（hinge-fracture）である。石刃の約 1/5（84/451, 18.6%），石核の約 2/5（67/155, 43.2%）に認められる。結局，石核中，57.4%（89/155）がなんらかの失敗をみせている。小形化とともに，石核放棄の重要な原因となっているのだろう。

（８）　石核維持（鈴木と赤澤の第６工程）

鈴木らのいう石核の再生剝片は66点みられる。いわゆる石核盤（core tablet）である。ただ，こうした剝片は必ずしも石核を「再生」したものばかりではなかろう。最初に打撃面を「作出」する際にも，同様の剝片は生み出されたはずである。従って一括するわけにはいかない。

当洞窟の標本をみると，少なくとも二種類が認められる（図17）。１型は打撃面の剝離が背面の剝離痕にきられ打点を残していないもの（図11：6）で，２型は打点を残すもの（図11：7, 8）である。ドゥアラ第２洞窟では１型が24点，２型が35点出土しており，７点は分類不能の破片である。このうち２型のみが実際に石核打撃面を

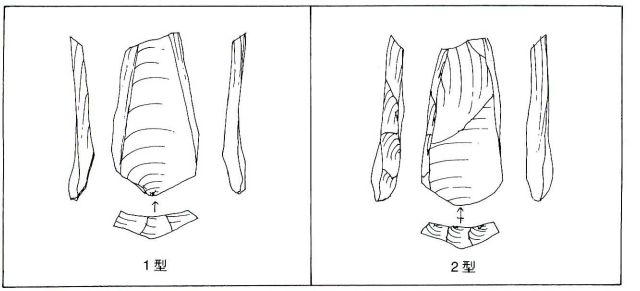

図17　ドゥアラ第２洞窟打面再生剝片分類模式図

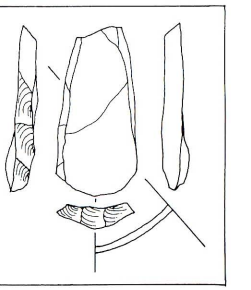

図18　打撃面長軸と作業面分布域のずれ計測法

再生したものと考えられる。2型の打撃面の剝離は，実は打撃面調整痕ではなく，石核作業面の石刃剝離痕に相当する。左側縁にも剝離痕がおよんでいるものが見うけらるが，右側縁にはない。ここにも，石核軸と作業軸のずれの結果がみられる。

鈴木と赤澤はパルミラの採集品について再生剝片にみられるずれと，石核打撃面にみられるずれの角度を計測し，比較している（図18）。再生剝片のほうが，打撃面長軸からのずれが小さいという意外な結果を報告している。即ち，石核打撃面平均が59.17±17.31度（標本数57），再生剝片平均が75.08±13.90度（標本数12）であった〔Suzuki and Akazawa 1971：122-3〕。しかし，これは上述のような二種類の再生剝片を識別しなかったためにおこった現象であろう。ドゥアラ第2洞窟の場合，2型についてのみ両者の角度を比較してみた。結果は，石核打撃面が平均56.31±21.881度（標本数111），再生剝片は43.05±14.479度（標本数20）となり，再生剝片の方がずれが大きい。かなり石核右側面の剝離が進んだ段階で，打撃面の再生がなされたことがわかるだろう。

（9）　加撃具

最後に，剝離に用いられた加撃具について検討する。ドゥアラ第2洞窟からは7点の叩き石がみつかっている。従って，少なくとも，硬質ハンマーによる直接打撃が実施されたことは確実である。これらはいずれも，石核の再利用品である。7点のうちナヴィフォーム石核が5点ある（図12：4，6）。石核を叩き石として再利用するのは，PPNB期シリアではかなり一般的な行動パタンだったらしい。テル=ボクラス〔Roodenberg 1986：14〕，クデイル1〔Calley 1986a：Table 2〕，テル=アブフレイラ〔Nishiaki 1992a〕からも報告されている。

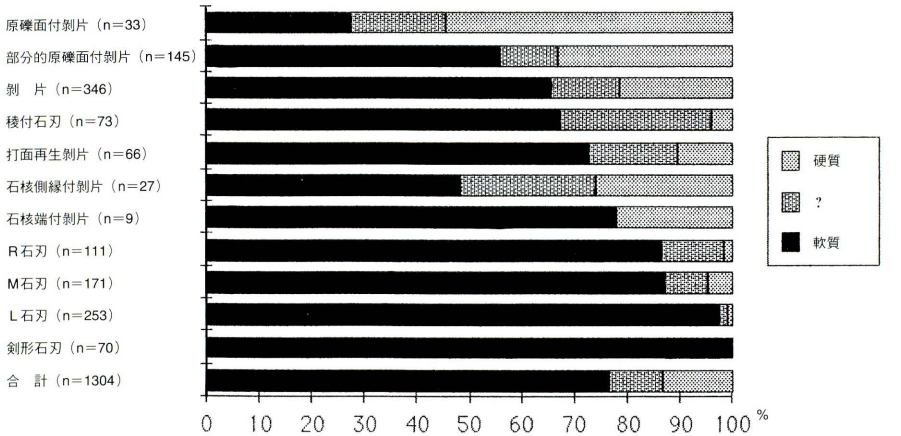

図19　ドゥアラ第2洞窟出土石刃・剝片類の加撃具推定結果

一方，石刃や剝片の打撃面の特徴を観察することによっても，加撃具を推定することはできる。大沼やハイデンらが実験的研究によって，その推定に有効な形質をいくつかあげている〔Ohnuma and Bergman 1982；Hayden and Hutchings 1989〕。それらに基づいて今回の標本を分類した結果を図19に示した。原礫面付き剝片は硬質ハンマーで剝がされた可能性が高いが，全体としては軟質ハンマーの使用が一般的であったようだ。その割には洞窟で叩き石が数多く見つかっている印象を受けるが，それらは洞窟で用いられたというよりは保管されていたもの

で，必要に応じてフリント原産地・製作址にもっていって使用されたのではないだろうか。

(10)　要約：ドゥアラ型ナヴィフォーム式技術の定義

以上，ドゥアラ第2洞窟の石刃製作技術を工程別に分析した。鈴木と赤澤の復元を確認した一方，若干の修正，新事実の指摘もおこなった。ドゥアラのナヴィフォーム式技術はコヴァンがレバノン海岸部で定義したものと同一ではない。最も異なる点は鈴木らが早くから強調していたように，作業軸と石核軸とがずれる点である。この独特な技術はドゥアラを中心としたパルミラ一帯の PPNB 期に共有されていたものだったようだ。そこで，この技術を他と区別するために，ドゥアラ型ナヴィフォーム式技術とよびたい。以下に，特徴的な形質を列記する。

- 石核軸と作業面軸とがずれる。
- 石核背面の稜が中央をとおらず，左右の端による。
- 稜付き石刃の断面形がいびつな三角形を呈する。
- 剣形石刃を剝離する。
- 石刃の打撃点が打撃面の左端による。
- 石刃の側面観が歪む。
- 石刃の先端が右に曲がる。
- 石刃が IDB 打面をもつ。

これらの特徴は個々を取り上げれば，どのような石刃生産技術にも有り得るものだが，組み合わせてみれば特定の技術体系を代表する要素といえるだろう。これらに加えて，基端部の彫器状二次加工もあげておいてよいかも知れない。この二次加工は石刃の打撃点が左端によることと深くかかわる可能性があるからである。

Ⅳ．　ナヴィフォーム式技術の地理的変異

ドゥアラ型の技術がレヴァント地方 PPNB 文化の中でどのように位置づけられるのかは，類似した詳細な研究がないため判断が難しい。1980年代半ばまでの各地の出土例はカレイ〔Calley 1986a：61–5〕がまとめている。ここではその後の出土例と筆者が実見した資料を中心に，地域別に検討してみる。

1.　北シリア

ユーフラテス川中流域，およびドゥアラ第2洞窟が位置するシリア砂漠の関係遺跡をまず概観する。ムレイベト遺跡がこの地域で最古の PPNB 石器群を産出している。ここでは紀元前8千年紀前半に位置づけられる PPNA 期のⅢA層から既にナヴィフォーム式石核がみつかっている〔Calley 1986b：Fig. 136–1〕。図示されたものは長さに比して幅の小さいやや不整なものであって，ドゥアラ型ではない。

続く前7千年紀前半の例としてはアブ=フレイラ遺跡Dトレンチ出土品があり，大量のナヴィフォーム式石核が出土している。この資料を筆者は細かく分析する機会をえている〔Nishiaki 1992a〕。この遺跡の石核は，技術的にドゥアラ第2洞窟例と殆ど識別不可能である。石核作業軸の傾きはもちろん，剣形石刃，IDB 打撃面付き石刃などの剝離という特徴も共通している。また，Y字石刃はドゥアラ第2洞窟同様，少ない。この類似に基づけば，ドゥアラ型ナヴィフォーム式技術は前7千年紀始めには既に確立していたといえる。

一方，ユーフラテス下流のボクラス遺跡では前7千年紀末（6300–5900 BC 頃）の集落址がみつかっている。

この遺跡の石器群はJ. J. ローデンベルグ〔Roodenberg 1986〕によって分析されている。彼によれば，石核類は全体に消耗が激しく，剝片石核が多いという。しかし，ナヴィフォーム石核が含まれていることは明らかで，彼の報告の図7：5にみられるように作業軸のずれたドゥアラ型のものも出土している。

シリア砂漠北部，クデイル第1遺跡の石器群はドゥアラ第2洞窟のものとほぼ同一と思われる。C14年代によって，前6千年紀半ば（5610 BC）に位置づけられている。この年代は周辺の類似遺跡から得られた年代と矛盾しない〔Stordeur 1989〕。クデイル1遺跡でカレイは，剝離の進展にともない作業面が石核側面へ移動していく現象を認め，石核「進化（evolution）」と呼んでいる。しかし，どの方向に移動していくのかは述べていない。また，その移動が果して剝離の進行によるものなのか，筆者が言うように意図的なものなのかは解決されていないが，ドゥアラ型の技術と同様のものであることは間違いないだろう。ただ，カレイはクデイルの石核は常に幅が厚さよりも大きく，平面形も細長くないことを強調している。24点の計測値（mm）は平均長が84.0±14.95，幅47.3±8.42，厚さ31.0±7.23，長幅比が1.8±0.467であったという。ドゥアラ第2洞窟では長さ75.0±14.79，幅36.53±8.69，厚さ34.29±6.47，長幅比2.17±0.65であるから（計測標本数88点），確かに若干の違いもある。しかしながら，作業面がずれるこれらの石核では「正面」の認定が難しく，幅と厚さの計測箇所が研究者によって異なることが予想できる。従って，計測値の差の解釈には注意が必要であろう。

さて，以上の比較結果からみて，ドゥアラ第2洞窟の石器群は技術的には前7千年紀始めから6千年紀半ばにいたる北シリアの石器群と対比可能である。一方，石器型式の点ではどうか。ドゥアラ第2洞窟には彫器が多いことを述べた。実はこれはクデイル1でも同様である。代表的な石器型式をみると，ドゥアラでは尖頭器が4.0%，彫器が65.0%，掻器が24.0%であるのに対し，クデイル1では尖頭器が5.3%，彫器が51.4%，掻器が24.1%〔J. Cauvin 1981〕と酷似しているのである。彫器が多いこと自体は，北シリアのPPNB石器群に一般にあてはまることだが，型式は必ずしも一定ではない。ドゥアラ第2洞窟やクデイル1で目をひくのは裁断彫器（truncation burins）である。この型式のものは多数を占めるというわけではないが，前7千年紀後半から一般的になるものである。前7千年紀前半の遺跡では少ない。例えば，アブ=フレイラDでは彫器が大量にみつかっているが，筆者が検討した約300本の彫器の中には裁断彫器は一本もなかった〔Nishiaki 1992a：160〕。一方，時代の下るボクラスではこの型式のものがみられる。しかも，彫器そのものの比率が前6千年紀初頭になって急増している〔Roodenberg 1986：71〕。これらのことから，ドゥアラ第2洞窟の石器群はPPNB期でも末，前6千年紀前半の遺跡ではないかと推定される。尖頭器が少ないこともこの編年を裏付けるだろう。前6千年紀といえば，次に述べるようにレヴァント地方の殆どの地域でナヴィフォーム式技術は放棄されている。ではなぜ，ドゥアラ第2洞窟やエル=コウム盆地ではこの技術が保持されたのだろうか。この点については後でもう一度，考察する。

2.　ジャジラ

ユーフラテス川以北，以東の平原をジャジラ地方という。ナヴィフォーム石核の分布を検討したF. ウールとコープランド〔Hours and Copeland 1983〕はこの地域にはナヴィフォーム式技術がおよんでいない，とみている。ユーフラテス川が分布の境界になっているというのである。

この地方にはバリーフ川，ハブール川という二本のユーフラテス川の支流が流れている。バリーフ川流域のPPNB遺跡としてはアスアド（Assouad）が著名である。編年的位置については意見がゆれているが，筆者は少なくとも前7千年紀中ごろまでは遡ると考えている〔西秋 1992c〕。J. コヴァンらの発掘した石器群は，残念な

がら詳細には記載されていない〔M.-C. Cauvin 1972〕。ただ，バリーフ川流域では現在，アムステルダム大学が広範な遺跡調査活動をおこなっており，アスアドを含む数十の遺跡から石器資料を収集している〔Akkermans 1990〕。その表採品を検討したコープランドは，ナヴィフォーム式石核は認められなかったと述べている〔Copeland in press〕。筆者も同じ資料を検討させていただいた。やはり，ナヴィフォーム式石核そのものは，見いだせなかった。しかし，両設打面石核や，IDB 打撃面をもつ石刃，剣形石刃の剝離痕をもつ石刃などが採集されていることがわかった。従って，ドゥアラ型のナヴィフォーム式技術が採用されていた可能性を否定できないのである。

テル=ダミシリヤ遺跡は前7千年紀末から6千年紀初頭にかけて（6100–5700 BC 頃）の堆積物をもつ。地山には達していないが，現段階での最下2層は先土器である〔Akkermans 1988〕。筆者の分析によれば，石器群にはナヴィフォーム石核らしいものが一点，含まれていたが，消耗が激しくドゥアラ型かどうか不明であった〔Nishiaki 1992a〕。石器の主体は剝片であって，石刃類にも IDB 打撃面，剣形石刃などは全くない。バリーフ川流域では，ナヴィフォーム式技術が用いられていたとしても，それは遅くとも前6000年頃には放棄されていたとみられる。

一方，ハブール平原では先土器新石器遺跡は少ない。現在，わずか三遺跡が知られているに過ぎない〔西秋 1991b〕。最古のものはファカリーエのものであろうが，詳細は不明である。そこでは石核は1点出土したのみで打撃面等の記載はされていない〔Braidwood 1958〕。テル=フェイダ遺跡では F. ホールらが最近，試掘をおこなっている〔Hole n.d.〕。石器群はファカリーエのものに類似しているという。筆者らもこの遺跡で表面採集をおこなっているが，ナヴィフォーム式技術の痕跡を示すものは採集できなかった。もう一つの遺跡はシクル=アル=アヘイマルで，1991年に仏日合同踏査で発見されたものである〔Nishiaki 1992b〕。1000点以上の採集石器の分析は現在進行中である。尖頭器の型式等から先土器新石器期の最末期のものとみられる。ナヴィフォーム式技術の痕跡はみつかっていない。続く，前6千年紀，土器新石器期初頭の遺跡としてはテル=カシュカショク2の石器群が良好なデータを提供している〔Nishiaki 1991a〕。ナヴィフォーム式の石核はないが，若干の搬入石刃にその痕跡が僅かに認められている。同時期にナヴィフォーム式技術を使用していた集団が他にいたことが示唆される。いずれにせよ，ハブール平原もバリーフと同様，PPNB 前半の様相は不明で，遅くとも前6000年頃にはナヴィフォーム式技術が用いられていなったことのみが確実である。

ハブールの東，シンジャル地方でも若干の先土器新石器遺跡がみつかっている。PPNB の中・後半に相当するマグザリヤ遺跡では両設打面の石核がみられる〔Bader 1989〕。しかし，詳しい記載はなく，図示されているものには単打面石核が多いようである。前6000年前後の先土器～土器新石器遺跡であるギニグの石器群はキャンプベルらが報じている〔Campbell and Baird 1990〕。ここではナヴィフォーム式石核は得られていない。出土石核は全て押圧剝離による単打面石刃石核である。こうした石核はレヴァント地方というよりは，むしろジャルモなどザグロス山地の同時代遺跡とつながりを示すもののようである。

3.　アナトリア

東南アナトリアでも最近，レヴァント的 PPNB 遺跡があいついで報告され始めている。ただ，この地域ではムレイベトⅢに相当するような PPNA 末から PPNB 前期にかけての遺跡はない。中半以降のもののみである。J. コヴァンらは北シリアからの移民を想定している〔J. Cauvin 1989〕。チャヨヌの居住は前8千年紀末〔Redman

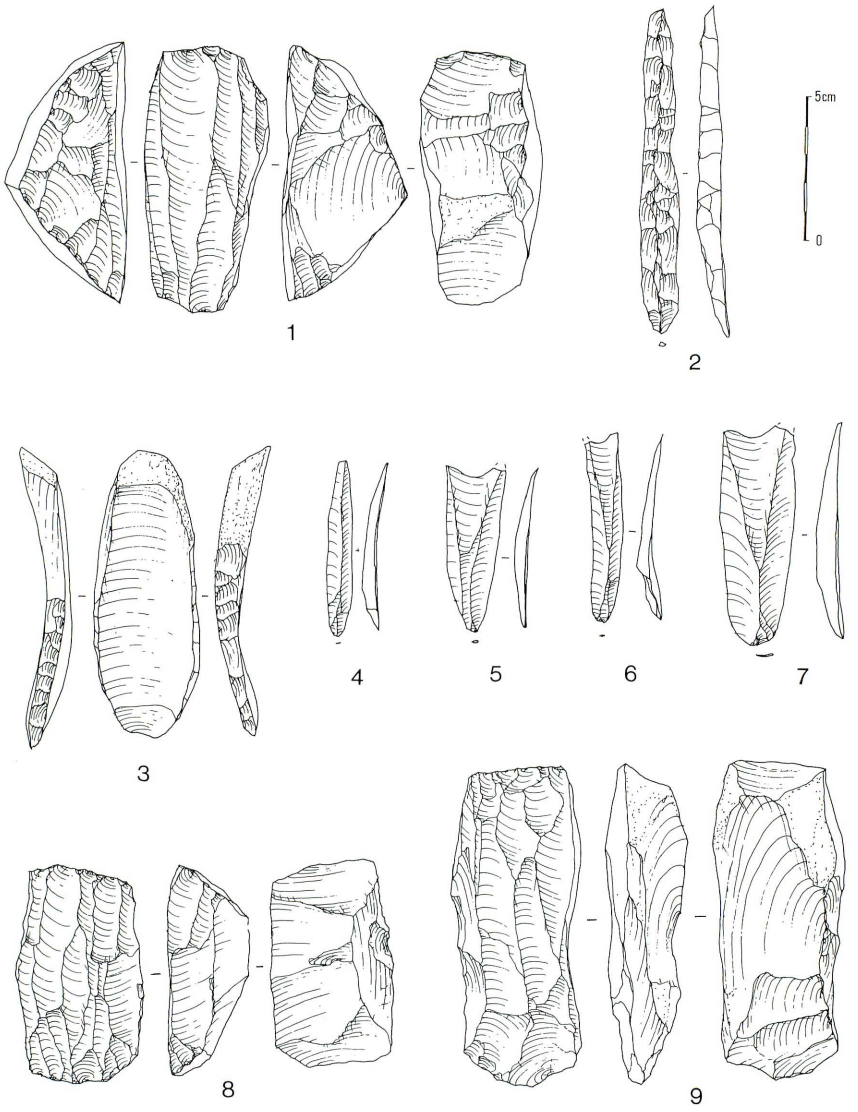

図20　パレスチナ，アナトリアのナヴィフォーム式技術関連標本
1～7：イェリコ遺跡トレンチM出土（オックスフォード大学アシュモレアン博物館蔵），8，9：マラティヤ近郊V52-1 遺跡採集（イスタンブール大学先史学教室蔵）。

1982〕，ジャフェル=ホユックは前7千年紀始めから始まっている〔J. Cauvin 1985〕。これらの遺跡の古い文化層では，ナヴィフォーム式石核は見つかっていない。ジャフェル=ホユックでは，単打面石核からの押圧剝離による石刃生産が実施されていた〔Calley 1985〕。

前7千年紀後半の遺跡にはハヤズ〔Roodenberg 1989〕，グリティル〔Voigt 1985〕，ネヴァラ=ジョリ〔Schmidt 1988〕などがあり，ナヴィフォーム式といってよい両設打面石核が報告されている。ハヤズではY字石刃が多く作られているのが特徴的である〔Ataman 1988, 1989–90；Calley 1988〕。既に述べたように，この種の石刃は作業面が石核正面に据えられた定形的な石核から剝離されやすいのであって，ドゥアラ型のものとは異なる技術を反映している。これらの遺跡，およびマラティヤ付近のV52–1遺跡の採集品はイスタンブール大学に保管されている。それらの石核には，作業面が素材両面体の平たい一面に設定されているものが目だつ（図20：8，9）。背面の稜も二本あるものがある。従って，平面形，断面形とも長方形を呈するものが多い。これらの石核はドゥアラで設定した6型に近いものであるが，作業面のずれは全く認められていない。

この地域には前6千年紀初頭の土器新石器遺跡が殆ど見つかっていない。クマル=テペはその数少ない遺跡の一つである。C14年代で5980 BCが得られている。両設打面の石核も出土しているが，典型的なナヴィフォーム式と呼べるものはないようで，石核の主体は剝片用である。ローデンベルグは先土器新石器時代の石器群からは大きな断絶があるとしている〔Roodenberg 1989〕。

アナトリア西部のアシクル遺跡もレヴァント先土器新石器的遺物を産出することで早くから知られている〔Todd 1966〕。ナヴィフォーム式といってよい石核も確かに出土している。筆者は最近の再発掘品，およびI．トッドの表採品（英国アンカラ考古学研究所）を検討したことがある。ここでは先述したような断面が平たい長方形を呈する石核もあるが，むしろ断面が三角形，平面形が細長いものが目だつ。どちらかといえば，次に述べるレバノン海岸部のものと近いような印象を受けた。ドゥアラ型ではない。

4.　西シリア・レバノン

海岸地帯でもPPNB期前半の遺跡はまだ知られていない。この地域に遺跡が広がったのはその後半，前7千年紀のことであったと考えられている。J. コヴァンが最初にナヴィフォーム式石核を定義したテル=オーシもそのような遺跡の一つである。カレイ〔Calley 1986a：65〕も指摘しているように，この地域のナヴィフォーム石核は細長いことが特徴的である。幅や厚さに比して長い。作業面の位置も明確で，ドゥアラ型とはかなり異なった形状を示す。同様の石核はサイダ〔Hours 1969〕でも報告されている。前7千年紀末のラス=シャムラのV層〔de Contenson 1977〕やラブエ〔Copeland 1969〕でも出土しているというが，図面の報告がない。コヴァンによれば，前6千年紀の土器新石器遺跡ビブロスではその種の石核はもう使用されていないようである〔J. Cauvin 1968〕。

アンチ=レバノン山脈東側のオロンテス地峡にみられるPPNB遺跡も，現在の知見に基づくかぎり，前7千年紀以降のものである。しかしながら，この地域からは詳細な遺跡報告がなく，石器群の実態は不明といわざるをえない。ド=コントンソンがホムス周辺の表採資料を紹介しているが，石核は記載していない〔de Contenson 1969〕。クミナス遺跡では先土器・土器の両文化層が発掘されている。略報から判断する限りナヴィフォーム式らしい石核も利用されている〔Masuda and Shaath 1983〕。アパミア近郊遺跡では前6千年紀初頭の土器新石器文化層が発掘されている〔Otte 1977〕。ナヴィフォーム式石核が1点図示されているが，ドゥアラ型であるかどうかは決めかねる。ネビ=メンデ遺跡からは最近のロンドン大学の調査によってやや時期の下る土器新石器文化層

が見つかっている〔Nishiaki 1992a〕。出土した約500点の石器群にはナヴィフォーム式技術が利用されていた痕跡はみられない。

5. 南部レヴァント

ダマスカス盆地，テル=アスワド（Aswad）のⅠA層は前8千年紀に位置づけられ，ここからナヴィフォーム式石核がみつかっている〔de Contenson 1972〕。細かい記載はないものの，おそらく，ムレイベトⅢAとともにレヴァント地方最古の出土例だと言える。

続く前7千年紀前半の例としてイェリコの石器群をとりあげよう。筆者は，K. ケニヨンの発掘したMトレンチの石器群を詳細に分析する機会をえている。この石器群は既にクロウフォット=ペインによって記載されている〔Crowfoot-Payne 1983〕。彼女は，アブ=フレイラ出土の石器群も検討し，両者のナヴィフォーム式石核が「全く同一である」と述べている。しかし，筆者の分析によれば注目すべき差異がいくつか見いだされた。まず，イェリコでは必ずしも両面体を石核素材としておらず，板状フリントを用いることが目だつ。従って，両側面に原礫面をのこす石核がある。また，石核背面には二本の稜が走るものがある。作業面は石核正面に位置する（図20：1）。石刃の形状はドゥアラのものとかなり異なる。打撃面は点状のものが殆どで，きわめて整った「真性石刃」が剝がされている（図20：4-7）。稜付き剝片も同様に形状の整ったものが多い（図20：2）。石刃の先端部は左右対称のものが主で，Y字石刃も完形石刃の14.5%（54/372）に達している（図20：5，7）。この遺跡のナヴィフォーム式技術がドゥアラやアブ=フレイラなど北シリアのものと違うことは明かであろう。

P. モルテンセンによると，ベイダ遺跡では石核の主体は剝片石核で，ナヴィフォーム式石核は全体の1割にもみたない〔Mortensen 1970〕。技術的にはイェリコのものと類似しているようである。断面は台形で打撃面角は小さく，平均が45-50度だという。ここでも板状フリントを素材とし，両側面に原礫面を残すものが目をひく。

ムンハタでもナヴィフォーム式石核は報告されている〔Gopher 1989〕。ベイダと同じく，量的に多数を占めるというわけではない。技術的にはイェリコのものと類似しており，ドゥアラ型の特徴はもたない。やや，北方のベイサムンからは石核が300点以上見つかっているが，ナヴィフォーム式石核は1点しかなかったという〔Lechevallier 1978〕。背面の中心を稜が1本走るもので，典型例に近いタイプだが，やや幅が広い。作業面のずれはみられない。

南部レヴァント地方では，PPNB 末から土器新石器初頭にかけて遺跡が激減する。アインガザルはこの両期にまたがる文化層をもつ稀な遺跡の一つである。この時期には石刃生産から剝片生産への急速な技術的変化があったことが報告されている〔Rollefson 1990〕。

6. 東部レヴァント地方

広大なシリア砂漠からサウジ=アラビアにかけての乾燥地帯でも先土器新石器遺跡が報じられている。テルの発達が悪いうえに風化の激しい遺跡が殆どであるため C14 年代測定例も少ないが，一般にこれらは前7から6千年紀にかけての PPNB 後半の遺跡が殆どであるとみなされている〔Betts 1986, 1989〕。これらの遺跡に共通しているのは，石器群に占める彫器の割合が非常に高いことである。藤井〔1987〕が指摘するように，それらの遺跡には少なくとも二種類あるようだ。一つはヨルダン黒砂漠付近のもので，石器群が南部レヴァントの前7千年紀石器群と多少とも類似した一群である。メジャラ，ウエイニド〔Rollefson and Frohlich 1982〕，ドウエイラやイ

ブン=エルガッシがこのグループに相当しよう〔Betts 1986〕。ここではナヴィフォーム式石核とよびうる両設打面石核が用いられている。レバノン海岸でみられるような細長いものではなく，長さと幅に比して厚みがあるのが特徴のようである。南部レヴァント地方同様，板状フリント素材のものがめだつ。報告の図をみる限りではドゥアラ型のような作業軸のずれはみられない。

もう一つは，いわゆる彫器新石器遺跡（burin Neolithic sites）で，出土する定形的石器の殆どが彫器で占められているというものである。それらの遺跡は特に内陸奥地で典型的なものがみられる〔藤井 1987〕。年代的には前6千年紀にまで下るとされている。そうした彫器が実際に石器であったという説と穿孔器の素材をつくるための石核であったという説とがあって〔Finlayson and Betts 1990〕，この現象については十分な解釈がなされていない。型式的には彫器の殆どが裁断彫器であるという点も独特である。裁断彫器はドゥアラ第2洞窟などでも小数だがみられる。なんらかの年代的関係を示唆するものとして重要である。

彫器は肥厚な石刃を素材としている。意図的に石刃の片面に原礫面が残るような剝離をおこなっている。「石核」は単設打面の石核が主体である。イラクのルトバやヨルダンH4近郊遺跡では殆ど全ての石核がこの型式である〔Nishiaki and Fujii 1986〕。石核調整は殆どない。硬質ハンマーで剝されたものと思われる。ナヴィフォーム式技術の痕跡は全くない。

7. 要　約

ナヴィフォーム式技術は地域によって異なった様相をみせる。類似した対向剝離石核は実に広い地域でみられるわけだが，細かくみると地理的な変異のあることが明かである。ドゥアラ型のナヴィフォーム式技術はユーフラテス川流域からシリア砂漠北端を含む北シリアの一地域相を示している。レヴァント地方西部では細長い古典的石核，北部アナトリア方面では平たいもの，南部レヴァント地方では板状フリント素材のものが用いられていた。ナヴィフォーム式技術はムレイベトやアスワドでみられるように前8千年紀に，おそらくシリアで生み出された。その頃にはまだ地域性が顕著ではなかったが，その後，前7千年紀に各地に広まる過程で様々に変異をとげたものと思われる。そして，前6千年紀にはいると，大部分の地域は土器新石器時代にはいり，この技術は放棄されてしまう。ドゥアラやエル=コウムなど一部の内陸地域のみで利用が続けられたようである。

V. ナヴィフォーム式技術と先土器新石器時代

ここまでドゥアラ第2洞窟出土石器群を中心に，ナヴィフォーム式技術の工程，年代的・地理的分布など，技術そのものについて分析してきた。この技術の石核調整過程がいかに特殊化し，工夫の凝らされたものであったかを明かにできたと思う。また，その実態は地域によって異なっていること，そしてその一方で，技術の基本的工程はレヴァント地方の広い地域で共有されていたことも指摘した。

石器製作技術に限らず，レヴァント地方PPNB文化が示すこうした地域性と共通性という二面性については近年，議論が盛んである〔J. Cauvin 1989； Bar-Yosef and Belfer-Cohen 1989 など〕。J. コヴァンはコイネー（*koine*）という概念を提示した。それは，現代ヨーロッパのように，異なった国民性・生活習慣を保持しながらも，諸国家がまとまっている状態に例えられるという〔Rollefson 1989：172〕。また，O. バル=ヨーセフはレヴァント地方西部を「レヴァント回廊（Levantine Corridor）」とよび，そこが文化の核地域として機能していたと考

えている。そして，そこと周辺地域との文化的交流が行われた結果が文化の地域性，共通性として表れたと示唆している。どちらの考え方をとるべきか現在では決めかねるが，いずれにせよ PPNB 期には，地域性がさらに強調される土器新石器時代とは異なった文化的統合があったと考えられよう〔藤井 1981；西秋 1992c 参照〕。

PPNB 文化が広い地域で共通性をみせたのは集団の移動・回遊が盛んであったせいではないかと筆者は考えている。と言っても，PPNB 期の人々が移動生活民であったといっているのではない。大規模な住居が作られていること，家畜動物が年中屠殺されていること〔Legge and Rowley-Conwy 1987〕などからみて，多くの集団は一集落で通年的な居住を行っていたに相違ない。しかし，少なくとも一部の集団ないし集団の一部が狩猟等の目的で移動・旅行する頻度は後の時代よりも高かったと考えられる。農耕・牧畜が行われていたとはいえ，野生動物資源が PPNB 期に後の時代よりも多く利用されていたことは明かである。特に北シリアの集団についていえば，ガゼル捕獲のために毎年，季節的狩猟旅行が繰り返されていた可能性が高い。そのような移動による交流が各地の文化的類似に関係していた可能性は十分あろう。

ここで，PPNB 文化全般の性質についてさらに議論する余裕はない。ナヴィフォーム式技術が関わる点についてのみ，いくつか延べ，本稿の結論としたい。

筆者はナヴィフォーム式技術の流行と PPNB 期の狩猟活動およびそれを目的とした移動（＝旅行）とは深い関係があったものと考えている。まず，この技術には移動に適した携帯性が備っている。ナヴィフォーム式技術の利点の一つは定形的な大形石刃を連続的に生産できることにある。石刃が剝片よりも携帯性に優れていることはいうまでもないだろうが，一方，ナヴィフォーム石核素材としての両面体が携帯に便利であったことも見逃せない。移動・旅行においては多くの原石を携帯するわけにはいかない。いわゆる「運搬コスト（carrying cost）」〔Shott 1986〕が高くつくからである。この点，不要部を取り去った半加工両面体，即ちナヴィフォーム石核素材はきわめて携帯性に優れていたと考えられる〔Kelley 1988 参照〕。

今回のドゥアラ第 2 洞窟の分析の結果，半加工の両面体が原産地遺跡で製作され，それが洞窟に持ち込まれて石刃が剝離されていたことが示唆された。半加工石核を携帯するという行動パタンは実は，ドゥアラ第 2 洞窟に限られたものではなかったようである。PPNB 期に広く採用されていたものと筆者は考えている。例えば，パレスチナのイェリコでも，何層かにわたって石器製作場が発見されているが，原礫面でおおわれた石屑が少量しか見つからなかった。報告者のクロウフォット=ペインはかなりの程度よそで調整済みの石核が遺跡に持ち込まれたせいだとみている〔Crowfoot-Payne 1983：672〕。エル=コウム盆地のクデイル 1 遺跡〔Calley 1986a〕，アブ=フレイラ遺跡でも同様の現象が指摘されている。

ナヴィフォーム式技術の実行に必要な良質の大形フリントは必ずしも，遺跡周辺で利用できたとは限らない。産地が遠隔地であった場合には，原石調達旅行が必要である。そうした調達は，おそらく，狩猟など他の目的での資源調達旅行に組み込まれていたのであろう。携帯的・経済的な形に加工してから遺跡に持ち込まれたものとみられる。しかし，このパタンは，続く土器新石器期になると一変する。原石そのものが遺跡に持ち込まれ，保管され，剝離工程の全てが遺跡内で実施されるようになるのである。しかも，原石は遺跡近辺のものが大部分になる〔Nishiaki 1991a, 1992a〕。剝離技術もきわめて簡素化される。狩猟が低調になり定住化の高まった土器新石器期の農耕村落においては，労力をつぎ込んで石核を調整し，携帯性を高めたり，原石の効率利用を図ったりする必要性が減じたのだと考えられる〔Parry and Kelley 1987 参照〕。

ナヴィフォーム式技術の盛行は狩猟活動そのものとも関係が深かったものとみられる。この技術によって大形

石刃の生産が可能になり，PPNB 期に尖頭器が発達したことは既に指摘されている〔Moore 1978〕。これに加えて，ここで言及したいのは，最近の地球規模での民族誌研究の成果である。様々な生業活動を行っている各地の集団の技術を比較した R. トレンスらは，道具や装置の複雑さとその集団が利用している食料資源との間には強い相関があることを明かにしている〔Oswalt 1976；Torrence 1983, 1989〕。大形野生動物のように動的かつ季節的な食料獲得を生業としている集団は，複雑で高度な技術を発達させている。捕獲機会も限られているし，獲得も容易ではないから，装置・道具の準備には十分な時間をかけ，失敗を回避しようとするのである。一方，植物や家畜のように静的な資源を利用する集団には複雑な技術も道具もあまり必要でない。時間の制限も特にないから，その時その時に応じて，道具を準備すればよいわけである。

こうした，現生民族誌からえられるモデルが，ナヴィフォーム式技術流行の説明にも有効であると思われる。ナヴィフォーム式技術は石核調整には時間がかかるが，一旦，石核さえ準備しておけば狩猟に必要な尖頭器用・動物解体用大形石刃を容易に大量生産できるのである。そして，この技術の衰退，祖雑な剝片生産への移行が，まさにこの地域での野生動物狩猟の衰退，農耕・牧畜の専従化の時期に一致していることはきわめて示唆的である。

前 6 千年紀，土器新石器時代初頭には，レヴァント地方の大部分の地域で本格的な農耕・牧畜の進展，定住化の進行，人口増加など様々な社会変化が生じた〔Moore 1978, 1985；藤井 1981〕。その変化と共にナヴィフォーム式技術は多くの地域で有効性を失った。ただ，本稿で述べたように，ドゥアラやエル=コウム盆地など内陸砂漠では前 6 千年紀になってもなおこの技術が用いられていた。内陸砂漠の遺跡は通常，石器のみが地表に散乱する開地遺跡・洞窟遺跡であって，大形テル遺跡はまれである。それらは，とうてい農耕定住村落址とは考えられず，狩猟や放牧の際のキャンプ地であった可能性が高い。内陸砂漠の遺跡が，独立した別の集団が残したものか，それとも気候温暖地の定住村落から派遣されたグループが残したものかはにわかには決められない。しかし，移動性の高い生活形態をとっていた集団のものであることは間違いない〔Zarins 1990〕。ドゥアラのような内陸乾燥地では，環境の制約から遊牧や野生動物資源獲得が主要な生業となっていたのであろう。石核の調整に多大な労力をつぎ込んででも携帯性と専門性を確保しようとするナヴィフォーム式技術は，そのような先土器的移動集団においてのみ意義をもっていたものと考えられるのである。

Ⅵ. おわりに

完新世初期に石刃生産技術が放棄され祖雑な剝片生産技術へ移行するという現象は，レヴァント地方のみならず，日本の縄文時代やヨーロッパ中石器時代など世界各地で知られている〔Parry and Kelley 1987；阿子島 1989：50 参照〕。それらの地域の変化も，今回述べたレヴァント地方の例と多少とも似た性質のものであった可能性があろう。下部旧石器時代以来，石器の改良は携帯性・専門性の向上（＝重量の軽減，器種の分化・管理化）という方向に向けられてきた。それは動物資源獲得およびそれに関わる移動という生活様式の枠内での改良であったとみることができるだろう。レヴァント地方先土器新石器時代に生み出されたナヴィフォーム式技術は，その最後の到達点の一つであったようだ。これ以降，携帯性を高めることを目的とした本格的な石刃技術はついに生まれることはなかった。この地域のその後の石刃製作は，農耕用の鎌刃着柄効率化という全く別の原理に従って改良されていくようにみえる。石器製作技術という点にのみ限ってみても，先土器・土器新石器時代の

移行は大きな転換点だったのである。

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SHELLS AND SHELL OBJECTS FROM AREA A OF 'USIYEH

Kazumi OGUCHI*

＜要 旨＞

オウシーアA区出土の貝と貝製品

ユーフラテス川中流地域のオウシーア遺跡A区から発掘された多量の貝と貝製品には，アラビア湾（ペルシャ湾）の貝はもちろん，インド洋·太平洋などの遠隔地の貝も多く含んでいる。粘土版文書では，これら遠隔地とメソポタミアとの直接交易は，２千年紀のはじめには衰退している。しかし実際にはその後の時代も遠隔地から運ばれてきたものが出土することが知られている。オウシーアの貝も、これを証拠付ける一例であり，おそらくマリ文書で知られているように，ティルムン（バーレイン）とユーフラテス中流地域のマリとの間の交易，もしくはそれよりも上流地域との間の交易の産物であったと推測される。メソポタミアにおいて，貝が装飾品としてもっとも好んで利用，または加工されたのは前第３千年紀である。オウシーアを含む前第２千年紀初頭の遺跡でも貝は出土するが，未加工品もしくは単純な加工品にとどまるようである。いずれにしてもオウシーアのように，多種で多量の貝が一遺構から出土する例は希であり，これらの貝が、単に装身具として利用されただけにとどまらない可能性もある。＜なおオウシーアA区の調査は，日本私学振興財団学術研究振興資金の助成により，1982年，1983年にかけて国士舘大学イラク古代文化研究所が行ったものである。＞

Introduction

In the ancient Near East, shellfish was utilized not only as food but also as dye and a source of medicine. The remain, shell, was utilized for ornaments, small containers, lamps[1] and inlay plaques. Beginning of the shell use in Mesopotamia was as early as in the seventh millennium B.C. [Gensheimer 1984: p. 67], and the maritime trade through the Arabian Gulf was presumably started in the fifth millennium B.C. Then in the late fourth millennium B.C., shell objects spread over Mesopotamia and had been used by preference in the third millennium B.C. After this period, in the early second millennium B.C., shell objects, especially shell cylinder seals, lamps, cosmetic containers and inlay works of shell, seem to have decreased or disappeared [*cf.* Edens 1992: Figs. 3 and 4][2], although the shell trade has continued in the Gulf.

Shells and shell objects from Area A of 'Usiyeh fall in the early second millennium B.C. 'Usiyeh is really rich in shell, and these finds are significant evidence of shell trade in the middle Euphrates region, through the Gulf and southern Mesopotamia, in this period.

Site

'Usiyeh was located on the right bank of the Euphrates river, between the towns of Ana and Haditha, and about 700 km from the Gulf and about 600 km from the Mediterranean Sea. The site had a vast expanse of protrudent area caused by the meanders of Euphrates with measurements of about 1200 m in the north-south direction and about 1000 m in the east-west direction. The highest area of the site has been called by the name of Area A which was the south-west of the site. Area B was located about 220 m toward the north-west from Area A[3]. So called Main Mound or Tell 'Usiyeh was located in the north-east

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part of the site, and many graves were also scattered all over the site, whose excavations were carried out by the Iraqi Expedition [see Aga 1987/88: pp. 110–141]. One of the grave is dated in the Early Dynastic III period, whose tomb is similar construction to an underground structure (Underground Structure or U.S.) of Area A. Most of the shells and shell objects in Area A of 'Usiyeh were found in this structure. On the other hand, the date of Underground Structure can not go back to the Early Dynastic III period[4].

The excavations in Area A of 'Usiyeh were carried out from November 1982 to December 1983 by the Japanese Archaeological Expedition in Iraq, Kokushikan University (headed by Prof. Hideo Fujii)[5] with cooperation of the State Organization of Antiquities and Heritage in Baghdad[6].

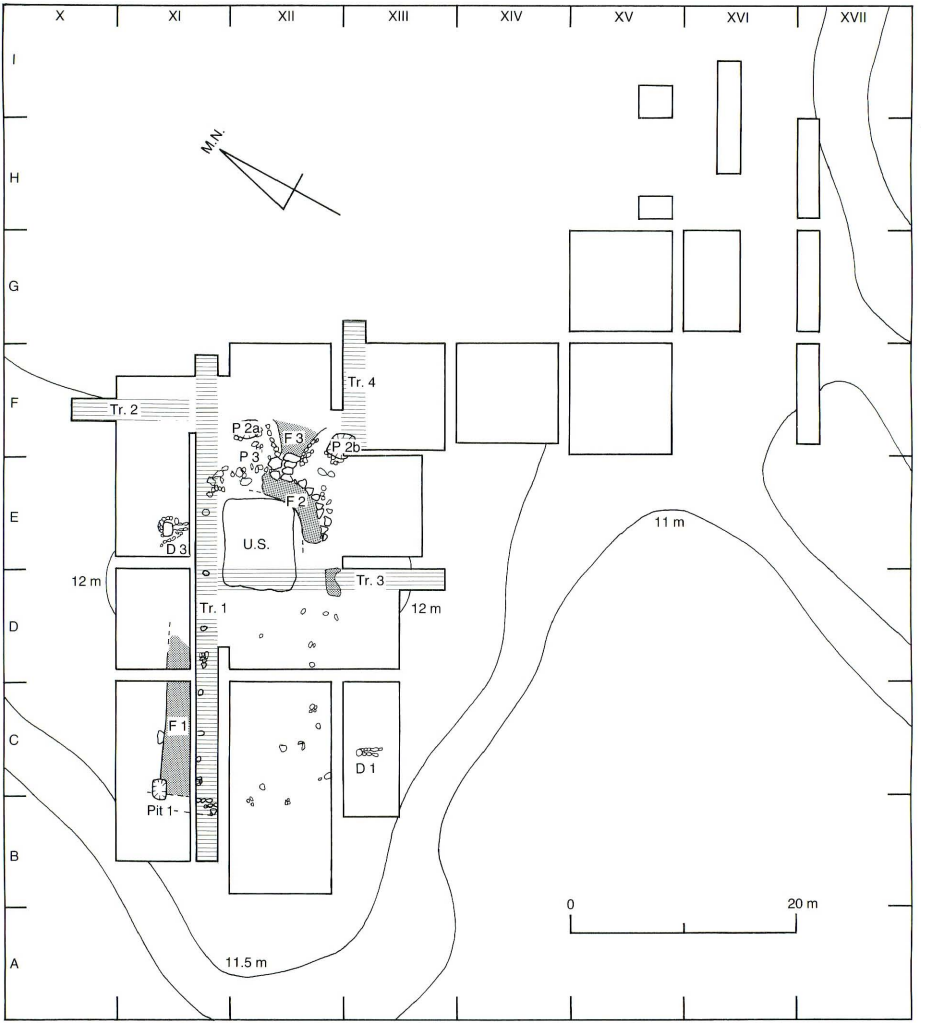

Fig. 1 Excavated Area and Remains of the Early Second Millennium B.C., 'Usiyeh Area A.

Underground Structure and the other structures were discovered in Area A (Fig. 1). Originally Underground Structure was constructed in a rectangular pit (Fig. 2). Inside the structure was divided into two portions: One half had two cells, Room S and Room W (R.S. and R.W.), with a forecourt doorway (F.D.); and the other half had a connecting room, Room E, Room N and Room M, with an entrance opening on to the stone roof. Afterwards, this structure was destroyed and reused at least three times with five phases. In the later phases, an additional room, R.W.2, was constructed across R.W. and F.D., and a new gypsum-laid floor was prepared in Room N, Room M and Room S which were made over the destruction deposits. Therefore these rooms have some phases individually, which are based on their floors, and the low number indicates the early phase and the high number is the later phase[7] (see Tables). On the other hand, the deposit was not always clear in each phase, and around Underground Structure, it was divided into five accumulations from ① to ⑤, from the upper accumulation to the lower accumulation.

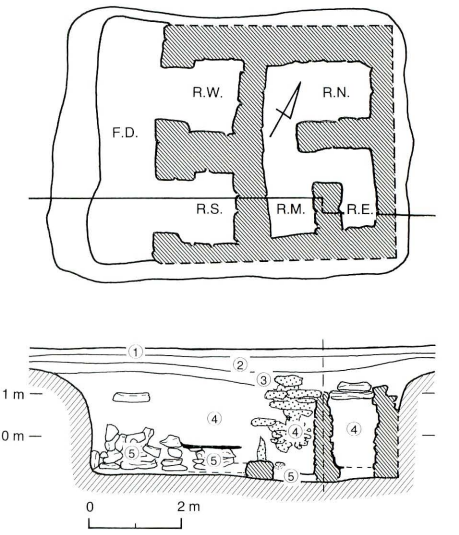

Fig. 2 Plan (Original Plan) and Section, Underground Structure.

The date of Underground Structure seem to be during the Isin-Larsa period on evidence of the finds. Therefore the shells and shell objects are also dated within this period.

Shells and Shell Objects

Through the excavations in Area A, a considerable number of shells and shell objects were found with the other finds,—pottery vessels, terracotta statues and figurines, stone objects including cylinder seals and beads, metallic objects, an ivory object and bone objects—, as well as the usual excavations in the Near East.

Mrs. Emily Glover kindly identified the shells and shell objects, by some actual samples and photographs[8]. According to her, there are no Mediterranean species in the shell collection of 'Usiyeh [Glover 1990: unpublished]. She has given genus and species of each specimen. On the other hand, the determination was impossible in many cases, either because of the eroded condition of the specimens, or difficult to made the identifications from photographs. Also many mollusc families are not well studied, and taxonomic uncertainties exist [*ibid.*].

The present writer attempts to make a table "Frequency of Shells and Shell Objects" (Tables 1a, 1b, 1c, 2a, 2b and 2c, continuously), after the writer left the site and the actual collection, which is based on the Mrs. Glover's determination, the 'Usiyeh's field notes, field lists, photographs and photograph lists. In some case, however, the table may necessary the modification in feature study on the aforementioned reasons.

It is remarkable that all the shells of Area A, excluding the shell rings, are only unworked or simple worked specimens, not like specimens of the third millennium B.C.[9]. Total 2859 specimens of the shells

and shell objects were unearthed from Area A of 'Usiyeh. Among them, 2509 are shell rings made from *Conus* species or possibly *Strombus decorus*. The other 350 specimens are including marine gastropods (313 specimens), marine bivalves (eighteen specimens), fresh water gastropods (six specimens) and fresh water bivalves (thirteen specimens).

Most of the specimens were found in or near Underground Structure, especially concentrate in the south-western portion (R.S. and R.W.) with the forecourt doorway of the structure (see Fig. 3 and Tables), same as the beads, cylinder seals and bronze objects. On the other hand, the shell rings were dispersed at the other find spots, too, while the number is not many. Anyhow, all the specimens are found as a single object, and these arrangements are unknown.

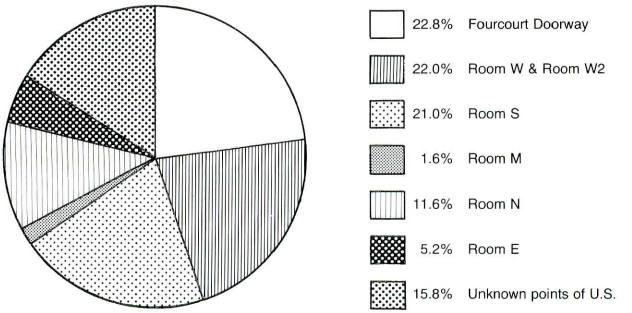

Fig. 3 Percentage of the Distribution of the Shell and Shell Objects within Underground Structure.

1. Marine gastropods (Pls. 1 and 2)

Nearly 99% of the specimens come under the group of marine gastropods (nearly 90%: in case of exclude the shell rings). These are Strombidae (species *Strombus decorus*/*Strombus decorus persicus*), Buccinidae (species *Engina mendicaria*), Planaxidae (species *Planaxis sulcatus*), Nassariidae (species *Nassarius pullus*), Olividae (species *Oliva bulbosa* and *Ancilla)*, Taididae (species are indeterminate from photo), Cypraeidae (species *Cypraea turdus* and *Cypraea annulus*), Muricidae (species *Siratus kuesterianus*), Conidae (species *Conus ebraeus* and *Conus taeniatus*), Columbellidae (species is indeterminate from photo), Charonia (species is probably *Charonia tritonis*), Neritidae (species *Nerita sp.*) and Scaphopoda (species *dentalium octangulatum*).

Most common marine gastropods in the 'Usiyeh collection is Nassariidae (species *Nassarius pullus,* Linnaeus 1758, basket whelk in common English name) which is an Indo Pacific species occurring from India to the Pacific Ocean [Glover 1990: unpublished] (Pl. 1e). Basket shells were reported by Reese and Mount-Williams, although both of them are species *Arcularia gibbosula* from the Mediterranean Sea [Reese 1989: p. 81; Mount-Williams 1980: pp. 39f, TPR 8 47]. The former come from Hasanlu IVB and the later come from the Khana period at Terqa in the middle Euphrates region. At Mari in the middle Euphrates region, a basket shell necklace is also found [Parrot 1975: p. 13 fig. 6; Reese 1991: p. 135]. According to Reese, there are three specimens also found at Tell Brak, in the north-east of Syria [*ibid.*].

In the 'Usiyeh collection, eighteen specimens out of 89 *Nassarius pullus* are unworked or unholed shells (the third row of Pl. 1e). 37 specimens has one or two holes, usually one (the lower three rows of Pl. 1e), however these holes are not clear whether by artificial made or by natural or accidental made, because the species is very weak and these holes are irregular in shape. On the other hand, two of them

seem to have been arranged with some bronze object, because there is some bronze trace there. Therefore these holes may have been artificial made. 34 of them are ground-down both back and front (the upper two rows of Pl. 1e). Ground-down both back and front are particular observed on basket shells [*cf.* Reese 1989: Fig. 4; McCown and Haines 1967: Pl. 147–3].

Next common family of shell in the 'Usiyeh collection is Conidae (cone in common English name) which include the species of *Conus ebraeus* (Linnaeus 1758) and *Conus taeniatus* (Hwass 1792). Conus occur in the Arabian Gulf [Reese 1989: p. 81], but *Conus ebraeus* do not occur there, and this would suggest that the middle Euphrates region had a wider contact with Indian Ocean regions [Glover 1990: unpublished].

Conidae, especially *Conus ebraeus,* has a beautiful intrinsic marking, check like design, and the people were fond of this shell as a pendant (Pl. 2a). At Mari, *Conus ebraeus* is used as a pendant which has a bronze projection at the holed apex for stringing [Parrot 1968: p. 32f., Pl. 16–2 (4438)]. Similar shell beads or pendants are also reported at Mari [Parrot 1956: p. 168, Pl. 61-c (312)], Fara [Martin 1988: p. 221 Penn. obj. no. 298], Hasanlu [Reese 1989: Fig. 11], although this species seems to be rare or unknown in north Mesopotamia.

In the 'Usiyeh collection, seventeen out of nineteen specimens of *Conus ebraeus* have a hole at the apex which is usually well arranged. The technique of this arrangement seems to cut the apex by probably grinding method at first, and then polished the hole. The other two specimens also have a hole at the apex, but have a hole on the side, too. One of them seems to be accidentally broken down and the hole of the other specimen is not arranged. Therefore all of this species may have used as pendants with a hole at the apex.

30 specimens out of 36 *Conus taeniatus* have a hole at the apex, same technique as *Conus ebraeus.* These may have been also used as pendants, although *Conus taeniatus* is smaller than *Conus ebraeus* and is less decoratively than *Conus ebraeus.* The others are, however, unworked (unholed) specimens. Similar shells are also discovered in Level VII of Tell Gubba (Jemdet Nasr period) in the Himrin basin [Ii 1989: Fig. 20–63aa and 63bb]. These also have a hole at the apex and are used the same technique [*ibid.*: p. 179].

The third of the common shell is Buccinidae (whelk in common English name), the species *Engina mendicaria* (Linnaeus 1758) which has an intrinsic design, dark brown and white stripes (Pl. 1a). This shell may have particular have an intrinsic value. *Engina mendicaria* occurs in the Indian Ocean and the Red Sea, but in the Arabian Gulf, the habitat was primarily at its far eastern edge and being more prevalent in the Gulf of Oman and along the western Makran coast [Glover 1990: unpublished; Gensheimer 1984: p. 65]. Therefore it is also a very evidential material for the trade between the middle Euphrates region and there. *Engina mendicaria* is also discovered from Level VII of Tell Gubba [Ii 1989: p. 179, Fig. 19b–62c, Pl. 43–62]. It seems to be the earliest evidence of *Engina mendicaria* in the archaeological sites in Mesopotamia, as far as I know. Therefore the beginning of the trade of this shell seems to be in the Jemdet Nasr period. It is well known that there is some connection between the Gulf of Oman and the Diyala region in this period from pottery. *Engina mendicaria* was prefer as beads for long time in extensive regions, and is found at Tell Gubba [*ibid.*], Tell Songor B [Matsumoto 1989: Pl. 79-g], Tell Yelkhi [Quarantelli 1985: p. 157], Tepe Hissar [Schmidt 1931: Pl. 145, H 492], Hasanlu [Reese 1989: Figs. 2 and 19], Tell Jigan [Ii 1984/85: pp. 188 and 191, Pls. 35–215, 216 and 36–217] and Mari [Parrot 1956: Pl. 61-c]. Majority of these specimens have one or two holes on the side of the body for stringing, and are found as the grave goods.

'Usiyeh's specimens are, however, ten specimens out of 34 *Engina mendicaria* are unworked or unholed natural shells (the top row of Pl. 1a). Sixteen of them has a hole at the apex, but the holes are unsure whether accidental or artificial (the second and third rows of Pl. 1a), and some of these are impossible to thread the hole. Four of *Engina mendicaria* has a hole at the apex with one or two side

holes, and the other four specimens have one hole on the side (the lower two rows of Pl. 1a). The side holes are pierced by grind method, and these must be used as eyelets for beads.

The next common shell in 'Usiyeh is Strombidae (conch in common English name), the species of *Strombus decorus* or *Strombus decorus persicus* (Swaison 1821) (Pl. 1d.). The former species has a high spire, and the later has a low spire and occurs in the Gulf [Glover1990: unpublished]. According to Mrs. Glover's report, most of specimens closely resemble the later species but difficult to determine from photos, and *Strombus decorus* is possible to use for the manufacture of shell rings, same as *Conus sp.* [Glover 1990: unpublished]. On the other hand, the 'Usiyeh's shell rings seem to made from more large sized shells. Twelve specimens out of 30 *Strombus decorus* are unworked or unholed. Eight of them has a hole at the apex and two of them has a hole on the side of the body (right on Pl. 1d), but both cases of holes are not so arranged and unsure whether accidental or artificial made. The other six specimens are clearly accidentally broken. Therefore most of *Strombus decorus* are unworked or possibly unworked. These seem to be not beads, and not used as ornaments with shell's natural form. *Strombus decorus* has no intrinsic design, but large in size compare with the other species of 'Usiyeh. It may have been raw material intended for later ornament working and stored. Unholed specimens of this species are also discovered at Fara [Martin1988: p. 59 and pp. 212f, Penn. obj. no. 212]. One case of the Fara's *Strombus decorus* hold cosmetic [*ibid.*: p. 59], but the shell receptacles, including the other shell species, seem to have been restricted in the early third millennium B.C.

The fifth of the common family of shell in the 'Usiyeh collection is Olividae (olive in common English name) including the species *Oliva bulbosa* (Roeding 1758) and *Ancilla sp. c/f lineolata,* which occur in the intertidal to shallow sub-tidal Indo-Pacific Ocean and the Gulf [Glover 1990: unpublished]. The former species is large (Pl. 2c) and the later is small (Pl. 1c). Most of the 'Usiyeh's Olividae has a hole at the apex, whether accidental or artificial. Some of *Oliva bulbosa* have a clear evidence of artificial finishing, polishing the apex hole. Especially in case of *bulbosa,* it need some filling material for hold, if these species are used as beads. Therefore majority of *bulbosa* may have been used as pendants, same way to *Conus ebraeus*. In the other sites also, there is no side hole on this species, and all of them have a hole at apex [*cf.* Ii 1984/85: pp. 196 and 208, Fig. 26–6, Pl. 36–219; Matsumoto 1991: 270ff, Fig. 12–7, Pl. 10-e; Martin 1989: p. 221 Penn. obj. no. 300]. *Oliva bulbosa* is also reported as a very common species at Nineveh [Beck 1931: p. 432].

There are seventeen indeterminate species of the family Columbellidae in 'Usiyeh (Pl. 1b). All of them are unworked, excluding two of them have an accidental-like hole on the side. These small marine gastropods are available for beads, if these have a hole at the apex or on the side.

At least two species, *Cypraea turdus winckworthii* (Schilder and Schilder 1939) and *Cypraea annulus* (Linnaeus 1758), of family Cypraeidae (cowrie in common English name) are found in 'Usiyeh (Pl. 2d). Unworked or unholed specimens are being (two specimens of *turdus*) but rare, although this shell is possible to use as beads same way to Olividae. Three specimens out of ten *Cypraea turdus* have a hole and four of them have two holes on the side of the body. Most of the holes are pierced by grind method. There is a *Cypraea ?annulus* with an open dorsum, too (Pl. 2g), which is also found at Tall Sheikh Hammad [*cf.* Reese 1991: p. 133 and Abb. 84]. It is known that the distribution of cowrie shells extended to Central Asia from the sixth millennium B.C. Cowrie shells sometimes have an open dorsum, and opened cowries spread over the Near East for long periods, between the third millennium B.C. to the Roman period [Reese 1989: Fig. 3; Reese 1991: p. 135].

There are two indeterminate species of Cypraeidae in the 'Usiyeh's collection, which are used only one side of the front and pierced at the end (Pls. 2e and 2f), although one of them is halfway (Pl. 2f). This is a type of pendant from the third millennium B.C. or more early period [*cf.* Strommenger 1977: Fig. 10].

Similar shell pendants are also found at Mari [Parrot 1956: Pls. 60–204, 205 and 61–312] and Nineveh [Beck 1931: p. 433 no. 34] in the third millennium B.C.

There are 14 specimens of the family Taididae in 'Usiyeh (Pl. 2b). Taididae is predatory gastropod in the intertidal zone and is certainly from the Indo Pacific Ocean [Glover 1990: unpublished]. This shell is rare or unknown in the other sites of Mesopotamia as far as I know, but being of this shell is another evidence of the trade between the Indo Pacific Ocean and the middle Euphrates region through southern Mesopotamia. Eight of them are unholed, three of them have one or some holes on the side of the body, and the other three are fragmentary specimens. On the other hand, the holes are possibly made by some accident. The function of this shell is unsure but it not seem to be a bead or a pendant.

12 specimens of family Planaxidae, the species *Planaxis sulcatus* (Born 1778) are also found in there. Some of them has one or two holes on their sides, but there are also unholed specimens same as the other species.

There are also rare species of marine gastropods, family Muricidae (murex in common English name, species *Siratus kuesterianus,* Tapparone-Canefri 1875), Neritidae (*Nerita sp.*), Scaphopoda (species *Dentalium octangulatum,* Donvan 1803), Charonia (maybe *Charonia tritonis*) in there.

Siratus kuesterianus (Pl. 2c left) occurs in the intertidal zone in the Arabian Gulf and occurs in the sites of Ras al-Khimah and Oman [Glover 1990: unpublished]. It produces a valuable red-purple die which was used for dyeing textiles and was famous in Phoenician [Klengel 1983: pp. 273ff.]. Certainly some textiles unearthed from at-Tar Cave, in the south-western desert of Iraq, which are dyed by murex [Yoshioka 1980: p. 106]. At Ugarit in the middle of the second millennium B.C., dyes and textile's industry were well established, which have both archaeological and textual evidences [Dalley 1984: p. 54]. The earlier time, the archives of Mari is also evidential, which is mentioned about the prosperity of murex-based industry [*ibid.*]. On the other hand, 'Usiyeh's *Siratus kuesterianus* is an only specimen, and it not seem to used for dyeing and for ornaments.

Only one specimen of Neritidae (*Nerita sp.*) is also found in 'Usiyeh. *Nerita* is also found in a Roman grave at Tall Sheikh Hammad [Reese 1991: p. 135]. According to Reese, there is also a *Nerita,* species come from the Red Sea, at Tell Brak [*ibid.*].

Dentalium octangulatum occur in the Arabian Gulf and the Indian Ocean [Beck 1931: p. 432; Ii 1989: p. 180] and used as beads, which are common in the third millennium B.C. and seem to have been rare in the second millennium B.C.

There are two fragments of Charonia (Pl. 2h), individually different specimens. *Charonia tritonis* is the famous "trumpet" shell of the Pacific and the Indian Ocean [Glover 1990: unpublished]. The find of this large shell is interesting for the use of shell. Did the people use Charonia shell as a trumpet or some wind instruments? Trumpet was already known in the middle of the third millennium B.C. (c.2600 B.C.) at Khafajeh [Rimmer 1969: Fig. 7, p. 37], but it is unknown that the shell trumpet go back to the early second millennium B.C. 'Usiyeh's specimens not seem to be the raw material for making small ornaments or beads, and must have been complete. If complete Charonia used as an ornament for some room, it must surprised the people and had value.

2. Marine bivalves (Pl. 3a to 3e)

At least three families of Marine bivalves—five specimens of family Glycymerididae (species *Glycymeris c/f lividus*), two of Cardiidae (species *Trachycardium c/f lacunosum,* Reeve 1845) and two of Veneridae (species *Pitar umbonella,* Lamarck 1818)—are found in Area A of 'Usiyeh.

Four of the Glycymerididae specimens are worked, two of them are ground and polished on their edges and the others have a hole at the umbo for stringing (right on Pls. 3a and 3b). There is one unworked or

unholed specimen, too. *Glycymeris* are also found at Tall Sheikh Hammad, Mari and Tell Nebi Mend, but these came from the Mediterranean Sea [Reese 1991: p. 134].

It is known that *cardium,* cockle shell, was frequently used for the container of pigment, cosmetic paints, which first appear in the Early Dynastic I period, then it become a common grave goods in the Early Dynastic period in southern Mesopotamia [*cf.* Moorey 1982: p. 69; Ii 1989: p. 178; Ii 1990: p. 152, Pl. 8–519a, b; Matsumoto 1991: p. 267; Mackay, 1925, Pl. III-8; Postgate 1985: p. 4; Martin 1988: p. 59; Woolley 1934: p. 245]. In the later periods, however, there is no clear evidence of the use, although as the function of beads or pendants have been continue. In the case of 'Usiyeh, all of them, six specimens, have no trace of work, but these seem to used as ornaments (left on Pl. 3a and 3b).

There are also five specimens of unknown family of the marine bivalves (Pl. 3c). Among them, two species are possibly halfway of making ornamental objects, probably beads or pendants, which are well polished and their natural form are become unknown (Pl. 3d and 3e). The others are unworked or unholed specimens.

3. Fresh water gastropods (Pl. 3f)

Fresh water shells are less common in 'Usiyeh, and total six specimens seem to come under the family Thiaridae. These are available for made beads, and probably used same as the marine gastropods, because all the specimens are found concentrically in Underground Structure. Among them, four specimens are unworked and the other have a hole on the side of the body.

4. Fresh water bivalves (Pl. 3g and 3h)

Total thirteen specimens seem to come under the family Unionidae (species *Unio c/f terminalis,* Bourginart, Pl. 3h). Similar fresh water bivalves can collect easily in the Euphrates River, and we can use as a food in the present time. At Tall Sheikh Hammad, on the lower Khabur River, *Unio tigridis* and *Unio mancus* are found and these are probably a food source [Reese 1991: p. 133]. 'Usiyeh's *Unio* may have been a food source, too. Their find spots are also different from the other shell groups (Tables). Actually they were not find in the lower phases of Underground Structure, and not seem to accompanied the structure.

All the specimens are unworked and weak specimens, except for one doubtful specimen to the species which has a large hole, 0.8cm in diameter, and may have been used as a pendant (Pl. 3g).

5. Shell rings (Pl. 4a and 4b)

In this study, I used the term the "shell rings" are including not only the form of a finger ring with a large hole (Type A on Tables; Fig. 4–1 to 10) but also horizontally sliced specimens with a narrow hole (Type B on Tables; Fig. 4–11 to 14). Type C on Tables indicate broken specimens of the shell rings. Most of the third type belong to Type A.

Generally, the shell rings are made from Conus shell [Gensheimer 1984: pp. 67ff.] and used for long time from the fourth millennium B.C. [*cf.* Ii 1989: p. 179f.], and found at a lot of sites in Mesopotamia, including in the southern and northern Mesopotamia, in the Diyala region and in the middle Euphrates region. Sometimes the shell rings are engraved, although there is no engraved specimen in the early second millennium B.C. same as the 'Usiyeh's shell rings. On the other hand, both the 'Usiyeh's Conus, *Conus ebraeus* and *Conus taeniatus* are too small species for the manufacture of the shell rings. *Strombus decorus* is possible to use for it, but this species is also not enough the size in many cases. Probably more large sized species of *Conus* was used for the manufacture.

The manufacture of Type A is, at first, the upper half (spire part) of Conus was sliced, and hollowed

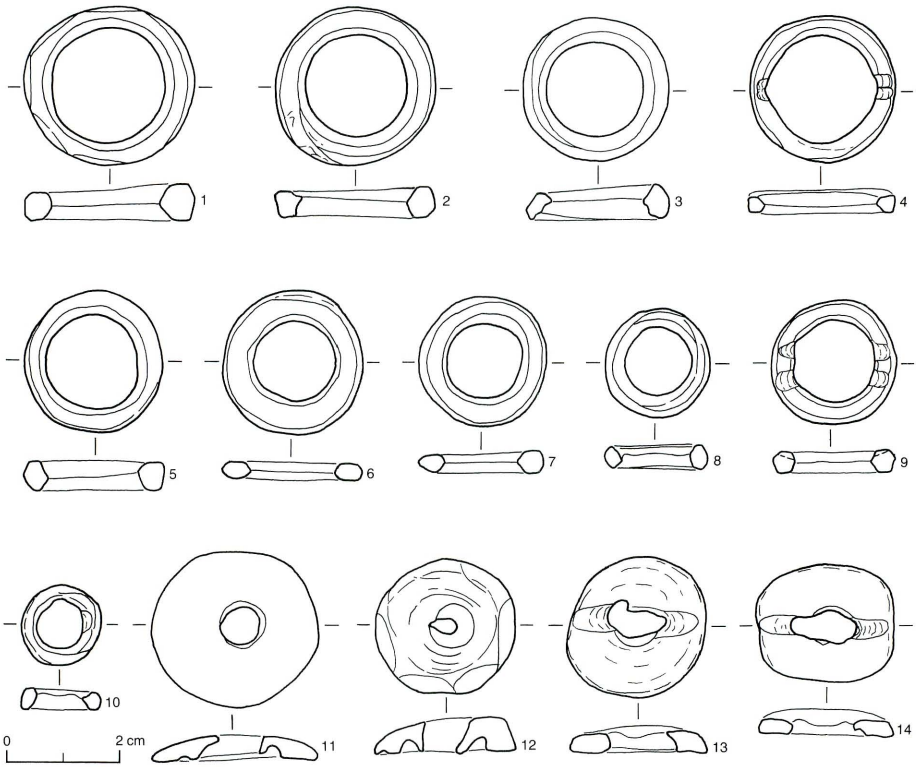

Fig. 4 Shell Rings (Type A: 1 to 10; Type B: 11 to 14).

out, then arranged the form and polished. In case of Type B, only the upper part of the sliced spire can use, except the apex, and is not hollowed out, then arranged the form and polished. Therefore Type B has only a narrow hole, and is not enough to allow them to be worn on the finger. The range of the utilization is different between Types A and B.

At least 2509 shell rings, including 1431 specimens of Type A, 754 of Type B and 324 of Type C, are found in Area A of 'Usiyeh. Among them 2118 are discovered from Underground Structure and the other 321 are upper level of Underground Structure or the other parts of the site (see Tables).

The largest shell ring is measured 3.1 to 2.9 in external diameter and 2.0 to 2.1 cm in internal diameter (Fig. 4–1). The smallest specimen is measured 1.4 cm in external diameter and 0.85 cm in internal diameter (Fig. 4–10). The range of size is between them, therefore there is no regular or common size of the shell rings, which is depend on shell. On the other hand, the height is regular and measured about 0.3 to 0.4 cm, in some case about 0.5 cm.

The shell rings during the Jemdet Nasr period to the Early Dynastic I period, in case of Tell Gubba, the height is irregular and higher than the 'Usiyeh's shell rings, and is measured between 0.4 cm to 1 cm [Ii 1989: p. 179 Table 5]. This difference may have been not only depend on the change of fashion but also progress of the sliced technique. In the early second millennium B.C., probably there were some expert for the shell work. In 'Usiyeh, there is no waste of Conus, and the manufacture seems to be not in the

site. Probably shell rings were imported after the work or half way the work. This import method may have continue to the later period [*cf.* Reese 1989: p. 84].

In the 'Usiyeh's collection, six specimens of the shell rings are blackened, which seem to be fired. On the other hand, all the other specimens of shells are no fired and not change the colour, although the deposit of Underground Structure contained much ash. Therefore these six shell rings are possibly artificial colour, iron, as according to Beck, but it is unsure [Beck 1931: p. 433f.].

The shell rings are used not only as finger rings but also as beads and the other ornaments. At Kish, sometimes white shell rings is used as a belt [Moorey 1982: p. 77], and at Ur, "... a row of shell rings lying horizontally round the waist must mean (as in the case of the women) either a proper belt or belt attached to and forming part of a short coat" [Woolley 1934: p. 243]. In some specimens of 'Usiyeh, there are clear traces of one or two threads on both the obverse edges diagonally (Fig. 4–4, 9, 10, 13 and 14), and one specimen has the trace on both obverse and reverse faces. It means that the shell rings were sewed on a leather or cloth by a thread, or linked at the both edges, a chain-like, by a thread. The length is more than 60 m, if all the shell rings are linked. So, it is possible to decorate the Underground Structure and to fill the surface of a garment by the shell rings. Anyhow the utilization of the shell rings may have cover a wide range as a material of decoration.

Conclusion

Unfortunately, shells and shell objects are not so much studied and reported, although there are many shell objects in the archaeological sites, and shell was a significant material same as semiprecious stones for making the ornaments[10]. Most of shells which are found as archaeological finds in Mesopotamia, seem to be the Arabian Gulf and the Indian Ocean sources rather than the Mediterranean Sea source. The reason seems to be not only geographical conditions but also the political and the economic relations can not ignore.

At Ebla in the third millennium B.C., 90% of shells came from the Arabian Gulf or the Indian Ocean and the other 10% of them came from the Mediterranean Sea [Pinnock 1984: p. 26]. The former shells were certainly brought to Ebla through southern Mesopotamia along the Euphrates river. Ebla is not a faraway from the Mediterranean Sea and the access to there is no difficulties, while the distance to the Arabian Gulf is a quite faraway. On the other hand, it is natural things, because we know that there were close relations between Ebla and southern Mesopotamia on the textual and the archaeological evidence[11]. 99% of a collection of shells and shell ornaments from Hasanlu IVB (9th century B.C.) also came from the Arabian Gulf or the Indian Ocean [Reese 1989: p. 80]. In case of Hasanlu IVB, the reason is probably geographical conditions, but in case of Ebla, the reason must be the political or the economic relations. Anyhow a main route of the shell trade was through the Arabian Gulf for long time, and the shells were spread over in extensive regions.

On the other hand, many of the Mediterranean species were discovered, too, which are discovered from the "bead-layer" at Nineveh in the early third millennium B.C. [Beck 1931: p. 432][12], and Temple A at Nuzi in the middle of the second millennium B.C. [Starr 1939: p. 489], although the majority of these shells seem to come from the Arabian Gulf. At Tall Sheikh Hammad on the east side of the lower Khabur River, "Mediterranean shells are present beginning in the 13th century B.C. but Indo-Pacific shells only from the late 8th to 6th century B.C." [Reese 1991: p. 133]. These results are clearly owing to the political and economic relations. Moreover, the Gulf trade is almost not carried out between the middle of the second millennium B.C. and the 9th century B.C. [Klengel: p. 127; see also note 14 below].

In case of Nuzi, it is not only aforementioned reasons, but also there may have been some religious meaning. The Mediterranean shells are restrict exclusively to the temple, which may have used for cult practices [Starr 1939: pp. 94 and 489]. At Nuzi, the Mediterranean shells may have been valued rather

than shells from the Arabian Gulf.

The distance between 'Usiyeh and the Mediterranean Sea is near than between 'Usiyeh and the Gulf, although the 'Usiyeh is slightly convenient to for the Gulf rather than to for the Mediterranean Sea. Therefore it comes as not surprise that if there is some Mediterranean shells, but practically there is no Mediterranean shells in 'Usiyeh at the present time. The middle Euphrates region in the early second millennium B.C., was prosperous, with Mari as a main relay station for trade[13]. Mari has trade with Tilmun directory, although the trade through the Gulf was on the decline[14]. On the other hand, most of the shells and shell objects of 'Usiyeh come from the Arabian Gulf or more faraway from the Indo-Pacific Ocean. These must be outgrowths of the trade between the middle Euphrates region and the Gulf with Tilmun. In the early second millennium B.C., 'Usiyeh had close connection with southern Mesopotamia rather than with the region of Syria, as long as consideration to the shells and shell objects of 'Usiyeh. Afterwards, shell trade through the Gulf seems to have declined with the decline of the maritime trade with Tilmun. At Terqa, on the right bank of the middle Euphrates region and about 100 km upper stream of 'Usiyeh, in the Khana period, all the identified shells are local fresh water shells or Mediterranean origins [Mount-Williams 1980: p. 7]. The 'Usiyeh's shell collection seems to symbolize the last prosperous time of the Gulf trade which had been presumably started in the fifth millennium B.C.

Almost the shells and shell objects of 'Usiyeh have been restricted to simple worked shells which is remaining their natural forms, except for shell rings, and there is no engraved shells or shells of exquisite workmanship. In the early second millennium B.C., the fashion of the worked shells may have been discontinued, and the people become use simple worked shells with some holes for use as beads or pendants. The people may have preferred the intrinsic markings of shells to artificial designs. The other sites, which are occupied in the early second millennium B.C., are also the same appearances, although most of them have one or two holes.

It is unusual that there are many unworked natural shells (unholed shells) in 'Usiyeh, although it is rare in the other sites. Usually shells are found as personal grave goods, a part of necklaces and hair ornaments, and are worn the dead bodies. Even in case of stored shells in jars of the grave goods, usually these are pierced for stringing. Unholed natural shells seem to be impossible or difficult to sew and wear. Were unworked shells raw materials intended for later bead working and stored? Dyson and Voigt have suggested that "unholed shells had an intrinsic value, rather than value derived from their function as ornament" [Dyson and Voigt 1989: p. 83]. At Nuzi, so called the eye beads were used as architectural decorations, and Starr has suggested that some of the other beads also used as same way [Starr 1939: p. 93]. Some of unworked shells may have used same way, too, fit into plaster of walls, but especially small shells seem to have been stored probably in some pottery vessels or in the other receptacles, although there is no clear evidence in case of 'Usiyeh[15]. It is also possible that the shells and shell objects of 'Usiyeh were en route for the trade to the upper region. Anyhow there may have been some different functions between species of shells or dimensions of shells.

In the 'Usiyeh collection, all of *Conus ebraeus* and *Oliva bulbosa,* and some *Ancilla* and *Cypraeidae* must have been used as pendants. Some *Nassarius pullus, Conus taeniatus, Engina mendicaria, Ancilla,* Cypraeidae, *Planaxis sulcatus* and *Dentalium octangulatum* were used as beads, but some of them, unholed specimens of these shells, were possibly raw materials intended for later bead working. The function of Columbellidae is unsure, but this small shell is available for beads and probably stored in some vessel in pieces. Strombidae seems to be suitable for making small beads or ornaments rather than used as a pendant or bead in the natural form. Therefore this shell may have been the raw material. To make some simple worked shells are not necessary the shell industry, but it seems necessary that making beads or ornaments from Strombidae, although there seem to have been no shell industry in 'Usiyeh. On the

other hand, this large shell may have been available to the other functions, too, such as a decoration of walls, as fit into plaster of walls. Taididae, *Siratus kuesterianus* and *Charonia tritonis* seem to have been not personal ornaments. Among them, *Charonia tritonis* has an intrinsic value, and probably *Charonia* has been used as an ornament for rooms or buildings themselves. The functions of the others are, however, doubtful, but these may have had an intrinsic value, too, rather than value derived from their function as ornament, as Dyson and Voigt have suggested. Anyhow all the shell of 'Usiyeh seem to be not always personal ornaments or foods, and it may be necessary that the consideration of the other utilizable functions on the shells.

Notes

1) According to Moorey, "... , lamps, as is often said, does not seem very likely in view of the common absence of any trace of burning; indeed some of the marks said to be this may be traces of a black cosmetic." [Moorey 1978: p. 133]. Therefore the term "lamp" may be unsuitable for this study.
2) The shell cylinder seals, cosmetic containers and lamps first appeared in the beginning of the third millennium B.C. then these peaks were during the Early Dynastic II to the Akkadian period [*cf.* Edens 1992: Figs. 2 and 3]. According to Martin, shell was most favorite material for making beads in the Jemdet Nasr period at Fara [Martin 1988: Tables 9 and 10]. Anyhow preferred species of shells and its utilization seem to have been changed each period.
3) Total seven graves were discovered in Area B [see Fujii *et al.* 1984/85: pp. 139ff.; Numoto and Okada 1987: pp. 173ff.].
4) Similar tombs are also found at Mari and the other sites [see Margueron 1984 pp. 197ff.; 1990 pp. 401ff.; Lebeau 1984: pp. 217ff.; 1990a: pp. 349ff.; 1990b: pp. 375ff.; Jean-Marie 1990: pp. 303ff]. These probably cover the dates between the E.D. grave of 'Usiyeh and Underground Structure. On the other hand, the constructions between the E.D. grave and Underground Structure are most similar in shape. For the understanding these tombs, Dr. Tomio Takase, Dr. Sally Swai and Sd. Mustafe Al-Mudafer kindly help my translation or translate the aforementioned articles and Dr. Aga's article to me.
5) The excavations were carried out as a rescue survey of the Qadisiyeh (Haditha) Dam Salvage Project. The excavations in Area A of 'Usiyeh were given a grant of the Science Research Promotion from the Fund of Japan Private School Promotion. The other members of the expedition were Yasuyoshi Okada (field director of the early excavations), Ken Matsumoto (field director of the later excavations), Katsuhiko Ohnuma, Hiromichi Oguchi (the photographs of Plates 1 to 4 were taken by him), Kazumi Yagi (Oguchi), Numoto Hirotoshi, Masayuki Yokokura and Masaaki Itoga in his late period. The preliminary reports of the excavations were already published by some members on *Al-Rāfidān* Vol. 5/6 and *Archiv für Orientforschung* Band 34 [Fujii *et al.* 1984/85: pp. 111–150; Fujii and Matsumoto 1989: pp. 166–173]. I should like to thank Prof. Hideo Fujii who gave all the finds from Area A of 'Usiyeh for my study. The site and the other finds are under studying and preparation for submission a Ph. D thesis to the University of Manchester, under the supervision of Mr. Charles Burney.
6) Sd. Magid Mohammd Abdul-haman, Sd. Ismail Ibrahim Shaveaf, Sd. Kahatan Abdul Hamid and Makhady Saliekha Azidu joined the expedition as the representatives.
7) There are also level numbers to the site, which indicate correspondence numbers between the structures. On this study, however, the detailed explanations of the site, structure, level, phase, and accumulations are omitted [see a preliminary report of Fujii *et al.* 1984/85: pp. 111–150], although the study has progressed and slightly changed over from the preliminary report at the present time.
8) I should like to thank Mrs. Emily Glover for the identification the 'Usiyeh's shell collection and making a report "Report on Mollusc Samples from 'Usiyeh site, Iraq", and I also thank Dr. Yoshihiro Nishiaki who introduced Mrs. Glover.
9) In the third millennium B.C., There are a lot of engraved shells were found at many sites. In the early second millennium B.C., shell was never engraved. In the later period, in the 12th century B.C., some engraved shell rings are found at Mari and Tell Imlihiye [see Beyer 1982: pp. 169ff and Pl. 7; Boehmer and Dämmer: 1985 p. 59 and Tafel 145], then shell, *Conus* whorl, was sometimes decorated with dots or dots and circles, and was used as beads and bosses, which is wide spread during the late second and the early first millennia B.C. in Iran and some Assyrian sites in Iraq [see Reese 1989: pp. 80ff.].
10) Between the late fourth millennium B.C. and the third millennium B.C., there are a lot of imitation shells, shell rings and shell beads which were made from many materials [Woolley 1934: p. 245; Ii 1989: pp. 180, 186 and p. 211 note 18]. People may have valued shells not only as the rare material but also as the form of shells. Beginning of the semiprecious stone trade had been started earlier period than the shell trade. Shell tread seems to developed same as the development of the maritime trade through the Arabian Gulf. Semiprecious stone was also one of the main merchandise of the maritime trade same as copper.
11) Comparable shell inlay works are found at Kish, Ur, Mari and Ebla, which are dated in the Early Dynastic II and III periods [Moorey 1978: pp. 58ff.; Woolley 1934: pp. 262ff.; Parrot: 1956: pp. 135ff.]. Ebla's shell inlay works are found in the recent

excavations, which was reported by P. Mattiae, on a lecture of 4th of May 1989 in the British Academy.

12) According to Ii, there are some discussion about the date of these beads and the function of the structure which is found these beads [see Ii 1989: p. 184 and p. 210 note 10].

13) Mari was conveniently located for trade with the upper Khabur region, upper Euphrates region, southern Mesopotamia and Qatna through the Syrian Desert, and with more faraway to the regions of Anatolia, the Gulf and the Mediterranean Sea.

14) Trade between southern Mesopotamia and the Indus Valley with Meluhha and Magan had already declined at the end of third millennium B.C. on textual evidence [Klengel 1983: pp. 52ff]. On the other hand, the trade with Tilmun has continued to the middle of the second millennium B.C., then declined. Afterwards, the trade with Tilmun seems to regained in the 8th century B.C. [*ibid.*: p. 127].

15) Two shell rings were found in a complete white-fill incised jar [Fujii *et al.* 1984/85: Fig. 6–19], although it is unsure whether accidental stored or not.

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Table 1a. Frequency of Shells and Shell Objects (Marine gastropods)

Groups	Marine gastropods													
Families	Strombidae	Buccinidae	Planaxidae	Nassariidae	Olividae		Thaididae	Cypraeidae		Muricidae	Conidae		Columbellidae	etc.
Species	*Strombus decorus/ decorus persicus* (low spire)	*Engina mendicaria*	*Planaxis sulcatus*	*Nassarius pullus*	*Oliva bulbosa*	*Ancilla sp. c/f lineolata*	indeterminate from photo	*Cypraea turdus*	*Cypraea* etc.	*Siratus kuesterianus*	*Conus ebraeus*	*Conus taeniatus*	indeterminate from photo	
*	1 2 3a 6	1 2 2&3 3a	1 2 3a b 6	1 3a 4	2 6	1	1 3a 6	1 3a b 6	3a 6	3a	2 3a	1 2	1	1
Tr.1 ①														
Tr.1 ②								1				1		1 *Charonia tritonis*
Tr.3 ②														
B-XII ①														
C-XI ①														
C-XIII ①														
D-XI ①														
D-XII ①												1		
D-XII ②														
D-XIII ①														
D-XIII ②														
E-XI ①	1													
E-XI ②														
E-XII														
E-XII ②														1
E-XIII ①									1 *annulus*				1	
F-XI ①														
F-XII ①														
F-XII ②							1							
F-XIII ①~②														
F-XV ①														
F-XVII ①	1													

Table 1b. Frequency of Shells and Shell Objects (Marine gastropods)

Groups	Marine gastropods																																		
Families	Strombidae				Buccinidae				Planaxidae					Nassariidae			Olividae			Thaididae			Cypraeidae						Muricidae	Conidae				Columbellidae	
Species	*Strombus decorus/ decorus persicus* (low spire)				*Engina mendicaria*				*Planaxis sulcatus*					*Nassarius pullus*			*Oliva bulbosa*		*Ancilla sp. c/f lineolata*	indeter-minate from photo			*Cypraea turdus*				*Cypraea* etc.		*Siratus kuesteri-anus*	*Conus ebraeus*		*Conus taenia-tus*		indeterminate from photo	etc.
*	1	2	3a	6	1	2	2&3	3a	1	a	3a	b	6	1	3a	4	2	6	1	1	3a	6	1	3a	b	6	3a	6	3a	2	3a	1	2	1	1
Pit 1																																			
D3																																			
D3 in the pipe																																			
F2, Phase 2																														1					
F2 between Phase 1 and 2																																			
U.S.②~③																									1										
U.S.③	2	1	1												2	1	1			3					1					2	1		1		
U.S.④					1	2								4	10	2		1	3											2		1	1	3	
F.D.③	1	2														2	1					2						1 (work)		1			1		1 *Charonia tritonis*
F.D.③~④ west corner	1														1																				
F.D.④	1														1																		1	1	
F.D.④ west corner		1												1	2																				
F.D.⑤	1	2		1		2		1			1			4	3	8			4	1	1			2			1		1	2			3	4	1
RW2④																1												1		1					
RW, Ph.3 wall of RW2						1																													
RW below Phase 3	1	1		1	1	3	1			1	1	1	1	2	2	2			2						1					1	1		3	2	1
RW level of Phase 2									1					1		2			1									1							1
RW~F.D.⑤	1			1	1	2	1																												
RW, Ph.1																																			
RS③				2												2																			
RS③~④																	1			1	1												1	1	
RS④ above Phase 4	1										1					1								1											

Table 1c. Frequency of Shells and Shell Objects (Marine gastropods)

Groups	Marine gastropods																																		
Families	Strombidae				Buccinidae				Planaxidae					Nassariidae			Olividae			Thaididae			Cypraeidae						Muricidae	Conidae				Columbellidae	
Species	*Strombus decorus/ decorus persicus* (low spire)				*Engina mendicaria*				*Planaxis sulcatus*					*Nassarius pullus*			*Oliva bulbosa*		*Ancilla sp. c/f lineolata*	indeterminate from photo			*Cypraea turdus*				*Cypraea* etc.		*Siratus kuesterianus*	*Conus ebraeus*		*Conus taeniatus*		indeterminate from photo	etc.
*	1	2	3a	6	1	2	2&3	3a	1	2	3a	b	6	1	3a	4	2	6	1	1	3a	6	1	3a	b	6	3a	6	3a	2	3a	1	2	1	1
RS below Phase 4		1			3	4	2	3			1			1	8	6	1	1	13		1	1	1		1					3		2	9	4	3
RS, Ph. 3																																			
RM below Phase 3															1	1														1			2	1	
RN ③															1					1															Neritidae *Nerita sp.* 1
RN ④				2		1			1		1			3	6	3				1												3	4		2
RN, -1m																																			
RN, -1.3m					1										1																		1		
RE~RN, -1.1m pass between RE and RN														1																			1		
RE③	1																																		1
RE④					1									1		1	1						1					1 (work)		1					
RE, -1.6m level of Phase 2				1																															
RE below the level of Phase 2	1								1																										
RE, -1.8m lowest level					1																														
Surface inc. etc.					1	1				1						1														2				One of them is Scaphopoda (*dentalium octangulatum*)	2
	12	8	2	8	10	16	4	4	3	2	5	1	1	18	37	34	5	2	23	8	3	3	2	3	4	1	1	5	1	17	2	6	30	17	15
				30				34					12			89		7	23			14				10		6	1		19		36	17	15
																																			313

* 1 : unworked specimens 2 : with an apex hole 3a : with one side hole 3b : with two side holes 4 : with ground down both front and back 6 : broken specimens

Table 2a. Frequency of Shells and Shell Objects (Marine bivalves, fresh water shells and shell rings)

Groups	Marine bivalves							Fresh water gastropods		Fresh water bivalves		Shell rings <Marin gastropods>			Subtotals		
Families	Glycymeridae			Cardidae	Veneridae			Thiaridae		Unionidae		*Conus* sp./ *Ebraeusor taeniatus*/ *Strombus decorus*					
Species	*Glycymeris c/f lividus*			*Trachycardium*	*Pitar umbonella*	etc.		indeterminate from photo	etc.	*Unio c/f terminalis*	etc.						
*	1	3a	5	1	1	1	6	1 3a		1	3a	A	B	C			
Tr.1 ①												6			6		
Tr.1 ②												8	16		27		
Tr.3 ②												1	2		3	36	
B-XII ①												1	5		6		
C-XI ①													2	1	3		
C-XIII ①												1			1		
D-XI ①													6		6		
D-XII ①												2	8	1	12		
D-XII ②												1	12		13		
D-XIII ①												1			1		
D-XIII ②												1			1		
E-XI ①										1			6		8		
E-XI ②			1							1		25	18	2	47		
E-XII												5	20	2	27		
E-XII ②										3		32	79	2	117		
E-XIII ①													3	2	6		
F-XI ①													1		2		
F-XII ①													1		1		
F-XII ②										1	1	2	7	1	13		
F-XIII ①~②												1			1		
F-XV ①												1	2		3		
F-XVII ①															1	269	305

Table 2b. Frequency of Shells and Shell Objects (Marine bivalves, fresh water shells and shell rings)

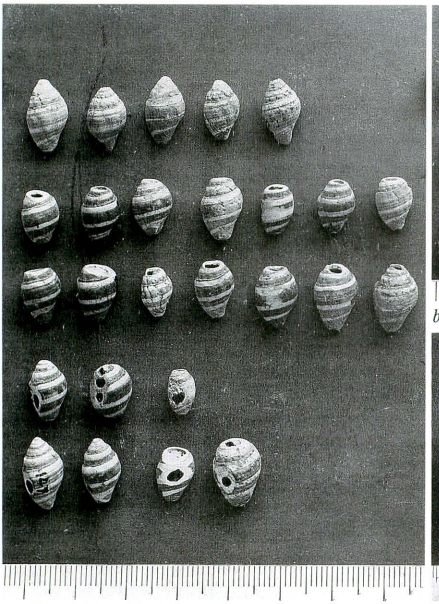
Groups	Marine bivalves							Fresh water gastropods			Fresh water bivalves			Shell rings <Marin gastropods> *Conus* sp./ *Ebraeusor taeniatus*/ *Strombus decorus*			Subtotals		
Families	Glycymeridiae			Cardidae	Veneridae			Thiaridae			Unionidae								
Species	*Glycymeris c/f lividus*			*Trachycardium*	*Pitar umbonella*	etc.		indeterminate from photo		etc.	*Unio c/f terminalis*		etc.						
*	1	3a	5	1	1	1	6	1	3a		1	3a		A	B	C			
Pit 1														8	2	5	15		
D3														1	3	1	5		
D3 in the pipe											2			1		2	5		
F2, Phase 2														1		3	5	37	37
F2 between Phase 1 and 2														3		4	7		
U.S.②～③																	1		
U.S.③			1			1		1			1			85	55	79	239		
U.S.④														67	51	9	157	397	
F.D.③		1		6	2						2			9	6	1	39		
F.D.③～④ west corner																	2		
F.D.④								1						25	27	11	68		
F.D.④ west corner														78	25	4	111		
F.D.⑤						1								250	22	37	353	573	
RW2④																	3		
RW, Ph. 3 wall of RW2														7	6	2	16		
RW below Phase 3							1	1	1					70	4	10	116		
RW level of Phase 2								1						218	53	41	320		
RW～F.D.⑤														40	4	4	54		
RW, Ph. 1														26	13	3	42	551	
RS③														19	42	5	70		
RS③～④														4	7	1	17		
RS④ above Phase 4																	4		

Table 2c. Frequency of Shells and Shell Objects (Marine bivalves, fresh water shells and shell rings)

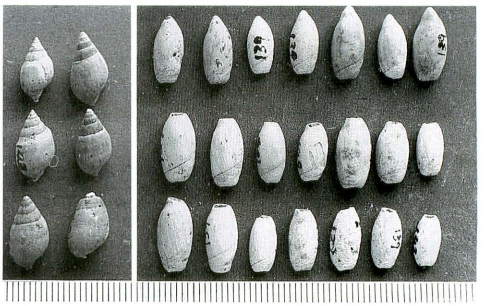
Groups	Marine bivalves								Fresh water gastropods			Fresh water bivalves			Shell rings <Marin gastropods>			Subtotals		
Families	Glycymerididae			Cardidae	Veneridae				Thiaridae			Unionidae			*Conus* sp. / *Ebraeusor taeniatus*/ *Strombus decorus*					
Species	*Glycymeris c/f lividus*			*Trachycardium*	*Pitar umbonella*	etc.			indeterminate from photo		etc.	*Unio c/f terminalis*		etc.						
*	1	3a	5	1	1	1	5		1	3a		1	3a		A	B	C			
RS below Phase 4		1													47	3	7	127		
RS, Ph. 3															190	115	3	308	526	
RM below Phase 3	1												1		24	1	7	40	40	
RN③																		3		
RN④															93	39	65	224		
RN, -1m															23	8	1	32		
RN, -1.3m															16	8	2	29		
RE~RN, -1.1m pass between RE and RN						1												3	291	
RE③							1									3		6		
RE④															3	3	1	14		
RE, -1.6m level of Phase 2										1					24	23	3	52		
RE below the level of Phase 2																		2		
RE, -1.8m lowest level															11	43	2	57	131	2509
Surface inc. dtc.																		8	8	8
	1	2	2	6	2	3	2		4	2	0	12	1	0	1431	754	324			
SubTotals			5	6	2		5			6	0		13	0			2509			
							18				6			13			2509	Total		2859

* 1 : unworked specimens 2 : with an apex hole 3a : with one side hole 5 : grind at the edge 6 : broken specimens
A : have a finger ring form B : shell rings with a narrow hole C: broken specimens for Type A

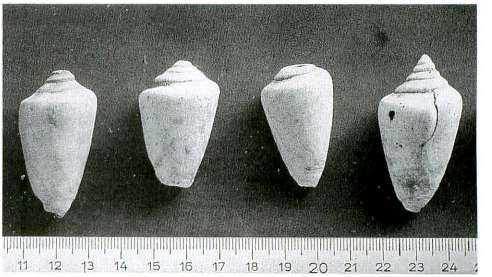
Pl. 1



a. Buccinidae, *Engina mendicaria.*

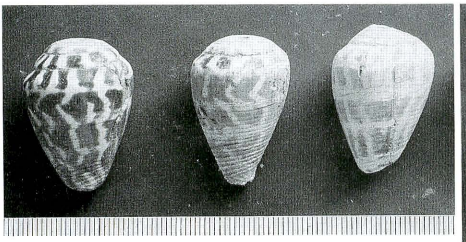


b. Family Columbellidae. *c.* Olividae, *Ancilla sp.*

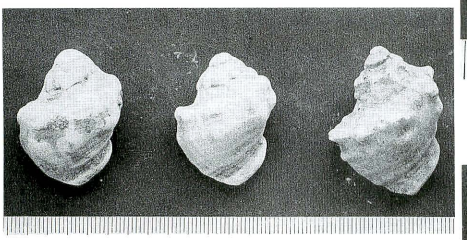


d. Strombidae. *Strombus decorus* or *decorus persicus.*

e. Nassariidae, *Nassarius pullus.*



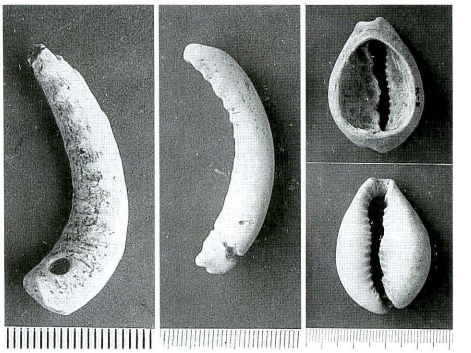
a. Conidae, *Conus ebraeus*.



b. Family Thaididae.

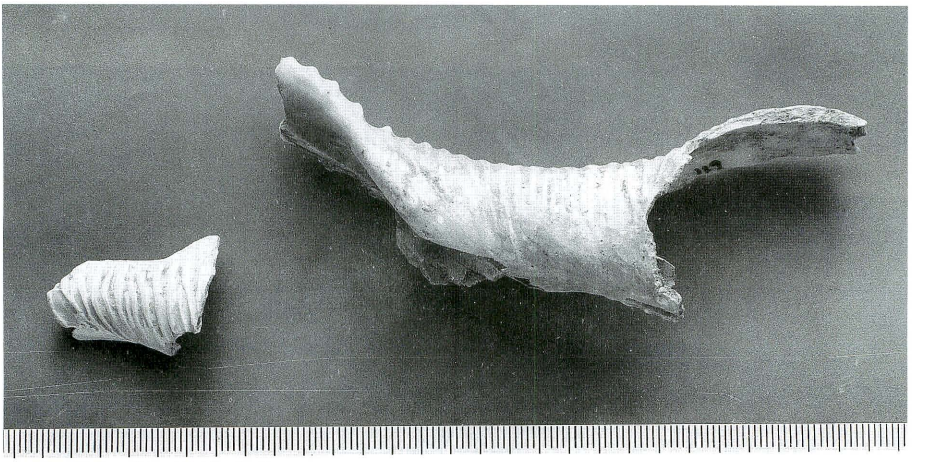
d. Family Cypraeidae, *Cypraea ?turdus* (except large one).

c. Muricidae, *Siratus kuesterianus* (left).
Olividae, *Oliva bulbosa* (right).

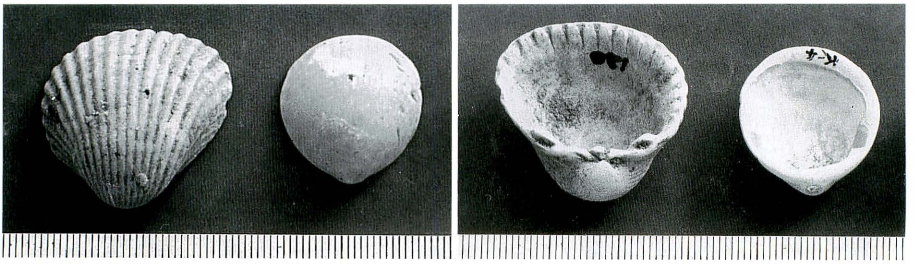


e and *f.* Fragments of Cypraea.

g. Cypraeidae, *Cypraea ?annulus*.



h. Cymatiidae, *Charonia ?trutonis*.



a and *a'*. Cardiidae, *?Trachycardium sp.* (left). Glycymeridae, *Glycymeris lividus* (right).

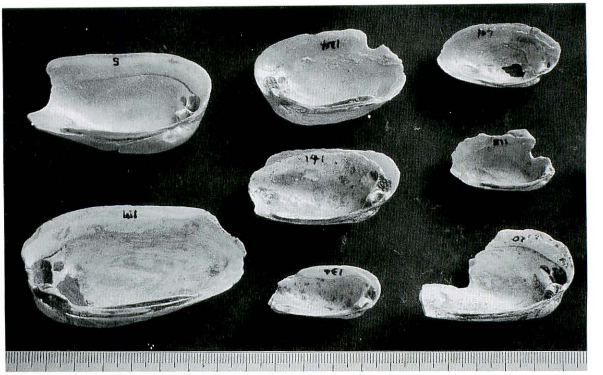
b. Cardidae, *?Trachycardium sp.* *c*. Marine bivalves.

d. Fragment of marine bivalve.

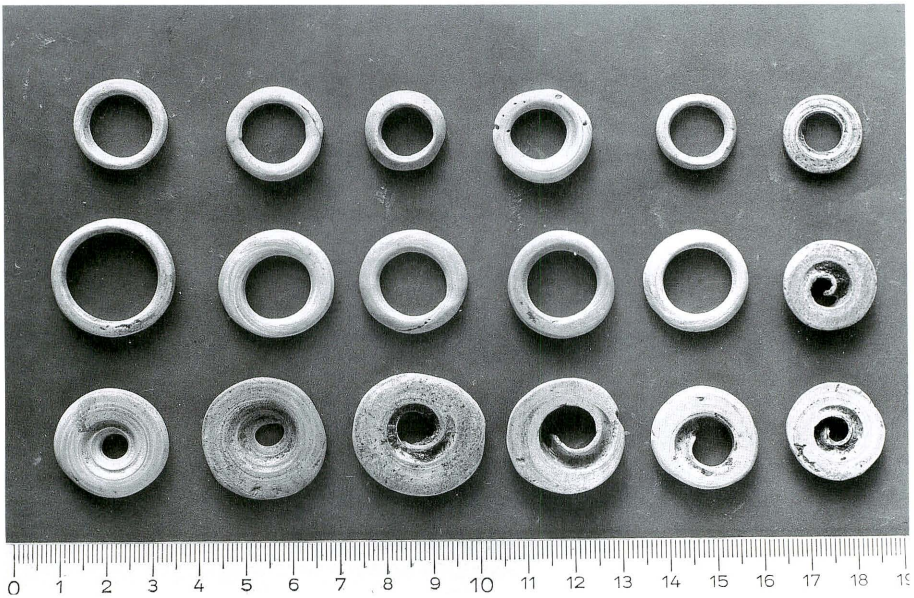
e. Fragment of marine bivalve.

f. Fresh water gastropods.

g. Fresh water bivalve.



h. Unionidae, *Unio c/f terminalis*.



a. Shell rings.

b. Shell rings.

AIN SHA'IA AND THE EARLY GULF CHURCHES: AN ARCHITECTURAL ANALOGY

Yasuyoshi OKADA*

＜要　旨＞

アイン・シャーイア遺跡で発掘された教会堂建築は，シリアや北メソポタミアで数多く知られる建築様式とは異なり，またイラク西南沙漠地域に点在する教会遺構と照らしても，その様式上の独自性を主張するのに十分な遺構だ。しかもイスラーム期アッバース朝統治の時代である。前稿において初期教会堂建築の新たな様式を想定すべきとした所以である。遠く湾岸に浮かぶハーグ島に類似の遺構が知られていたことも，論拠の一つとした。その後，ファイラカ島での教会建築の発掘が報じられていることを知った。その遺構は，アイン・シャーイアの教会堂と比べ見るとき，規模こそ異なるが，類似というより直写というに相応しい。本稿はこれら3か所の遺構を子細に比較し、当時東方キリスト教会建築が規格化された様式を保持していた可能性を論じる。そのことはイスラーム期になおバビロニアから湾岸にかけての広い地域で，教団が強い組織力を誇っていた証左ともなりうると考える。

Introduction

My recent paper dealt with early Mesopotamian churches, particularly in the Iraqi South-western Desert region, and the discussions led to a conclusion that they may demand a new category of architecture, neither Sasanian nor Islamic, which is represented by the constructions of the church buildings at Qusair near Thithatha and at Ain Sha'ia near Najaf〔Okada 1991〕. Attention was paid, at the same time, to the church in the monastery at the Kharg Island, since it should be considered in the same context[1]. It is then a series of reports on the recent discovery of a church building by the French mission at al-Qusur in the Failaka Island that motivated me to write the present paper[2]. Some authors of the al-Qusur reports refer to Ain Sha'ia only in connection with pottery finds in part〔Bernard and Salles 1991: 16; Kennet 1991: 102〕; as for an architectural comparison, only the church at Kharg was reviewed〔Bernard et al. 1991: 163–7〕[3]. It is also noteworthy, however, that the plan of the church discovered at al-Qusur is, though its mass is fairly larger, so much analogous to that at Ain Sha'ia that one of the two might be reproduced by consulting the other. Apart from architecture there is another comparable viewpoint between the three: the similarity of stucco or plaster works bearing Christian cross motifs, of which the discussion will be revealed at the next opportunity.

Ghirshman's report on the monastery at Kharg is found to be lack of descriptions not only of archaeological finds such as pottery but of measurements of the architectural remains and stucco works[4]. The reports on al-Qusur are, on the other hand, as the excavators acknowledge themselves, not more than preliminary〔Bernard et al. 1991: 145–6〕. A comparison of these sites in architecture may, therefore, be tentative. It will be proved, however, with a comprehensive certainty that some ecclesiastical communities would have a certain standardized form of church in common and that Nestorian or Syriac-Christian activities[5] would have still retained a close connection between the Mesopotamian inland and the Gulf

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islands in the late Pre-Islamic through early Islamic times.

The present brief study aims chiefly at an architectural comparison between the three churches, and the comparison will be made on common factors which all the churches contain. To prevent repetition, therefore, total descriptions of each will not appear in the following paragraphs[6].

Geographical and historical setting

The Island of Kharg itself is made of coral and is about six miles long by two and a half to three miles wide. The site of the Christian monastery is located in the western part of the island, where "the naked rock, barren and forbidden, rises to a plateau." On the other hand, the eastern region is said to have been inhabited by the laity during the Sasanian era, where Ghirshman found a small village still surviving and an abandoned fortress built by Dutch in the eighteenth century as well as extensive burial grounds towards the mountain range. Apart from these, on a flat-topped rock at the side of the range were discovered remains of a temple of Poseidon, possibly abandoned by the fourth century A.D., and a ruined Zoroastrian Fire Temple thereon. There was once a holy water nearby according to Ghirshman. Around these ancient shrines remain numerous rock-cut caves. Only two are large catacombs, one of which shows a relief of the Palmyran style, assigned to the third century [Herzfeld 1934: 103–4]. The rest have been regarded as Christian tombs, mostly bearing a carved cross of the special form, said by Ghirshman, employed by the Nestorian Christians, but we can find there, as far as the report documents describe, no evidence of human burials and no clue to their acceptable date, which neither Ghirshman nor Herzfeld assumed. The fact that somewhere was a Palmyran colony of such a date is plausible, but it seems unlikely that its population are Christians, not only because there exists a remarkable difference between the two types of caves but because the use of the so-called Nestorian cross by Palmyrans in such early times is almost unbelievable. If Zoroastrianism would have intervened between the two populations, it seems likely that the said Christian caves, probably some centuries later than Palmyran tombs, may not have been provided solely for interment. In any case we must know that the historical circumstances of the early Christian institutions here extend widely over the island.

Meanwhile, the Island of Failaka lies off the coast of Kuwait and is fairly flat all over. Its Hellenistic sites, recently watched in connection with a classical designation "Ikaros"[7], gather mainly towards the western sea shore, whereas the site of Al-Qusur, where the French mission discovered remains of a church, occupies the centre of the island. The site was once sketched by the Italian mission, covering an area of 1.8 by 0.8 km. No one refers to the precise location of the church itself; the excavators only suggest in *AAE* that west to the church is "maison 56". The maison can be identified in the sketch plan of the site cited by the excavator [Kennet 1991: fig. 2]. Judging from both the descriptions, the church stood in "a small but densely built up centre measuring about 300 by 300 m" [Kennet 1991: 98] of the site after all. To compare to the Kharg Island, archaeological remains relevant to Christians seems to be confined to this site.

In both the islands of Kharg and Failaka, Christian building complexes seem to have taken the trouble to occupy somewhat isolated spots of land, fairly distant from some preceding settlements or religious monuments elsewhere in the Hellenistic age and by no means convenient for daily life. The circumstances of the site of Ain Sha'ia, situated on the foot of the continuous cliff in the arid region, are similar enough.

Architectural comparison

Each of the churches at Ain Sha'ia and at Kharg is enclosed by the outer wall with a row of cells along

it. At Kharg Ghirshman disclosed somewhat complicated dependencies, such as a library and Capitulary chamber, much more thoroughly than at Ain Sha'ia. In the case of al-Qusur, there is no structural evidence of an enclosure wall, as was both at Ain Sha'ia and Kharg, though the site name, Qusur, would remind us of a fairly large fortified structure. The area excavated so far is too small to assert that there was not an enclosure. If the church stood alone, the aspect of al-Qusur would not have been a monastic settlement like Ain Sha'ia, but a commonplace village inhabited mainly by the laity.

At present, therefore, we are not able to make an architectural comparison between the three together with dependent facilities, and the following discussions deal with comparable factors mostly of the church proper.

Geometry of rectangles

The three churches are different in the mass; the church at Ain Sha'ia is the smallest and al-Qusur's the largest. The wall thickness of the skeletal masonry also varies, but corresponds to the whole mass respectively. Nevertheless, schematically to say, every church has a tripartite sanctuary with a rectangular recess or niche, at least in the deepest wall of the choir, or middle chamber; the nave is triple-aisled with partitions or pier walls dividing it, the central aisle being communicated to side ones by three doorways arranged symmetrically on either side. The churches are provided each with a room annexed in the front. The very rooms in the two, Kharg and al-Qusur, may safely be regarded as a narthex, whereas the one at Ain Sha'ia may not. In this case is found no front entrance from the outside, and either of the narrower side walls was left unexcavated.

Thus the most reliable and possible way of objective comparison between the three churches will be found in the church plan, because every one of the three consists of common rectangles in plan. The first

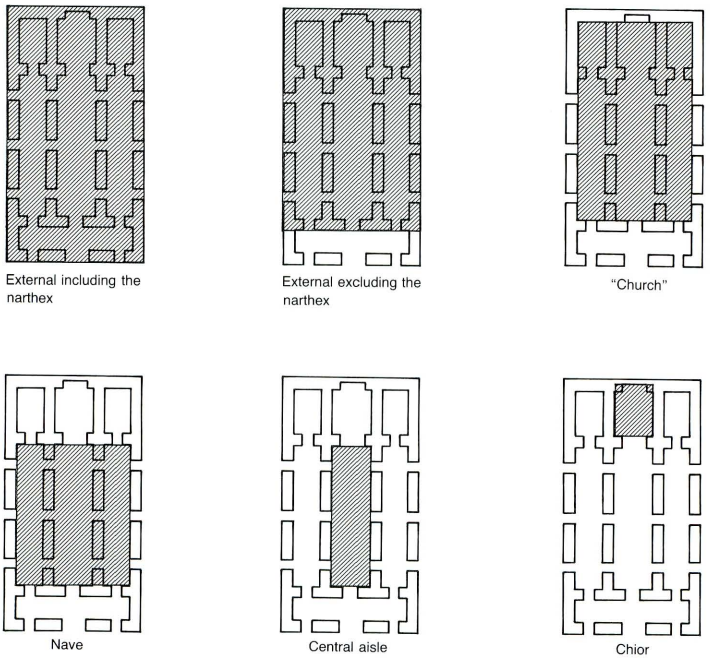

Fig. 1 Rectangles of the church

Table 1 Rectangles of three churches

Rectangles \ Sites		Ain Sha'ia		Al-Qusur		Kharg	
		values	index	values	index	values	index
External including the narthex	L(m)	26.5	1	35.1	1.32	28.7	1.08
	W(m)	13.8	1	19.1	1.38	15.5	1.12
	L/W	1.92 (19:10)		1.84 (9:5)		1.85 (9:5)	
External excluding the narthex	L(m)	22.4	1	31.0	1.38	25.0	1.12
	W(m)	13.8	1	19.1	1.38	15.5	1.12
	L/W	1.62 (8:5)		1.62 (8:5)		1.61 (8:5)	
"Church"	L(m)	20.1	1	28.6	1.42	23.5	1.17
	W(m)	11.5	1	15.8	1.37	13.0	1.13
	L/W	1.75 (7:4)		1.81 (9:5)		1.81 (9:5)	
Nave	L(m)	14.5	1	19.0	1.31	15.5	1.07
	W(m)	11.5	1	15.9	1.38	13.0	1.13
	L/W	1.26 (5:4)		1.19 (6:5)		1.19 (6:5)	
Central aisle	L(m)	14.5	1	19.0	1.31	15.5	1.07
	W(m)	3.9	1	5.6	1.44	5.4	1.38
	L/W	3.72 (19:5)		3.39 (17:5)		2.87 (14:5)	
Choir	L(m)	5.6	1	7.5	1.34	7.2	1.29
	W(m)	3.9	1	5.6	1.44	5.4	1.38
	L/W	1.44 (7:5)		1.34 (4:3)		1.33 (4:3)	

is the external rectangle, but two cases must be considered; one including the narthex, the other excluding it; the second rectangle is the internal church including sanctuary chambers and three aisles, obtained from interior measurements, which I designate "church" after Wilkinson[8]; the nave of three aisles is the third; the fourth one is the central aisle and the choir is the last.

What we may expect from these measurable factors is a geometrical analogy. To see whether or not a certain planning system is applied to the three churches in common, important is the proportion of the rectangle, that is L/W, as well. Also meaningful is the ratio of measuring values of the identical rectangles. Here we show the index number of each measurement based on the assumption of that at Ain Sha'ia to 1. Then all of necessary values are listed in the table above. The values of the church at Ain Sha'ia are taken from our investigations. Those at Kharg are from the plan inserted in the report document [Ghirshman 1960: Plate 12], because they are not specified in the text at all. The figures themselves may, therefore, be inaccurate, but the proportions can be thought enough reliable. Those at al-Qusur are not taken from the descriptions written by the excavators both in *AAE* and *PSAS*, but directly from the drawing associated in *PSAS*, since some of values are discrepant between the two reports and since the proportions are considered here to be more substantial than actual sizes.

From these results two significant aspects come to light. One is the fact that all the churches have a similar proportion in each rectangle, particularly that of the external rectangle without a narthex being strictly the same. The value is 8:5; most interestingly this is almost the same as that known as the golden proportion, though there is no clue to whether the builders were aware of it or not. Further to say, between Al-Qusur and Kharg are detected the same values in most of the other proportions, which are of the larger external, "church", nave and of the choir. Though these rectangles at Ain Sha'ia have indeed different proportions, the differences do not seem so great respectively as they have something significant. The other aspect lies in the index number, of which the values seem uneven each in the same church at a glance, but in case with al-Qusur the index numbers fluctuate only between 1.31 and 1.44, the intermediate

value being about 1.38. On the other hand, the basic thickness of skeletal walls at Ain Sha'ia is 1.10 to 1.15 m, and that at al-Qusur 1.6 m. The ratio of the latter to the former is nearly 1.40. Such a close proximity strongly suggests that not only the outline of the church but its internal rectangles may perhaps be planned in proportion to the wall thickness. Even in case with Kharg, the indexes deserve more or less 1.10 except those of the choir and the central aisle, though unfortunately the wall thickness has not been reported.

Miscellaneous factors

Orientation of the sanctuary: At Ain Sha'ia the orientation of the sanctuary is deflected as much as sixty degrees to the north; that at al-Qusur some fifteen degrees and at Kharg intermediately some thirty degrees. Thus, of the three churches, the sanctuary is never oriented due east. Such a greater deflection must be a peculiar phenomenon to compare to Syrian churches. However any deflection was unavoidable, it varies there within twelve degrees as far as Butler's survey once resulted [Butler 1929: 182].

Masonry: All the skeletal walls at Ain Sha'ia are made of mudbricks and coated with gypsum plaster. The thickness, 1.10 to 1.15 m, is fulfilled with three bricks. Bricks used for the foundation, a little wider than a wall thereon, are relatively stiff and have a format of $0.37\times0.37\times0.10$ m. The al-Qusur church seems again to be mainly of a mudbrick construction, partly of *pisé*. The foundation of seven course mudbricks was explored, though only in part, the visible length of the brick being 0.45 m and the height 0.10 m. In contrast to them, the church at Kharg is "made with stones which, for the most part, had been dressed on one or more of their faces." This recalls the construction of Church A at Qusair on account of the identical masonry [Finster and Schmidt 1976: 27–39]. These two are assumed to have a domed roof over the choir again in common.

Access: The church at Ain Sha'ia is thought to be given a main access from the paved-courtyard in the south-east. The north-western side is directly connected with dependencies and the narthex-like corridor without any suitable entrance prevents an access from outside to the south-western front. At Kharg the church proper projects into a large courtyard bounded by the enclosing outer wall. It seems to be accessible equally from three sides, as far as the published plan shows. The narthex has a fairly wide opening in the centre of the front, while the side aisles have three openings respectively. Seemingly this was the case also with the church at al-Qusur, where, though the excavations were not completed all over, it faces the courtyard at least on the north and west. The northern aisle as well as the narthex has three doorways, of which the central one is the widest. It is most worthy to note here that in all the three cases each of the four parallel walls composing three aisles has three doorways in the same way, by which four doorways across the three aisles are laid in a line. This could be nothing more than the result of pursuiting the symmetry in plan as a suitable style for a certain liturgical manner.

Built-in tomb: At Ain Sha'ia in the northern pier between the central and eastern aisles was found a built-in chest of 2.4×0.9 m, being walled up with mudbricks and plaster at last. The excavation brought from it no significant objects. With the most probability I assumed that it had once been made for a human grave and then removed and hidden [Okada 1989: 38–9 and Fig. 7]. Again at al-Qusur was uncovered in the pier wall a similar fixture, called a recess by the excavators, measuring 1.8 m in the length and more or less 0.5 m in the width insofar as on the drawing in the report. It is said to have contained scanty remains of a human grave with shells probably as funeral offerings. Noteworthy is not only the analogy of the fixture itself but also the fact that the findspot is quite identical to that at Ain Sha'ia.

In the meantime, at Kharg, "from the side aisle on the north of the nave, excavation revealed a tomb sealed with plaster and rising to a height of four inches above the level of the floor. This grave contained the bones of four adult persons, which had been thrown in pell-mell; they could be the remains of persons

formally interred in this spot. They were clearly bones brought here from some other place; perhaps those of Christian martyrs transferred from the mainland in order to be deposited in the church (possibly – to hazard a guess – on the occasion of its consecration)," Ghirshman said. His daring assumption in parentheses is quite meaningful. It seems most likely that this was the case with both Ain Sha'ia and al-Qusur.

Conclusion

There would be necessary comparisons other than the above. For example, as for the church architecture, possible roofings of the naves and choirs are problematic as well as the disorder to symmetry of the side chapels. As for the outside of the church, both at Ain Sha'ia and Kharg there seems to be a living quarter for clergymen, perhaps with their family, fairly distant from the church, and a kind of qanat system was utilized. A comparison between the so-called Christian tombs at Kharg and the Dukakin caves beside Ain Sha'ia is interesting, too. At present moment, however, incompleteness of the excavations and their documented information prevent them. Moreover stucco works brought from all the three sites, as I mentioned at the beginning, demand the deliberate study to us as well as the other archaeological finds such as pottery.

Nevertheless, this brief study leads to, as a conclusion, a common architectural concept throughout the three churches; there could be a schematic format, whatever the masonry would be, based on the symmetry and the proportional, and the way of consecration of the building might be allowed to add. This strongly suggests the chronological contemporaneousness[9] and, at the same time, the existence of a close communal tie of Syriac-Christian people in those days over the extended area from Babylonia through the Gulf.

Acknowledgement

I express my best thanks to two British scholars, Dr. Warwick Ball and Dr. St John Simpson, without whose sincere help the present article would never been completed. Such a work is, of course, initially based on the field activities conducted by the Kokushikan mission to Iraq, headed by Professor Fujii, and supported by the Iraqi staff of the Department of Antiquities; to all the participants of the mission I am much obliged. In Japan I am very grateful to Dr. Tomio Takase for his linguistic help without stint, and also to Mr. Kazushi Hamazaki for his help of searching a library at the Kyoto University.

Notes

1) The principal report "The Island of Kharg" written by Ghirshman did not reach me until I managed to complete that brief article. Soon after a copy of the report came to hand by courtesy of Dr. Warwick Ball.
2) Again I owe it to a British scholar, Dr. St John Simpson, that I have obtained principal informations about the al-Qusur excavations, which compose a very important part of the present work.
3) The campaign of excavations at Ain Sha'ia was for the time being finished in early 1989 with major part left unexcavated, whereas the al-Qusur excavations were carried out in 1988 as test soundings and in 1989 as the first main campaign. A subsequent campaign of the latter, once planned, seems to have unexpectedly been interrupted by the Gulf Crisis in 1990, though I do not know whether it has been done or not.
4) According to Bernard et al. the final report on the monastery at Kharg is under preparation [Bernard et al. 1991: 168].
5) I prefer to avoid the term "Nestorian" because of its ambiguity, as the excavators of al-Qusur pointed out [Bernard et al. 1991: 162–3], though Christology is of course not in my field. From a historical point of view A. Harrak stressed inappropriateness of that term [Harrak 1989: 14]. Archaeology can hardly distinguish which sect or school of christianity ruined edifices once belonged to, but apparently evidenced at Ain Sha'ia is that Syriac was used as a liturgical language. See E. Hunter 1989.
6) Unless a proviso is marked by brackets in the discussions below, the descriptions of the three sites here come from the

followings: Fujii et al. 1989 and Okada 1991 for Ain Sha'ia; Ghirshman 1960 for the Kharg Island; as for Al-Qusur, Failaka, Bernard & Salles 1991, often abbreviated here to *AAE*, and Bernard, Callot & Salles 1991, again abbreviated to *PSAS*.

7) For recent studies on Hellenistic Failaka, see Potts 1990: 154–96.

8) Wilkinson has once tried to review Butler's renowned work of Syrian churches, his methodology being based on the "three basic rectangles": external, "church" and nave [Wilkinson 1984].

9) So far, Ain Sha'ia is assigned to the late 8th century, as the foundation date, up to the 9th; al-Qusur to the middle of the 7th century as the beginning judging from pottery finds [Bernard and Salles 1991: 11–2]; the Kharg church to the 5th or 6th century only account of the designs of stucco works [Ghirshman 1960: 14], but as the excavators of al-Qusur have already pointed out, Ghirshman's date seems to be too early [Bernard et al. 1991: 168]. In any case, no site of them is thought to be never dated back to Sasanian times.

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CULTURAL CONTACTS BETWEEN THE EAST MEDITERRANEAN COASTAL AREA AND MESOPOTAMIA IN A.D. 1ST–3RD CENTURIES
—The Marked Characteristics of the Textiles Unearthed from at-Tar Caves, Iraq—

Hideo FUJII* and Kazuko SAKAMOTO**

This is the full text of the report lectured at the First International Conference on the Conservation and Enhancement of Archaeological Heritage of the Arabian Peninsula which was held under the auspices of IsMEO in Rome on May 27–31, 1991. It is to be published here by the courteous permission of *the Hellenistic Centers around Arabia: Arabia Antiqua.* And its summary in Arabic was presented to *Arabia Antiqua.* Moreover, here are some additional views given on the recent research study of the material uncovered at other sites.

Preface

At-Tar Site, groups of caves, which was discovered by Hideo Fujii in September, 1969, is located along the precipice line some 35 km to the southwest of Kerbala in the Republic of Iraq. And at the request of the Iraqi Government, the Expedition began the excavation of Hill-A in March, 1971. Later in the period from that time up to the sixth survey of 1984, we carried out the excavations of all the Caves of Hill-A, and Cave C-12 (Corridor), Cave C-17, Cave C-16 and Cave C-12 (Inner Room) of Hill-C.

In the first place, the textiles found in each cave were in the situation that rugs (pile textiles and rush mats) have been laid under the dead body [Fujii and Others, 1991: p. 157], and the dead had been covered with or wrapped up in the fabric which he or she seems to have been wearing while alive. What deserves attention is that most of the caves contain the pile textiles with some combinations of different pile yarn knotting types each.

In particular, A-2 type pile yarn knotting method is so unusual that we have never seen it in the reports on pile yarn knotting methods made public so far. It is especially worthy of notice that A-2 type is peculiar to at-Tar Caves as far as we are concerned (Fig. 1) [Fujii and Sakamoto, 1990: pp. 49–51].

What matters is the problem that over 4,000 fragmentary textiles have been uncovered together with lots of date-palm seeds, leather goods, bivalves which are native to the East Mediterranean coastal area, or the Arabian Gulf coastal area, a number of Roman glass bowls, Roman glass beads, iron arrowheads, date-palm baskets, woodenware, pottery and potsherds. Most of these fragmentary textiles have been discovered accompanied with human remains. So, they are regarded as the ones which were associated with burials.

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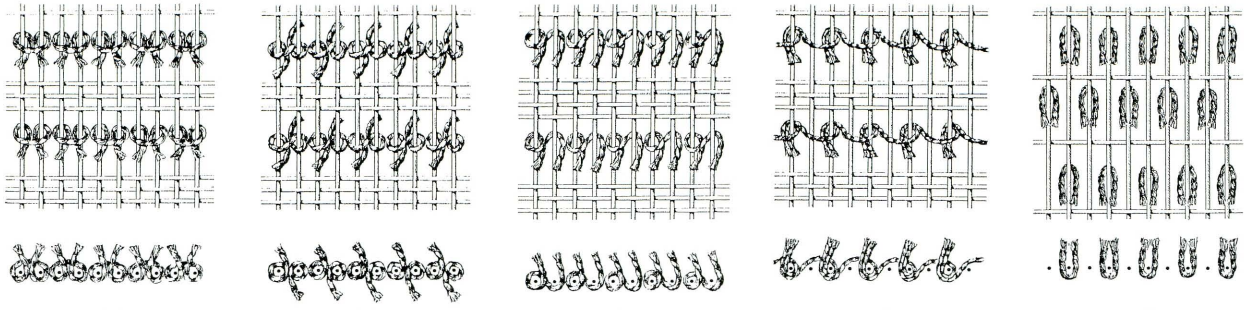

a) The diagram of Type A-2 knotting in the present report shows that Type A-2 knotting here duly agrees with all the Type A-2 knotting specimens coming from the at-Tar Cave in knotting direction. The diagram of double face of Type B-2 is also the same as above.

b) The twist directions of pile threads from the at-Tar Caves do not always agree with the direction schemes shown in the diagram.

c) Type C is not knotted in the actual state, but we give it the term 'knot'.

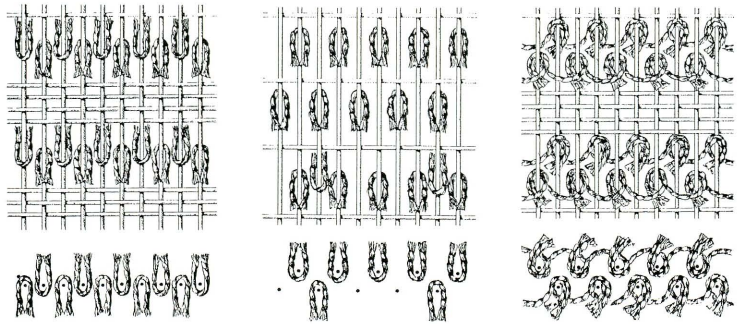

Fig. 1 Pile-knotting Types

Marked features of the uncovered textiles

(1) Material

Of all the uncovered specimens, the ratio of wool is about 90 percent, followed by cotton and linen products, respectively. No silk textiles have been evidenced. The fabrics are mostly of sheep-wool. Some rough ones are the produce from goat-hair.

And grandrelle thread is often used for the warps of pile textiles and rush mats. Grandrelle thread is made by plying sheep yarn and camel yarn or sheep yarn and cashmere yarn or sheep yarn and alpaca yarn together, or by plying the bright color sheep yarn and dark color sheep yarn together [Fibers & Textiles Laboratoris, Toray Industries, Inc., 1990: pp. 70–71; Fujii and Others, 1991: p. 164].

As for the sheep fiber, crimps are more remarkably visible, thereby making it more elastic and larger in milling because of its more crenated scale shape in longitudinal view, where change in size is more apt to occur, accordingly. As for the other beast fiber, on the other hand, crimps are less remarkably visible, thereby making it less elastic and smaller in milling because of its more flattened scale shape, where change in size hardly occurs, accordingly.

The predominant use of the grandrelle thread evidenced in the warp threads of pile textiles and rush mats may have been firstly because of the necessity required for warp toughness.

At the same time, with a view to realizing their combined effects onto a single plied yarn, the ancients probably intended to make better use of such excellent properties as the toughness and less milling of camel, cashmere and alpaca fibers in order to make up for the milling caused by sheep's scales [Fujii and Sakamoto, 1990: p. 48].

(2) Design composition

There are several features in the composition of the pattern bands. In particular, the horizontal stripe composition that the wave pattern bands and the shaded color bands are symmetrically arranged above and below with the central plant bands such as flower and/or tree patterns inserted in-between, and the monochrome stripes woven further outside of them is also common to that of the textiles uncovered at Palmyra and Dura-Europos. In reference to the plant patterns, there are grapevine scroll pattern (Reference: NIHRA: Second son of SANATRUQ I, Hatra, wearing the tunic with grapevine scroll pattern, Iraq Museum, IM 73001), sacred tree pattern and several kinds of flower patterns identified. The shaded color band is observed to gradually change its tint from light to dark, starting beside the central pattern bands [Fujii, Sakamoto and Ichihashi, 1989: pp. 122–125, 127, 128].

We have found some fragments with combinations of the wave patterns and shaded color bands, and a piece of extremely thin, large cloth where several kinds of patterns are widely woven in the warp direction along the selvages of checkered pattern ground. Moreover, there are some pieces of large, thin cloth with H-shape patterns, (Reference: The priest wearing the mantle with H-shape pattern, Hatra, No. Six Shrine, Iraq Museum, IM58085), and a piece of large, thin cloth with gamma patterns. The former ones have a set of three square patterns along the selvage each arranged near the four corners [Fujii, Sakamoto and Ichihashi, 1989: pp. 130–133]. They are observed to have been dyed by using tyrian purple and a compound of kermes or madder and indigo.

There are two kinds of wappen-like patterns where human figures have been symbolized in very unique way. The first one is a portrait which is surrounded with double rectangle frames, inner one of which is woven with red color thread. And inside the inner frame, we see an upper-half of a female with a scroll-like crown on her head, wearing a hair ornament of grape leaves and red bunches, and facing slightly

rightward with her eyes extremely toward the right. This lady seems to represent the image of Dionysos. Between the inner frame and the outer frame, there are parapet motif lines running above and below, and indented geometric designs seen on both right and left sides. The vertical direction of the portrait well agrees with the warp threads in direction. In addition, it is clearly known that there are three more fragments of female portraits wearing hair ornaments with border decorations, which are similar to the above [Fujii, ed., 1976: pp. 124–125, Pls. Textile Nos. 84, 86, 87, 88; Fujii, ed., 1980: pp. 108–114, 128–135; Fujii and Sakamoto 1987: pp. 221–222]. The second are two portraits upper bodies with wave pattern borders, facing left with their eyes directed further left; one of whom wears a golden crown and the other, a decorative cap on their heads, respectively. Both of them are seen hanging so big earrrings as doves' eggs from their ears [Fujii and Sakamoto, 1987: p. 223]. We see warp threads pass in the horizontal direction of the very portraits. Also, it has been confirmed that there is another similar female wearing a decorative cap without earrings [Fujii, ed., 1976: p. 125, Pl. Textile No. 85; Fujii, ed., 1980: pp. 136–137]. Moreover, there are three more such fragments, which have not been cleared yet. The similarity among them is that Hellenistic human figures have been woven by using the non-horizontal weft, tapestry weave technique [Fujii, ed., 1980: pp. 109–114].

In the pile textiles uncovered at at-Tar Caves, there are several types of designs such as stripe, square, chequered, staircase, and the combination of wave and geometric patterns. The chequered pattern is composed of alternate shifting of comb patterns (picket-fence patterns) one by one into two rows up and down in the weft direction. The stripe and checkered patterns are depicted along the unpiled weave start and weave finish of the pile textiles for the use of floor-rug as border decoration. All the border decorations of the at-Tar pile textiles are seen only at the starting and finishing portions, except for the double face pile textile (Type C) from Cave F-6, Hill A (C-04-3), where square patterns of different colors are designed along the selvage [Fujii, ed., 1976: p. 182, Textile No. 132; Fujii ed., 1980: p. 65] (Fig. 1). Among the specimens from Dura-Europos, there are some ones which seem to be of unpiled border decoration (Nos. 231, 225) [Pfister and Bellinger, 1945: pp. 47–49, Pls. IV, XXII].

A well-preserved rug has the four corners and border decorations at the weave start and weave finish. The corners of the field are delimited by a staircase design to form triangles. This is an intermediate stage of carpet design in the development from the simple border at both ends of the weave start and weave finish to the more complicated design including a field, field corners and a surrounding border.

It is considered that most of pile textiles were used for floor rug, and a few for clothing and saddle cloth [Fujii and Sakamoto, 1990: pp. 45–65, Pls. 1–3].

(3) Weave features

Given below are the weave features to be especially worthy of notice among the uncovered specimens [Fujii, Sakamoto and Ichihashi, 1989: pp. 113–116]:

a. Patterns are frequently woven by using tapestry weave technique which is classified into non-horizontal weft technique, slit type and dovetailed type. The dovetailed type is also observed in the making of decorative selvages.
b. Large, thin fabrics with H-shape patterns and other large, thin fabrics have the method of altering weave and crossing warps before the shifting zone from the ground to the pattern portion. For instance, this is ground (warp 1) → pattern (warp 2). It is just the reverse after the shifting zone from the pattern portion to the ground (Fig. 3).
c. One of the weave-start techniques is a cord-like making method, where weft threads pass through looped warp threads by weft-crossing.
d. There are three warp-finish methods: 1) fringe, 2) hemstitch, 3) warp cord finish. In the method

3), two pairs of a few warp threads each are first twisted in the same direction, and then the resultant pair is plied in the opposite direction, while adding the next two or three warps at one time respectively to be finally plied into a cord-like finish.

e. There are four kinds of selvage-making methoods: Firstly, a simple return work of the thread; the second two are the ones for selvage reinforcement by using additional thread in one case and by repeating use of the weft threads in the other case; the fourth is a decorative use in addition to selvage reinforcement.

Weave alteration and warp crossing

Weave alteration means that in process of weaving on the loom, the weave system is turned from plain weave into its variation (warp 2, weft 1), from variation of plain weave (warp 1, weft 2) into its variation (warp 2, weft 1), or from twill into variation of plain weave (warp 1 or 2, weft 1), and vice versa, for some purpose. We often see warp threads cross on the alteration line of the weave system, which is termed 'warp crossing'. This is frequently observed in altering the ground and pattern structures, which occurs in association with the warp moving order.

At-Tar has such types of weave alterations as Type A, Type B, Type C and Type D (Fig. 2). And among them, warp crossing is used in Type A, Type B and Type C.

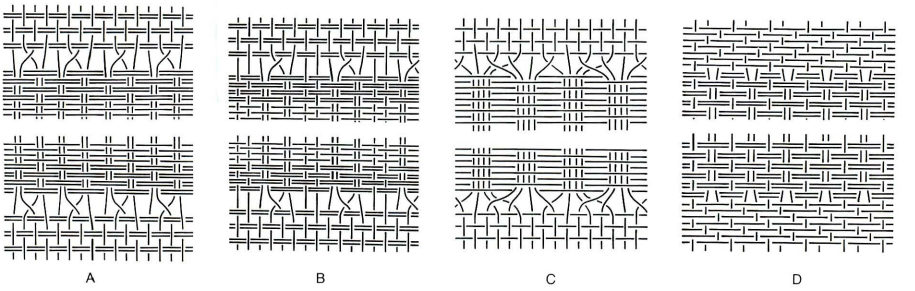

Fig. 2 Weave Alteration

At-Tar textiles vary in weave technique according to their uses (tunic, mantle, veil or scarf) at the time when their production program has been drawn up. For example, some fabrics require a smooth, soft feel, and others, a slightly hard feel. The mantle and the scarf must be excellent in soft, draping quality. In this case, it is essential that the pattern and ground textures are well balanced there.

Large, thin fabrics with H-shape patterns and other large, thin fabrics have the method of crossing warps before the shifting zone from the ground to the pattern portion (Fig. 3). For instance, this is ground (warp 1) → warp crossing → shifting zone (warp 2) → pattern (warp 2) → shifting zone (warp 2) → warp crossing → ground (warp 1). The pattern must be densely woven into weft-faced one in order to make pattern clear. By doing so, however, hardening would occur on the pattern part.

Passing of many weft threads into warp threads on the plain weave where a single warp alternately moves will surely make the pattern portion thicker and harder in touch. This is caused by the increase of intercrossing and interlacing points.

Therefore, the adoption of two or more warps instead of a single warp, as is often observed in pattern portion, will lessen the above problem, resulting in keeping balance between ground and pattern in texture

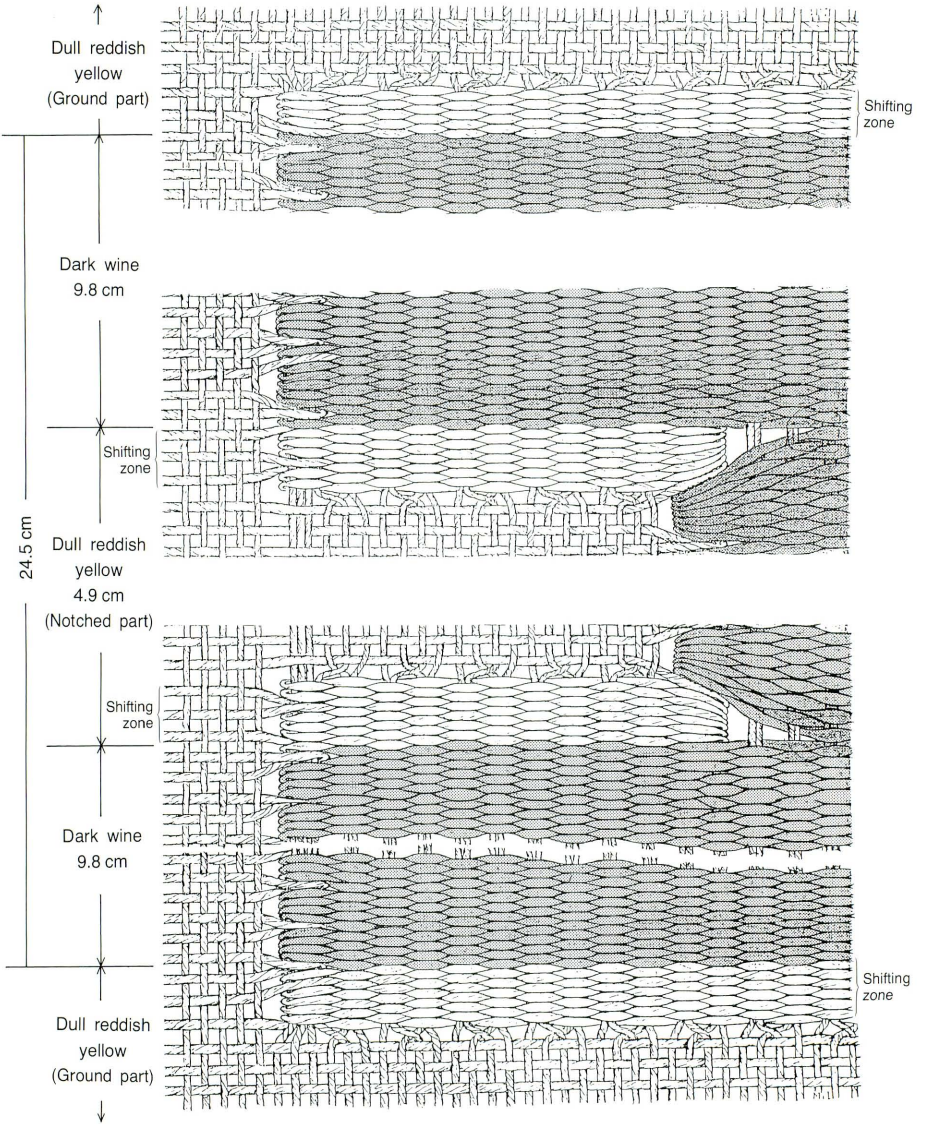

Fig. 3 Structure of H-shape pattern, Specimens Cave F4-C-31, 31′

and giving the cloth a soft feel. It seems that this is one of the reasons why the ancients altered their weave procedures.

At-Tar is abundant in specimens which use warp crossing in weave alteration. That may be due to the following reason, besides the moving order of warp (one over and one under the weft in plain weaving), where heddles work:

When the cloth is woven starting from the gauze-like ground portion of less weft density with the use of thin warp and weft threads successively into the pattern portion of thick weft density, the weft threads directly worked into the beginning of the pattern portion will come to be very unstable, and finally get out of shape.

To avoid its occurrence, it is necessary to take the following measures before getting into the first row of the pattern portion:

1) Warp crossing is first done before the shifting zone (Fig. 3) from the ground to the pattern portion.
2) And then, on the very zone, some rows of densely-woven ground weft threads follow next.

The warp crossing will prevent the weft straight line for the pattern contour from waving too large. But for the very zone, a minor zigzag line would still occur, affected by the warp crossing. Thus, the use of the same colored weft threads on the zone as those in the ground will result in this kind of zigzag line nearly vanishing from sight.

It is thought that the above measures will effectively prevent the pattern portion from running loose, thus finally leading to a neat external appearance to be given on the alignment of the pattern-making. This is the technique to be required when the difference between the weft density of the ground and that of the pattern is large [Fujii, Sakamoto and Ichihashi, 1989: pp. 140–146, Pls. 31, 32-c].

We find it extremely important to trace such warp crossing technique from among the data uncovered at the neighboring sites of at-Tar Caves when thinking over the matter of 'cultural diffusion' and 'racial exchange'. Researches made so far by us have shown that the warp crossing of No. 14 (1933·503) from Dura-Europos [Pfister and Bellinger, 1945: p. 19, Pl. IX] and No. 145 (Q594/Q2288A) from Nubia Grave Site [Thurman and Williams, 1979: p. 126] technically corresponds to that of Textile 14, Textile 16 from Cave 12, Hill C, at-Tar and F4-C-31, 31′ from Cave 4, Hill A, at-Tar. In addition, the warp crossing technique can also be seen among some wool textiles of the Coptic textile collection preserved in the Field Museum, Chicago, though it is still uncertain as to their uncovered place and age.

Among the specimens coming from Tomb No. 64 which were exhibited in the Palmyra Museum in April, 1992, there is a wool textile with its pattern depicted with tapestry weave technique on it, which has been accompanied with a drawing to explain warp crossing technique used there. The drawing tells us that warp crossing makes its weave altered from plain weave (warp 1, weft 1) to variation of plain weave (warp 2, weft 1) slightly before the shifting point from ground to pattern [Schmidt-Colinet, 1992: Abb. 1][1].

As for the warp crossing done in the above specimen, however, we see all the adjacent warps crossed into paired warps. And, directly after that, those paired threads repeat the same motion (up and down or backward and forward) at the same time. This kind of warp crossing adopted in the above specimen is different from that of the at-Tar specimens in the crossing method and the warp motion after crossing (Fig. 2).

As already stated, there are some reasons as to why weave alteration and warp crossing are conducted. This kind of method adopted in the above specimen will be able to answer the purpose of keeping balance between ground and pattern in texture, but this method cannot work for retaining the contour of the pattern portion in shape. This is because the warps which kept working separately come to turn into the same kind of motion after weave alteration, that is, one of the paired warps will not keep their moving order [Sakamoto, 1992: pp. 55–56]. Accordingly, there is no reason why the warp crossing was

adopted in this specimen.

Conclusion

As the result of our study, the textiles have shown resemblance to those from Dura-Europos, Palmyra, the Cave of Letters and the sites of Nubia along the East Mediterranean coastal area in their weave type, weave structure, feature and composition of the pattern. With them kept under closer observation, however, the at-Tar textiles have such complex cultural traits as are markedly distinctive from them in the concrete. In this connection, the writers are of the opinion that outstanding textile cultures which had been brought in through the following routes used to flourish here in at-Tar area all through the period of 1st–3rd centuries A.D.: eastward progress of the Roman culture from the Mediterranean coastal area → establishment of the Syrian cultural traits caused by locality-transformation → further, their eastward advance and arrival in Mesopotamia → finally, their contact with the native Mesopotamian culture. What is more, the existence of these at-Tar textiles fully makes us consider that most of them were not merely the imported ones by trade through the desert road, but also the ones produced here by some groups of people who were engaged in spinning and dyeing with skillful weave technique at some fixed workshop, while settling somewhere around at-Tar Caves and leading a considerable scale of social life. To be brief, the second problem is to solve precisely where around at-Tar Caves the people had had their group life, based on the fact that some groups of people who owned such elaborate textiles have been found buried here in at-Tar Caves.

Acknowledgements

We like to express our sincere gratitude to Dr. Susan B. Matheson, curator of Ancient Art, Yale University Art Gallery, who kindly gave us every facility in the research of the textile from Dura-Europos preserved in the gallery. The acknowledgement is also due to Dr. Bennett Bronson, curator of Anthropology at the Field Museum, Chicago, who warmly helped us to research the Captic textile preserved in the museum. Finally but not less, we thank Dr. Christa C. Thurman, curator at the Department of Textiles, the Art Institute of Chicago, for her kind and valuable help and advice during our research of the Nubian textile preserved in the department.

Notes

1) The textile being taken up by us here has been dealt with as the one excavated from Tomb No. 64, depending on the explanation for the objects displayed at the Palmyra Museum and the pamphlet, 'Ancient Textiles from Palmyra'. On the other hand, however, it is found in the paper, 'Bericht über die Arbeiten in Palmyra 1992' that this specimen has been defined as the one from Kitôt Grab, with the addition of the diagram showing weave alteration which interests us.

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PAINTED DESIGNS OF THE NINEVITE 5 POTTERY —PART 2—

Hirotoshi NUMOTO*

1. Introduction

In the last issue of Numoto [1991: 85–155], this author disccused the painted designs on painted wares from the Late Uruk period through to the Ninevite 5 period. However, that worth emphasised the painted design features of each period without having done research on comparisons and transitions between painted designs for the whole of the Ninevite 5 period. Thus, this paper aims to rectify this while providing a summary of the last issue. Furthermore, this author minutely examined and studied design elements, compositions of design units, and the connection between the painted designs and different types of pottery all of which were scarcely mentioned in the last issue. In this paper, the major emphasis is on the changes and transitions in painted designs. In the course of writing this papers, further questions and corrections occurred to the author relating to the last papers' classifications of painted designs, and these will be tackled herein. This paper follows the chronological order of the Ninevite 5 period established by Roaf and Killick [1987]. It may be noted that this author established and defined the Intermediate period in the last issue of Numoto [1991: 108].

2. Changes, and Developments, in the Elements of Painted Design (Fig. 1, Table 1)

How did painted design elements changes from the Late Uruk through to the Transitional, the Painted and Early Incised periods? Mainly specimens with popular and typical painted features from each period were examined, and were roughly classified by geometric or naturalistic motifs. The frequency of occurrence for the Late Uruk, the Transitional, the Intermediate and the Painted and Early Incised periods was noted. The designs' changes were further divided into four categories:

A: Designs occuring in the Late Uruk and the Transitional periods showing no style change up to the end of the Ninevite 5 period.

B: Elements which disappeared at a contain stage.

C: Elements first appearing in the Intermediate and the Painted and Early Incised periods.

D: Changes occuring at same paint:

a. elements which vary, b. elements with new sub-elements attached.

Group A Typical design elements in the Late Uruk period were the hatched rectangle (No. 1); cross-hatched rectangle (No. 2); cross-hatched triangle (No. 5); solid lozenge (No. 13) and checker (No. 3) motifs. After the first two periods, a change in design occurs. The outside lines of the hatched rectangles, cross-hatched rectangles and cross-hatched triangles are painted thick, while the inside of hatched and cross-hatched lines are extremely fine[1]. After the Transitional period, its most typical design element—the solid lozenges—became very rare, perhaps—as will be mentioned later—due to the increased use of cross-hatched lozenges (No. 14) thereafter. Concentric arcs (No. 20) are thought to have

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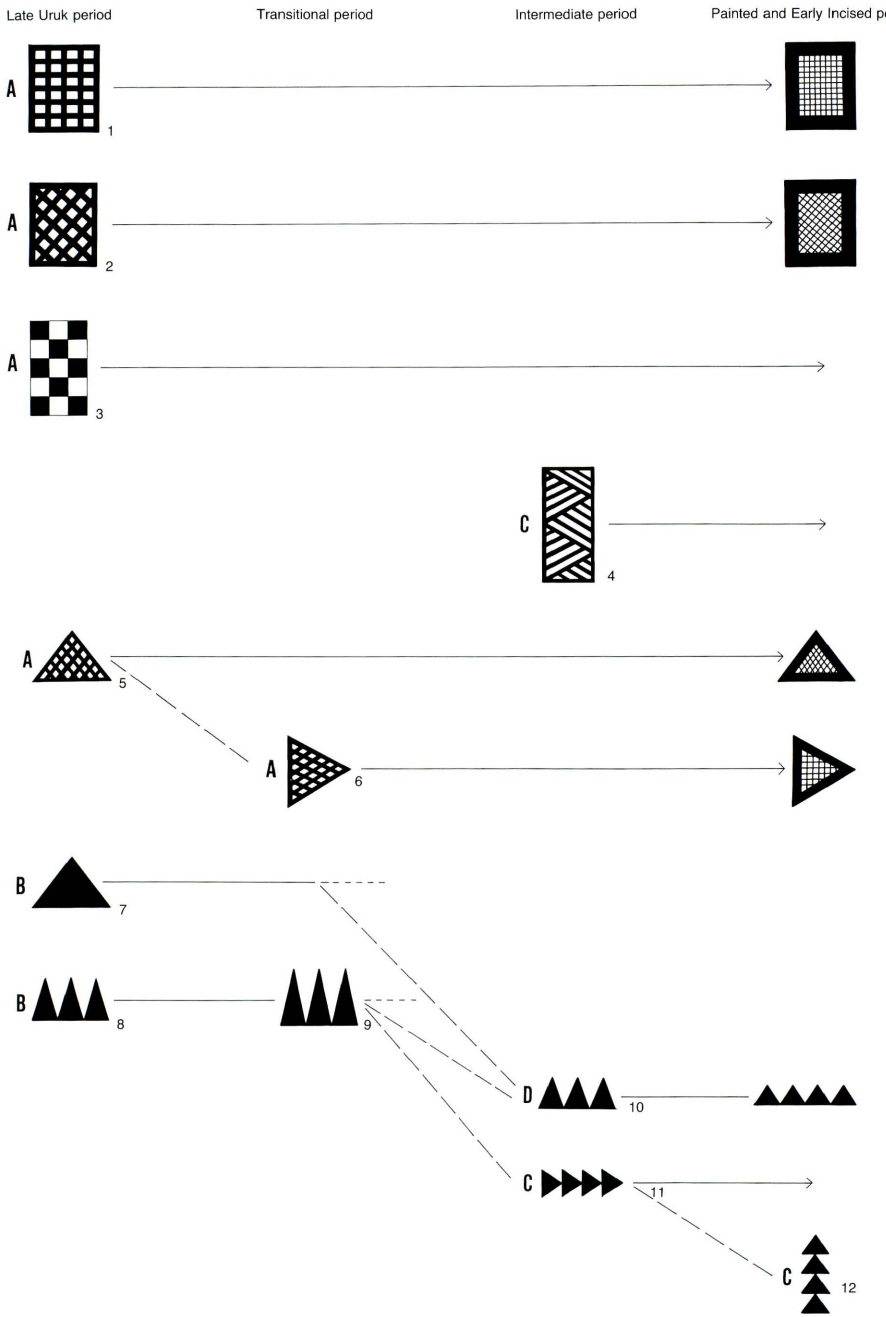
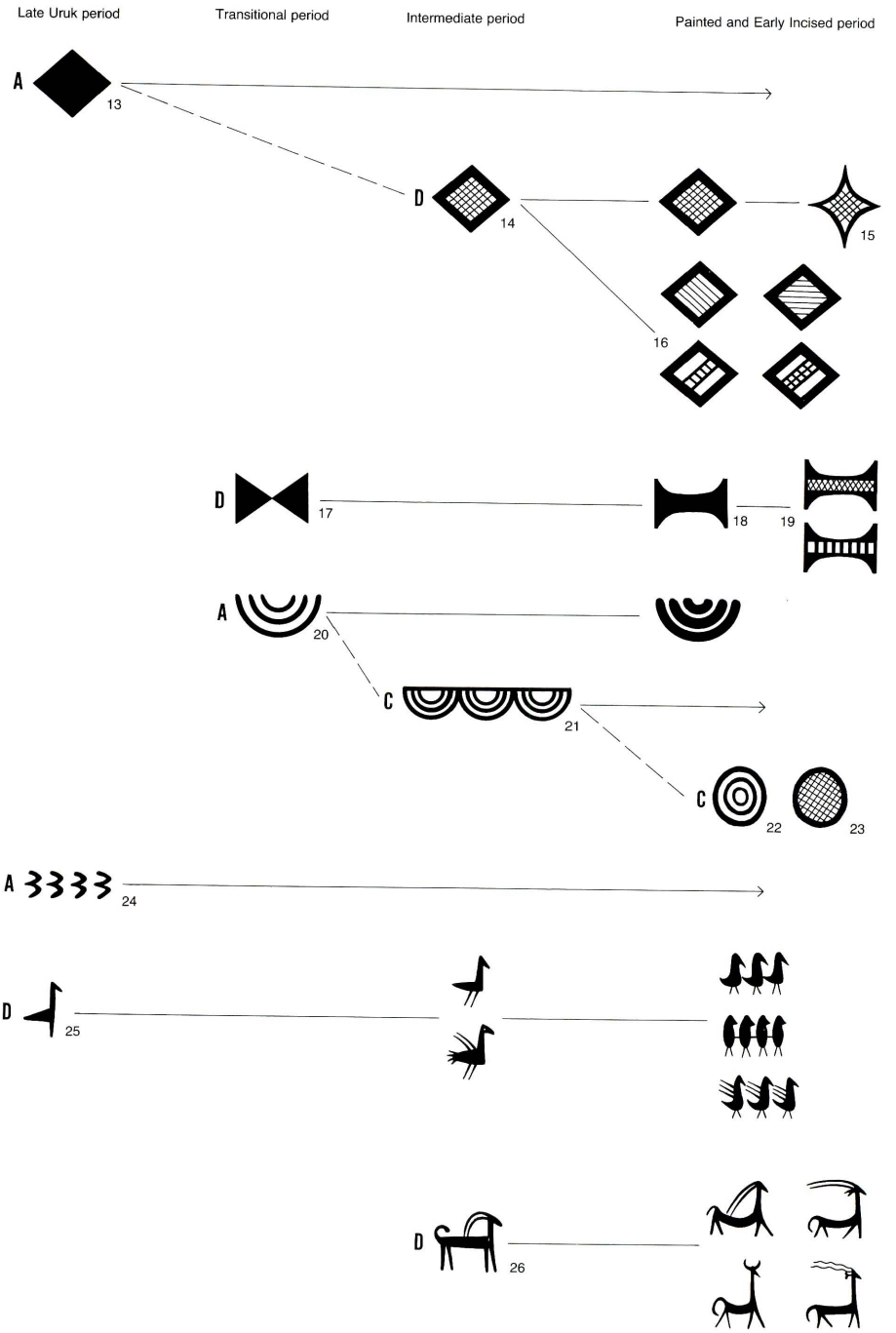


Fig. 1 Changes of the Design Elements


Late Uruk period
Transitional period
Intermediate period
Painted and Early Incised period
A
13
D
14
15
16
D
17
18
19
A
20
C
21
C
22
23
A
24
D
25
D
26

occurred in the Transitional period but its clear origin is unidentified. The use of flying bird motif (No. 24) started in the Late Uruk period and was frequently employed in the two subsequent ages, but less and less so in the Painted and Early Incised period. It was found in many samples from Tell Fisna [Numoto 1988], but on very few from Tell Thalathat [Fukai et al. 1974]. This difference may indicate variations in chronological characteristics and regional disparities. Sideways cross-hatched triangle (No. 6) are also considered to have appeared in the Transitional period, but there are few examples of them from this time. The outline and cross-hatched lines from the sideways cross-hatched triangles after this time become congruent with styles such as the hatched rectangle, cross-hatched rectangle and cross-hatched triangle. This element is also one of the most typical design elements in the Painted and Early Incised period.

Group B This groups' elements are found only in the first two periods' samples, and include only two examples: the solid elongated triangle (No. 9) and the solid triangle (No. 7). The former is one of the most typical design elements from the Transitional period, and may have turned into the low height solid elongated triangles frequently found in the Intermediate period, while the low height equilateral triangle forms characterize the latter and are distinct from the saw-tooth like elements which were popular in the Painted and Early Incised period. It is much more common in the Late Uruk period than in the Transitional period.

Group C The Intermediate period's elements were typically zigzag spacing with slantig lines (No. 4) and rows of solid triangles fallen sideways (No. 11), and did not change in the subsequent period. However the incidence of the zigzag spacing with slantig lines did decrease in the Painted and Early Incised period. What is more, Tell Thalathat leaves hardly any trace of this element, with possible congruent implications to this design as with the flying bird motif mentioned above. The motif of rows of solid triangles fallen sideways is one of the most typical and commonly found designs from the Painted and Early Incised period, but is not so with the Transitional period.

When exactly the motif of rows of concentric arcs (No. 21) first appeared is not known, but because it is not found in the Transitional period, the motif's chronological entry is in the Intermediate period. Yet because this design has similarities with the concentric arcs design drawn, as was mentioned earlier, on the lower part of the body, its origins are seen to have been in the Transitional period.

Columns of solid triangles (No. 12), concentric oval and cross-hatched oval elements (Nos. 22,23) are considered to have occurred in the Painted and Early Incised period. The former element is the most common and was always painted with cross-hatched rectangle elements. There are no examples of the latter two elements in the Transitional period. The prototypes of these oval elements are thought to have

Table 1. Frequency in Use of Design Elements of Fig. 1

No	Types of painted element	L.U.	% (in 26 specimens)	T.R.	% (in 87 specimens)	IM.	% (in 29 specimens)	P.and E.I.	% (in 262 specimens)
1	hached rectangle	0		3	3.4	1	3.4	19	7.3
2	cross-hatched rectangle	4	15.4	13	14.9	4	13.8	16	6.1
3	checker	3	11.5	1	1.1	0		7	2.7
4	zigzag spaces filled with slantig lines	0		0		9	31.0	2	0.8
5	cross-hatched triangle	13	50.0	13	14.9	0		11	4.2
6	sideways cross-hatched triangle	0		2	2.3	0		5	1.9
7	solid triangle	3	11.5	2	2.3	0		3	1.1
8	solid elongated triangle(middle height)	1	3.8	4	4.6	1	3.4	1	0.4
9	solid elongated triangle	0		10	11.5	1	3.4	0	
10	serrated solid triangles	0		0		0		35	13.3
11	sideways solid triangles	0		0		1	3.4	15	5.7
12	columns of solid triangles	0		0		0		16	6.1
13	solid lozenge	1	3.8	13	14.9	3	10.3	4	1.5
14	cross-hatched lozenge	0		0		0		14	5.3
15	cross-like cross-hatched lozenge	0		0		0		5	1.9
16	lozenges filled with elements	0		0		0		6	2.3
17	butterfly	0		19	21.8	3	10.3	0	
18	concave-lens	0		0		0		22	8.4
19	concave-lens filled with elements	0		0		0		3	1.1
20	concentric arcs(zone C)	0		9	10.3	4	13.8	40	15.3
21	rows of concentric arcs	0		7	8.0	2	6.9	12	4.6
22	concentric circles	0		0		0		3	1.1
23	cross-hatched oval or tear-drop	0		0		0		14	5.3
24	flying birds	0		2	2.3	11	37.9	13	5.0
25	bird	1	3.8	0		3	10.3	24	9.2
26	goat or gazelle	0		0		1	3.4	22	8.4

L.U.: Late Uruk period; T.R.: Transitional period; IM.: Intermediate period; P.and E.I.: Painted and Early Incised period
* The numbers of the table are identical with those in Fig.1

been the semi-circular and concentric arcs elements of the Transitional period.

Group D Cross-hatched lozenges (No. 14) and butterfly (No. 17) elements had been included in this group. The former element is not found in the Transitional period. As aforementioned, the origin of this design are thought to have been the solid lozenges design, first painted from the Intermediate to the Painted and Early Incised periods. Indeed, the Painted and Early Incised period originated many lozenge types, with various elements such as lozenges filled with horizontal lines; slanting lines; slanting ladders; etc (No. 16). It is not evident whether the cross-hatched lozenge design was the prototype for them, or not, as the possibility exists that solid lozenges turned directly into these elements. The cross-hatched lozenge, though, is clearly seen as the origin of the cross-like cross-hatched lozenge (No. 15).

The butterfly design is one of the most common of the Transitional period, but is not found in the Painted and Early Incised period. It is presumed to have appeared first between the Late Uruk period and the Transitional period. While not found in the Transitional period, the concave lens-like element (No. 18) is a typical element in the Painted and Early Incised period. Based on these facts [Numoto 1991: 123], the present author suggests the butterfly design turned into the concave lens-like element, as the combination of butterfly and vertical lines is similar to that of the concave lens-like and vertical lines. The first appearance of concave lens-like element is considered to have been from the Intermediate to the Painted and Early Incised periods. It is roughly classified into two types: the solid kind—and most popular, and those kinds filled with various elements (No. 19). It is obviously surmised that the former changed into the latter. Besides, in the Painted and Early Incised period, the various elements were drawn on the spaces of up and down of the concave lens-like element.

Serrated solid triangles (No. 10) are most typical element of the Painted and Early Incised period, but no similar examples are found in the Transitional or the Intermediate periods. This design's origins stem out of the rows of solid triangles design of the Transitional and the Intermediate periods.

This group also includes naturalistic elements (Nos. 25, 26) highly characteristic features of the Ninevite 5 period. A bird motif is the only naturalistic element to have been found in the Late Uruk or the Transitional periods. This example came from the Late Uruk level of Tell Mohammed Arab [Roaf and Killick 1987: fig. 2], and is considered to have been used more commonly only after the Transitional period. When the naturalistic elements first appeared gives important indications as to the connection between North and South Mesopotamia. These elements can be divided into birds, gazelles, goats and plants. The Painted and Early Incised period had many more than the Intermediate period. These examples are more refined and stylish than those of earlier periods. The rows of birds motif, a characteristic element of this group, is presumed to have first appeard in this period. Most of the gazelle and goat motifs are combined with cross-hatched tear-drop motifs or stitch lines [Numoto 1991: 123]. These latter motifs are always drawn in the space between the neck and back of a gazelle or goat. This phenomenon is also indicated that painted designs are densely drawn all over the vessel surface in this period.

Apart from the above-mentioned motifs, some elements were used progressively less in these periods. For example, the herring bone motifs are commonly found in the Late Uruk and the Transitional periods, but are rarely found from the Painted and Early Incised period.

The Group A design elements are the most common from the whole Ninevite 5 period, which had been succeeded from the Late Uruk to the Painted and Early Incised periods, and are thus indispensable design elements.

Strictly speaking, Group B design elements may not have existed. It may be that solid triangle or solid elongated triangle motifs changed into types of rows of solid triangles.

Group C design elements did not appear all of a sudden but evolved from similar elements from

previous periods.

The Ninevite 5 period's geometric design elements are intrinsically rectangular, triangular, lozenge and circular, and all vary more and more with each period.

One can generally say about the geometric design elements that the solid types of design elements (lozenge, butterfly, elongated triangles) are commonly found in the Transitional period; the filling types (cross-hatched triangle, lozenge, rectangle, etc.) are commonly found in the Painted and Early Incised period. It would therefore seem likely that painting techniqes advanced and more varied brushes were employed.

Characteristics of design elements of each type of pottery

Do different types of pottery have different types of design elements? Types of painted wares are roughly classified into carinated bowl, footed bowl, lugged jar and large jar. A meaningful statistical comparison is hard to do, as the spesimen numbers vary from each period. Thus, a comparison between specimens will be presented here, and only points of special interest will be extraporated upon.

In the Late Uruk period, the large jar with nose-lugs has only the cross-hatched triangle, cross-hatched rectangle or cross-hatched band motifs. It is surmised that the other solid types of design elements were not painted on this type of ware.

The design elements on the Transitional period's carinated and footed bowls are almost identical. But specimens of lugged and large jars are rare in the Transitional period and it is thus unclear how frequently each design was used. It is presumed, because of the connection between the concave lens-like motifs of the Painted and Early Incised period, that butterfly motifs were rare on these kinds of jars.

The Painted and Early Incised period's lugged and large jars have few concave lens-like motifs. Most of the latter design elements are found on the footed bowl[2]. The concave lens-like design elements' size, dimensions and shape lend itself to be suitable for the horizontal belt zones, or narrow horizontal oblong panels found mainly on the small to medium-sized footed bowls. It is not thought to have been so suitable for larger footed bowls or the vertical oblong, or large panels, and is thus rarely found on these. This indicates that design elements were indeed chosen according to the shape and size of vessels.

3. Combinations of Design Elements and Their Evolution

Changes of the horizontal belt patterns

If you take one unit of horizontal belt patterns from each period and look at the combinations of design elements, do any rules emerge governing change, and are there any commonalties which bridge periods? How did these design units changes during the Ninevite 5 period? These questions will be discussed below. Horizontal belt patterns of Zone B (upper part of body) were classified into four patterns in the last issue by the present author, as follows [Numoto 1991]:

P1. One element repeated successively.

P2. One element drawn horizontally in the form of a belt.

P3. Zone B being divided into two or three small horizontal zones, and one or three different elements being drawn successively in the small zones.

P4. A pattern assumed to comprise two or three design elements and units drawn alternately.

These follows a brief outline of changes occuring in each pattern (Fig. 5).

P1 Many examples of rows of cross-hatched triangle motifs were found in the Late Uruk period, as are rows of solid triangles and rows of solid lozenge motifs. The former motifs became progressively more scarce through the Transitional period. In the Painted and Early Incised period, the above motifs became

scarce, while rows of concentric arcs and rows of cross-hatched lozenge motifs became the most common. Many of these patterns are also drawn on Zone C (lower part of body) in this period.

P2 This pattern is mainly found in the footed bowls, but the carinated bowls. The reason for this was already discussed in the last issue [Numoto 1991: 89]. The cross-hatched bands are typical motifs in this pattern and while they are commonly found in both the Late Uruk and the Transitional periods, their numbers were severely diminished in the Painted and Early Incised period. There are no examples of large footed bowls or large jars with this pattern in this period. Only a few small-sized footed bowls or lugged jars have this pattern.

P3 This pattern is not found in the footed bowls of the Late Uruk and the Transitional periods. The reason for this was also mentioned in the last issue [Ibid: 89, 91]. The Late Uruk period abounds with examples of which patterns have combined rows of cross-hatched triangles and cross-hatched band motifs. This combination waned in the Transitional period, while examples of combinations of rows of solid elongated triangles and rows of solid lozenges motifs are conspicuous. This pattern has few examples on carinated or footed bowls from the Painted and Early Incised period. Many examples are found on small lugged jars, none on large jars. Most of the designs of Zone C in the footed bowls and lugged jars of the Painted and Early Incised period belong to this pattern. It is considered that this pattern dwindled according to the changes in the shape of vessels[3].

P4 In the Late Uruk Period, many examples show with cross-hatched triangles and cross-hatched rectangles motifs combined, while in the Transitional period, most common are one basic design element combined with vertical or slanting lines or solid elongated triangles. The most common of the latter motifs are the butterfly with vertical lines motif. The P4 pattern is presumed to have first appeared in the Transitional period, but waned in the Painted and Early Incised period, when the most typical in P4 combinations were:

1. Vertical lines with concave lens-like motifs.
2. Vertical lines with solid triangles.
3. Vertical lines with sideway solid triangles.

Combinations of Nos. 2 and 3 are rarely found on Zone B, it is usually found in the top or bottom parts of Zone C. This fact suggests that these two combinations of patterns are regarded as additional, or minor, disign patterns, and as such, were not suitable as the main disign motif on a vessel. Alternatively, the P4 patterns may have decreased as the number of panel patterns greatly increased in the Painted and Early Incised period.

Combinations of design elements of panel patterns and their changes (Figs. 2, 3)

The panel design patterns (P5) are arranged according to some rules. Examples of panel patterns examined here are mainly from the Painted and Early Incised period, and are representative of the Ninevite 5 period as the two types of panel are always systematically arranged according to fixed rules. These panel-design-pattern-combinations can be roughly classified into nine types as follows[4]:

A. Panels being divided horizontally and filled with design elements (Nos. 17b, 18a, 19b, 20b, 21b, 22b, 23a, 24b, 25b, 26a, 27b, 28b, 29b, 34b, 35ab, 37ab, 38b, 39b, 40b).
B. Panels being divided vertically and filled with design elements (Nos. 12a, 13b, 14a, 15b, 16b, 34a, 36a).
C. Panels being divided diagonally and filled with design elements (Nos. 4a, 5a, 6c, 36b, 38a, 39a, 40a, 41ab).
D. Slanting design element (Nos. 30a, 31a, 32a, 33b).
E. Designs consisting only of a single geometric element (Nos. 1ab, 2ab, 3ab, 4b, 5b, 6b, 7b, 8b, 9a,

10a, 11a).

F. Designs consisting mainly of one point-like single geometric element (Nos. 6a, 7c, 8a, 9b, 12b, 13a, 14b, 17a, 18b, 19a, 30b, 31b).

Fa. Designs consisting of repeated-single geometric elements (Nos. 24a, 27a, 28a, 32b).

G. Designs consisting mainly of one single naturalistic element (Nos. 20a, 21a, 25a).

Ga. Designs consisting of repeated-single naturalistic elements (Nos. 10b, 11b, 15a, 16a, 22a, 23b, 26b, 29a, 33a, 39b, 40b).

In the case of Type E, there are examples of panels which are completely filled with cross-hatched lines or horizontal lines, or, a cross-hatched triangle motif. Types F, Fa, G and Ga characteristically have only one single design element on a panel. The concave lens-like motif is the most common of Type F, and is where most examples of Type A are to be found. Typical panel patterns are found in Types A, B and C, where the panel is divided into three zones, either vertically or horizontally; with the two outside zones having the same design elements, while the center zone would have a different one (Nos. 12a, 13b, 14a, 15b, 16b, 24b, 25b, 26a, 34ab, 35ab, 36ab). This phenomenon is labelled as "Sandwich motif" and is marked as "S"[5]. The Type B examples belong to this panel pattern. Types G and Ga are characteristically naturalistic motifs. In the Painted and Early Incised period, they are always the main design on the whole panel. The difference in classification between Types G and Ga relates to the numbers of naturalistic motifs, and has little importance. In the case of specimen No. 15, a Zone B panel has two

Table 2. List of Fig. 2

No	Site	Type	Zone	Zone C	RD(cm)	MD(cm)	Literature
1	Thuwaij	Type 2	B				Numoto in press: Fig.14-94
2	Mohammed Arab	Type 2j	B	Panel	16.8	17.5	Roaf 1983: Fig.3-2
3	Nineveh	Type 4d	B,C			30.5	Thompson and Hamilton 1932: Pl.57-5
4	Mohammed Arab	Type 2j	B	Panel	22.1	23.2	Roaf 1983: Fig.3-1
5	Mohammed Arab	Type 2i	B	C.A.	12.0	13.1	Roaf and Killick 1987: Fig.3
6	Thalathat	Type 2	B	C.A.			Fukai et al. 1974: Pl.48-5
7	Thalathat	Type 2	B		14.5	13.8	Fukai et al. 1974: Pl.48-11
8	Thuwaij	Type 2	B				Fujii et al. in press: Fig.6-5
9	Thalathat	Type 2	B				Fukai et al. 1974: Pl.30-2-15
10	Mohammed Arab	Type 2	B				Roaf and Killick 1987: Fig.3
11	Kutan	Type 2	B				Bachelot 1987: Fig.6
12	Thalathat	Type 2	B	C.A.	11.1	10.3	Fukai et al. 1974: Pl.48-12
13	Rijm	Type 2	B		29.0		Bielinski in press: Fig.11-1
14	Thalathat	Type 4	C				Fukai et al. 1974: Pl.29-2-22
15	Rijm	Type 2n	B	Panel	35.0	33.5	Bielinski in press: Fig.4, Fig.5-B
16	Kutan	Type 4d	Ca	Panel(B),C.A.(Cb)		25.5	Forest 1987b: Fig.114
17	Nineveh	Type 3g	B	C.A.		5.2	Thompson and Hamilton 1932: Pl.55-2
18	Nineveh	Type 1g	B		7.7	9.4	Thompson and Hamilton 1932: Pl.53-14
19	Nineveh	Type 4d	B	C.A.(Cb)		34.3	Thompson and Hamilton 1932: Pl.57-1
20	Nineveh	Type 1h	B	C.A.		13.9	Thompson and Hamilton 1932: Pl.53-8
21	Rijm	Type 2j	B	C.A.	19.7	19.3	Bielinski in press: Fig.10-1
22	Mohammed Arab	Type 2	B	C.A.			Roaf and Killick 1987: Fig.3
23	Mohammed Arab	Type 2	C			32.0	Killick in press: Fig.4-8
24	Thalathat	Type 2j	B	C.A.	24.0	24.0	Fukai et al. 1974: Pl.48-3
25	Thalathat	Type 4d	B			27.0	Fukai et al. 1974: Pl.50-2
26	Rijm	Type 4d	B	C.A.(Cb)	14.0	30.5	Bielinski in press: Fig.4, Fig.5-A
27	Nineveh	Type 4d	B	C.A.	13.3	25.7	Thompson and Hamilton 1932: Pl.57-6
28	Nineveh	Type 4d	B	C.A.(Cb)		29.2	Thompson and Hamilton 1932: Pl.57-2
29	Kutan	Type 3j	B,C		10.0	14.3	Bachelot in press: Type 14
30	Thalathat	Type 2l	B	Panel	41.7	39.0	Fukai et al. 1974: Pl.48-19
31	Thalathat	Type 2	B				Fukai et al. 1974: Pl.31-2-2
32	Thalathat	Type 3	B			21.2	Fukai et al. 1974: Pl.51-7
33	Kutan	Type 2	B	C.A.		15.9	Bachelot in press: Type 14, K 21816
34	Billa	Type 2j	B	C.A.	20.3	19.5	Speiser 1933: Pl.48-1
35	Thalathat	Type 2	B	C.A.			Fukai et al. 1974: Pl.30-1-9,10
36	Mohammed Arab	Type 2	B		20.2	20.4	Roaf and Killick 1987: Fig.3
37	Thalathat	Type 3	B				Fukai et al. 1974: Pl.30-3-3
38	Thalathat	Type 4f	B,C				Fukai et al. 1974: Pl.51-2
39	Billa	Type 2	B				Speiser 1933: Pl.69
40	Thalathat	Type 2j	B	C.A.	24.7	24.3	Fukai et al. 1974: Pl.48-8
41	Leilan	Type 2	C			40.2	Weiss and Mayo in press: Fig.7-5

C.A.: Concentric arcs; RD: Rim diameter; MD: Maximum diameter

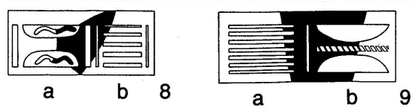
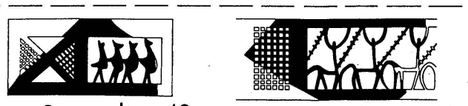
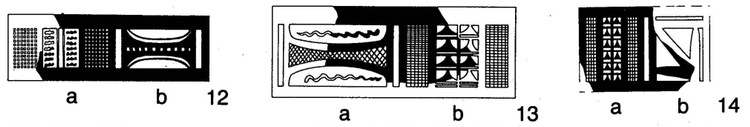
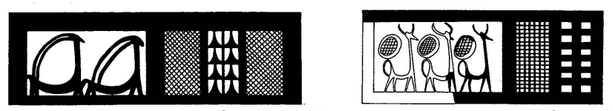
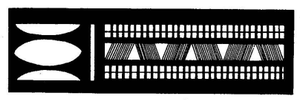
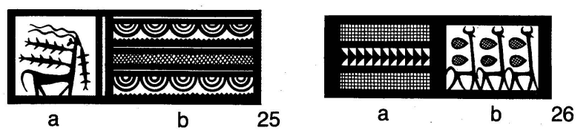
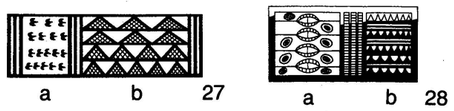
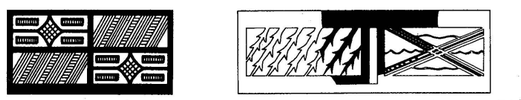
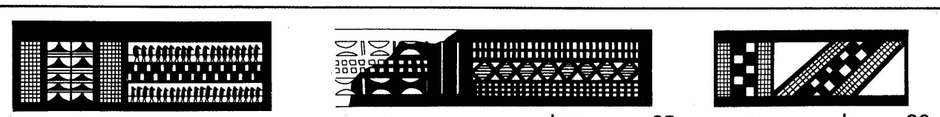
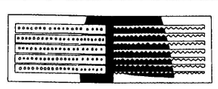
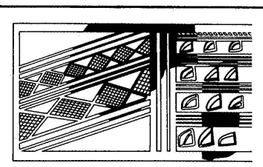
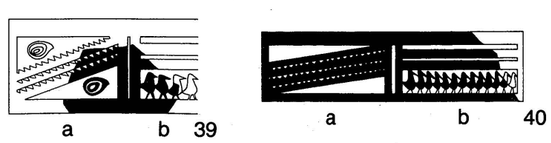
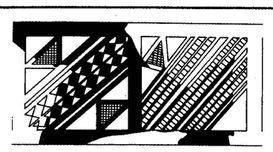
Group		Compositions of geometric panels (Group G)	Compositions of naturalistic panels (Group N)
1	a	 a b 1 a b 2 a b 3	
	b	 a b 4 a b 5	
2	a	 a b c 6 a b c 7	
	b	 a b 8 a b 9	 a b 10 a b 11
	c	 a b 12 a b 13 a b 14	 a b 15 a b 16
	d	 a b 17 a b 18 a b 19	 a b 20 a b 21 a b 22 a b 23
	e	 a b 24	 a b 25 a b 26
	f	 a b 27 a b 28	 a b 29
3	a	 a b 30 a b 31	
	b	 a b 32	 a b 33
4		 a b 34 a b 35 a b 36	
5		 a b 37	
6		 a b 38	 a b 39 a b 40
7		 a b 41	

Fig. 2 Compositions of the Panel Patterns in the Painted and Early Incised Period

goats, while a Zone C panel has only one. That is because Zone B has more space than Zone C—a clear indication that size of panel determines the number of elements.

As mentioned above the panel design patterns are consist of combinations of each type of panel and their classification is illustrated in Fig. 2. Some of these specimens are drawn on the footed bowls or jars. These combinations can fall into seven classes[6].

Group 1 The specimens of this group are combined with Type E panels. these are subdivided into combinations of Type E+Type E panels (1a), and Type E+Type C panels (1b). There are comparatively more examples of these from the Transitional and the Intermediate periods than from the Painted and Early Incised period.

Group 2 The combinations in this class are either from Types F (F, Fa) or G (G, Ga) panels. This class has the larger number of examples of panel patterns. Furthermore, these combinations are subdivided into six sub-classes, as follows:

2a. Composed of three types of panels: F+E+A or C.

2b. Combinations of Types F+E and Types Ga+E. It is highly likely that the Type E of No. 11a panel belongs to Type BS. Combinations of Types F+E of 2a and 2b (Nos. 6–9) are basically identical to those of the Group 1.

2c. These combinations are of either Types F or Ga, and Type BS (F+BS, Ga+BS). It is one of the most characteristic panel patterns in the Painted and Early Incised period. These combinations are common to the specimens of Nos. 34 and 36 in Group 4.

2d. The combinations consist of Types F or G or Ga and Type A (F+A, G+A, Ga+A). These combinations are also typical panel patterns in the Painted and Early Incised period.

2e. These cmbinations consist of Types Fa or G or Ga and Type AS (Fa+AS, G+AS, Ga+AS).

2f. Here, the combinations are made up of either Types Fa or Ga and Type A (Fa+A, Ga+A). The Fa and Ga type design elements are always repeated vertically. Moreover, all specimens that have been found with these combinations are found on the shoulder or lower part of body of jars. This indicates that the combinations suited the shape of the jars which allowed for vertical oblong panels.

Group 3 Consists of similar combinations as Group 2, differering though in that the kinds, or combinations, of design elements of Types F and Fa panels are not the same. Group 3 panel patterns consist of Types F or Fa or Ga and Type D (F+D, Fa+D, Ga+D).

Group 4 The combinations consist of the same type of sandwich panels. There are three types of combinations, *i.e.* AS+BS, AS+AS, BS+CS. The combinations in this group are common to the 2c and 2e groups.

Group 5 This panel pattern consists of the same Type A panels (A+A). Only one specimen has been found, and is closely similar to the Group 2f.

Group 6 These panel patterns consist of Types A, A or Ga, and Type C (A+C, A or Ga+C).

Group 7 The panel pattern consists of the same Type C panels (C+C) and, like Group 5, has only one specimen.

There follows a discussion of the most important points relating to the above mentioned groups of panel patterns. Group 2 has many specimens, and these are based on combinations of simple design panels (Types F, Fa, G, Ga) and densely-packed design panels (Types A, B, D, E). The combination of these contrasting panels is considered optical for the balance and layout of the design, as well as for artistic purposes. Thus, it is presumed that the panel patterns of Group 2 were most commonly painted in the Painted and Early Incised period. The prototype of this panel pattern clearly derived from the Late Uruk and the Transitional periods, as will be discussed later.

It becomes clear that what kinds of combination of panel patterns is not popular. For example, the combinations of Types F, G+Types F, G and Types F, G+C do not exist. As a rule, naturalistic design panels only occur alternately. This fact indicates that the combinations of the same simple painted style of panels, interspersed with blank spaces, were not drawn in the Painted and Early Incised period. Yet densely painted panel pattern combinations(Group 4) are considered to have been abundant.

Groups 5 and 6 specimen combinations are thought to be rare. Not so many of the once numerous specimens which combined naturalistic design panels (Types G, Ga) now exist.

a. The relations between panel patterns and the types and sizes of the wares

The panel patterns were found on all types of pottery. However, they are mostly found in the footed bowls and large jars, and rarely in small footed bowls or small lugged jars. This shows that panel patterns need a wider area available for painting. Thus, relatively many examples of Groups 1, 2a and 2b (with their simple characteristics), are found on small footed bowls, indicating that complex and densely designed panels are difficult to paint onto small vessels. Thus, larger vessels were always best suited for gazelle and goat motifs, and sandwich motifs (AS, BS), and allowed the full use of potters' skills. If follows, therefore, that the type of panel design is determined by the space available on the painted zones. Actually, the elegant and delicate of painted designs are always found in the large footed bowls or large jars. Judging from these facts, it is evident that the type of panel designs are greatly influenced by the difference of dimension of painted zones. In other words, potters alway decided choice of panel designs according to the dimension of panels.

It is clear that the Group 2f designs are common in jars, while Groups 1, 2a and 2b have a few examples on large jars. Type A panel designs are mainly found in jars (Groups 2f, 5 and 6 (No. 38)). One of the reasons for this has already been mentioned in the section on Group 2f. Another relates to the available spaces in the shoulder of jars (Zone B) and the lower part of body of jars (Zone C) both of which have the vertical oblong panels which are most suited to the drawing of the horizontal repetitious design elements which make up Type A.

Most of the above mentioned panel patterns are drawn on Zone B. They are also combined with the designs in Zone C, but the present author, having examined their link ups to determine whether any rules were discernible, has concluded that so few specimens show evidence of matching in their layouts that it is not therefore possible to precisely understand the characteristics of their combinations.

Most notable combinations on footed bowls are as follows:

1. The painted designs of Zone C are roughly classified into two types: the same panel pattern as Zone B; and concentric arcs.
2. The panel patterns are supposed to have been drawn mainly on Zone C of large-sized vessles from the specimens of Groups 2 and 3.
3. The concentric arcs are assumed to have been drawn mainly on Zone C of small to medium-sizied vessels.

b. Characteristics of panel patterns from each Tell

The most remarkable characteristics are:

1. Many of the specimens belonging to Groups 2a and 2b (Nos. 6–9) were found from Tell Thalathat.
2. Many of the specimens of Group 2d (Nos. 17–20) were found from Nineveh.
3. Most of the specimens of Group 3 (Nos. 30–32) were found from Tell Thalathat.
4. Only one Group 7 specimen was found from Tell Leilan.

As the number of specimens from each site is different, no conclusions about chronological difference

or regional variations can be reached. As for item of No. 3, the panel patterns on specimens Nos. 30 and 32 are presumed to be the newest style of pattern vis-a-vis the division of Zone B, and the combination of the incised pattern. As for item of No. 4, specimen of No. 41 is the only vessel with such as design from the whole the Painted and Early Incised period [Numoto 1991: 145]. It follows that this pattern shows regional variation.

Are there any chronological differences in the panel patterns of the Painted and Early Incised period? Specimes Nos. 27 and 29 of Group 3 are supposed to have been belonged to the earlist stage of the Painted and Early Incised period, or the Intermediate period, according to the whole layout of the painted designs [Ibid 137]. The details of chronological changes of panel patterns will be discussed in the next section. As has been mentioned above, combinations of panel patterns are based only on published material. Other combinations may very well exist. It is evident that the panel patterns are the most characteristic and typical design on painted ware in the Ninevite 5 period.

c. Changes of the panel patterns (Fig. 3)

Fig. 3 briefly illustrates the change in panel patterns from the Late Uruk to the Painted and Early Incised periods. Their origin was in the Late Uruk period, yet only three specimens remain from this time (Nos. 1–3), and all three came from Tell Mohammed Arab. Each of the three has a different combination of panel pattern. No. 1 combines two kinds of Type E panels. No. 2 combines a Type E panel with a herring bone motif and a blank panel. No. 3 combines Types A, E and G panels, and is remarkable because it combines a naturalistic, and a geometric, panel—similar to Group 2 combinations which are the most typical of the Painted and Early Incised period patterns, as discussed earlier. Thus, Group 2f's combination's prototype already existed in the Late Uruk period. Although these are the only three known the Late Uruk period. Specimens, others may still exist. Fig. 3 was based on the above three specimens.

Tow types of panel patterns were especially numerous in the Transitional period: a combination succeeded to the system of specimen No. 1 (Nos. 4, 5, 6), and a combination succeeded to the system of specimens Nos. 2, 3 (Nos. 7–12). These can be further subdivided into the following types:

A. Repetition of Type E panels, and blank panels (No. 4).
B. Repetition of Type E panels, and two elements of panels and blank panels (No. 5).
C. Repetition of Type E panel and Type E panel (No. 6).
D. Combinations made up from two or three elements panels (mostly Type A), and blank panels, or simple single element panels (Nos. 7–12).

These four types were based on designs of the Painted and Early Incised period. There are no pattern D panel pattern specimens where there is repetition of the same design panels, such as those found in the Painted and Early Incised period. Most of the panel patterns of this type are divided horizontally, not vertically. Those vertical herring bones, or vertical ladder motifs, which are drawn on both sides of panels (Nos. 7–10) are presumed to have succeeded to No. 2 patterns. The main characteristics of panel patterns in the Transitional period are as follows [Numoto 1991: 107]:

1. Most of the panel designs are composed of geometric elements only.
2. The blank panels are repeated alternately.
3. Few examples have all panels painted.

In this period, there are much fewer specimens of Zone B panel patterns on footed bowls than in the Painted and Early Incised period, as most of these bowls have narrow B zones which are not suited for drawing panel patterns. Indeed, the panel patterns of pattern D are hardly ever found in the Zone B of footed bowls. Panel designs were always arranged according to the shape and dimensions of the available

Table 3. List of Fig. 3

No	Site	Type	Zone	RD(cm)	MD(cm)	Literature
1	Mohammed Arab	Types 1 or 2	B	14.2	15.3	Killick in press: Fig.1-10
2	Mohammed Arab	Type 1	B	8.2	10.9	Roaf and Killick 1987: Fig.2
3	Mohammed Arab	Type 1	B			Roaf and Killick 1987: Fig.2
4	Fisna	Type 1	B			Numoto 1988: Fig.16-29
5	Nineveh	Type 2	B	14.3	15.1	Thompson and Hamilton 1932: Pl.54-8
6	Fisna	Type 2	B			Numoto 1988: Fig.16-53
7	Nineveh	Type 1c	B	6.6	8.7	Thompson and Hamilton 1932: Pl.53-6
8	Fisna	Type 4	B			Numoto 1988: Fig.17-65
9	Nineveh	Type 1d	B	7.5	11.4	Thompson and Hamilton 1932: Pl.53-13
10	Nineveh	Type 2d	C	15.6	16.9	Thompson and Hamilton 1932: Pl.54-2
11	Karrana 3	Type 1d	B	9.1	12.7	Rova in press: Fig.5-2
12	Karrana 3	Type 1c	B	10.9	14.8	Rova in press: Fig.5-1
13	Fisna	Type 3d	B		16.0	Numoto 1988: Fig.17-70
14	Fisna	Type 3d	C		16.0	Numoto 1988: Fig.17-70
15	Kutan	Type 3d	B		10.0	Forest 1987b: Fig.114
16	Kutan	Type 3d	B	6.3	10.3	Forest 1987b: Fig.114
17	Karrana 3	Type 2e	C	16.7	18.2	Rova in press: Fig.6-1
18	Thuwaij	Type 4c	B	15.2	34.5	Fujii et al in press: Fig.6-1
19	Mohammed Arab	Type 2i	B	12.0	13.1	Roaf and Killick 1987: Fig.3
20	Thalathat	Type 2	B			Fukai et al. 1974: Pl.48-5
21	Mohammed Arab	Type 2j	B	16.8	17.5	Roaf 1983: Fig.3-2
22	Thuwaij	Type 2	B			Numoto in press: Fig.14-94
23	Nineveh	Type 1g	B	7.7	9.4	Thompson and Hamilton 1932: Pl.53-14
24	Thalathat	Type 2j	B	24.0	24.0	Fukai et al. 1974: Pl.48-3
25	Thalathat	Type 2l	B	41.7	39.0	Fukai et al. 1974: Pl.48-19
26	Thalathat	Type 4f	B,C			Fukai et al. 1974: Pl.51-2
27	Billa	Type 2j	B	20.3	19.5	Speiser 1933: Pl.48-1
28	Mohammed Arab	Type 2	C		32.0	Killick in press: Fig.4-8
29	Rijm	Type 2n	B	35.0	33.5	Bielinski in press: Fig.4, Fig.5-B
30	Thalathat	Type 4d	B		27.0	Fukai et al. 1974: Pl.50-2

RD: Rim diameter; MD: Maximum diameter

painted area. Fundamental types of panel patterns common in the Painted and Early Incised period had their origins established in the Transitional period.

As has been mentioned, the present author has established the "Intermediate period" between the Transitional and the Painted and Early Incised periods, because pottery exists with painted design features and panel patterns common to both of these two periods. There are, however, few relevant specimens, on which most of the panel pattern are derived from very similar basic patterns A, B, C and D from the Transitional period. The former three, in particular, undergo little change (Nos. 13–16). Naturalistic motifs, which are rarely found in the Transitional period, are mainly drawn on the blank panels of pattern D, thus painting to a marked decrease in the incidence of blank panels in this period. It is very likely that the repetition rules about geometric or naturalistic panels were commonly abided by in this period. The content of the geometric panel, as in the Transitional period, is drawn horizontally. As a rule, the panel pattern of this period are more densely and regularly painted than in the Transitional period. Yet there is not the orderly regulation of the panel patterns from the Painted and Early Incised period.

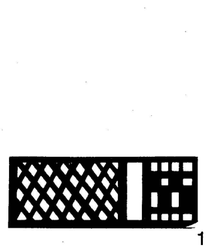
In the Painted and Early Incised period, the whole of the vessel surface is always densely painted, with no blank panels at all. As has been discussed, the blank panels of previous two periods are regarded as equivalent to naturalistic panels (Type G) or panels with one point-like element. Thus, it may be concluded that the blank panels evolved into relatively simple design panels. This period witnessed a great increase in the range and variety of panel patterns. The previous two periods had Type A panels (horizontal division), but Types C and D panels appear in the Painted and Early Incised period. Moreover, the repetitions and symmetries are painted more regularly than in the previous two periods. Patterns A and B system's simple design panels (Nos. 19, 20, Groups 1b, 2a) evolved from the blank panels, all the while the panel pattern of pattern C system (Nos. 21, 22, Group 1a) changed very little. However, system of these patterns tend to decrease in this period. Many of panel patterns of the pattern D system appeared (Nos. 23–31). Most common of these were those Group 2 (Nos. 28–30) combinations of geometric, and

Late Uruk period

Transitional period

Intermediate period

Painted and Early Incised period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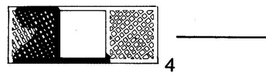
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A


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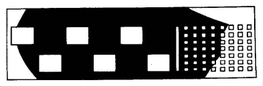
B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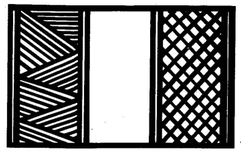
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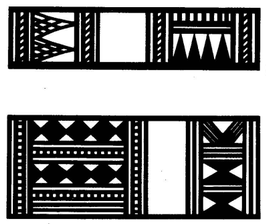
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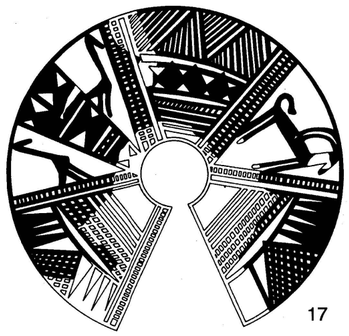
10

D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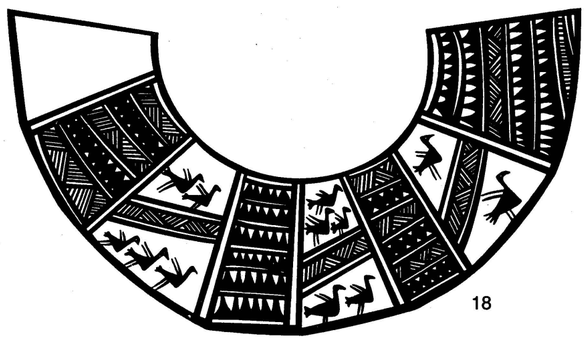
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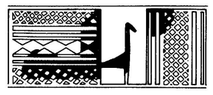
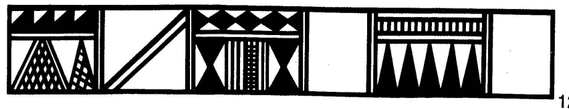

3


11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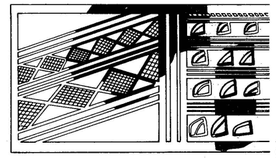
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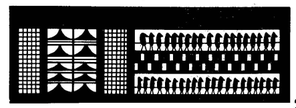
27


28


29


30

Fig. 3 Changes of the Panel Designs

naturalistic, panels as mentioned above. Yet the previously common vertical herring bones, or vertical ladders motifs on both sides (Nos. 8–10, 17), are not to be found. It is therefore postulated, that this type of panel pattern evolved into vertical division panals (Nos. 27, 29, Type BS) of the Painted and Early Incised period. No clear prototype of the panel patterns of specimens Nos. 24 to 27 (Groups 3, 4, 6) are found in the previous two periods. Judging from this fact, these panel patterns are supposed to have developed from the panel patterns of specimens Nos. 19 to 23. They are presumed to have represented newest features of the panel patterns in the Painted and Early Incised period.

4. Changes and Common Features of the Layout of Painted Designs of Each Type of Ware (Figs. 4, 5)

Changes of the layout of the painted designs

These follows on examination of how the whole layout of the painted designs on each type of ware changed from the Late Uruk period to the Painted and Early Incised period. In the last issue [Numoto 1991], all of the layout of the painted designs of each type of ware in each period were classified. The changes in the layout of the painted designs in each type of ware from the Late Uruk period to the Painted and Early Incised period are illustrated in Fig. 4. Types of pottery are classified into carinated bowl (Type 1), footed bowl (Type 2), lugged jar (Type 3) and large jar (Type 4). The painted patterns of Zone B of each type are mainly classified into patterns P1 to P5 as mentioned above. Other patterns also exist in types of jar, that is, vertical parallel bands (P6), unpainted (P7) and abstructed motif drawn irregularly (P8). The patterns of Zone C are roughly classified as follows:

a. Not painted.
b. Concentric arcs.
c. Panel patterns.
d. Patterns P1 to P8, and parallel lines.

The former patterns of Zone B arranged in a horizontal way in the figure, and the latter patterns of Zone C arranged in a vertical way. In the figure, the blank columns with a crossing of Zones B and C mean that specimens have not been found yet. Accordingly, the present author has made on estimation of what the pattern of the crossing would have looked like. The estimation can roughly be classified into three types as follows:

1. There is a possibility a pattern in the crossing.
2. There is no possibility a pattern in the crossing.
3. It is difficult to identified whether or not there is a pattern within the crossing.

And, each crossing is shown by the following marks:

A. Mark of a straight line for item No. 1.
B. No mark for item No. 2.
C. Dotted line for item No. 3.

Type 1 (carinated bowl) The P2 pattern is belived to be not of this type. The reason for this is already mentioned in the last issue [Numoto 1991: 89]. There are no specimens with painted designs on Zone C in the Late Uruk period. This phenomenon is common to all Late Uruk pottery. In the Transitional period, most of the specimens which have painted designs on Zone B only. Specimens with a combination of concentric arcs on Zone C are a P3 pattern. However, since there are examples of combinations of Type 2, it is assumed that there are also specimens of combinations of patterns P1, P4 and P5 and concentric arcs. There are no specimens which combine these with panel patterns, but there is a slight possibility of the existence of a combinations of a P5 pattern and panel pattern. Combinations of

other patterns except as mentioned above are thought not to exist in the Transitional period.

The Intermediate period, a creation of the present author, therefore, specimens included in this period could be taken as belonging to either the Transitional period or the Painted and Early Incised period. The number of the specimens of any type included in this period are few. The specimens of Type 1 are also few. Most of the specimens of the painted designs recognized at the Transitional period are presumed to have succeeded to this period. The combination of P3 (Zone B)+the same P3 design of Zone B (Zone C) appeared in this period. This combination is not recognized in the Transitional period. Accordingly, it is thought to have first appeared in this period. There is a possibility that the combinations of P1, P4 or P5 (Zone B)+same P1, P4 and P5 patterns of Zone B (Zone C) are also exist.

In the Painted and Early Incised period, painted designs are densely drawn all over the vessel surface, it is therefore presumed that most of the combination of layout existed. The most remarkable feature among these specimens is that the P4 pattern tends to decrease or vanish. The reason for this is presumed to be that the number and type of panel pattern (P5) increased in this period as discussed in the previous section. The composition of patterns P4 and P5 are basically identical, as two different types of designs are repeated alternately.

Type 2 (footed bowl) The P3 pattern of this type is not found in the Late Uruk and the Transitional periods. The reason for this is also mentioned in the last issue [Numoto 1991: 89]. Specimens which have many of combinations were found in the Transitional period. However, combinations of P1 (Zone B)+panel pattern (Zone C) and P4 (Zone B)+panel pattern (Zone C) are not found, but it is thought to exist. As discussed above, specimens of Zone B of this type with panel pattern (P5) are very few compared with those of Type 1 in the Transitional period.

Details of the Intermediate period are not known. The combinations of layout found in the Transitional period are assumed to have mostly succeeded to this period. On the other hand, specimens which have painted designs only in Zone B (type a) are considered to have decreased. Specimens, which were prototypes of various combinations of layout seen in the Painted and Early Incised period are belived to have existed in this period. Two specimens which have combinations of both P1 (Zone B)+different design of Zone B (Zone C) are considered to have belonged to the Painted and Early Incised period in the last issue [Numoto 1991: 127, 128]. However, judging from the features of their shape and design elements, they should be included in this period.

In the Painted and Early Incised period, many combinations of layout appear. These combinations can roughly be classified as follows:

1. Combination of concentric arcs in Zone C.
2. Combination of panel pattern (P5) (Zone B) and panel pattern (Zone C).
3. Combination of horizontal belt patterns (P1–P4) (Zone B)+horizontal belt patterns (P1–P4) (Zone C).

There are no specimens with painted designs in Zone B only, in this period. The same phenomenon is common to Types 3 and 4. Specimens of the P3 pattern, which are not found in the Late Uruk and the Transitional periods appear in this period. On the contrary, specimens of P2 patterns are very few. The reason for this belived to be width of Zone B, that is, the width of Zone B of the footed bowls of this period are larger than those of the Transitional period. Also, P3 pattern is regarded to be not suitable for the shape of footed bowls with a wide space in Zone B. In the Painted and Early Incised period, the specimens of P4 pattern also decreased more than those in the Transitional period. The reason for this is identical with Type 1 as discussed above. These facts suggest that the painted patterns changed according to the transition in the shape of the vessels. In this period, there is only one specimen with a combination of patterns P1, P2, P3 or P4 (Zone B)+panel pattern (Zone C) of the Transitional and the Intermediate

Type 1 (Carinated bowl): P1 P3 P4 P5
Type 2 (Footed bowl): P1 P2 P3 P4 P5
Type 3 (Lugged jar): P1 P2 P3 P4 P5 P6
Type 4 (Large jar): P1 P3 P5 P6 P7 P8

Late Uruk period

Transitional period: a, b, c

Intermediate period: a, b, d

Painted and Early Incised period: a, b, d

P1
P2
P3
P4
P5
P6
Abstracted naturalistic pattern
Concentric arcs
Solid paint
Parallel bands

Fig. 4 Changes of the Layout of the Painted Designs—Part 1

periods[7]. P1, P2, P3 and P4 patterns of Zone B are always combined with the horizontal belt patterns of Zone C (P1–P4). These patterns of Zone B are presumed to never combine with the panel pattern of Zone C. The panel patterns of Zone C, which were combined with P5 pattern of Zone B in the Transitional period are basically a vertical division, while the panel patterns of Zone C in this period are always a roughly horizontal division. The combinations of layout of painted designs in this period, such as a tendecy for the design patterns of Zone B to be repeated in Zone C are more regular than those of the previous periods.

Type 3 (lugged jar) Specimens of this type are very few in the Transitional period, therefore, it is not known whether types of combination exist. Accordingly, the present author will discuss here specimens of Types 1 and 2 of the Transitional period and Type 3 of the Painted and Early Incised period. P1 to P5 patterns of Zone B are belived to have certainly existed. Combinations of P1, P2, P3 or P4 (Zone B)+ concentric arcs (Zone C) are also considered to have existed. In addition, there is a strong possibility that the combination of P5 (Zone B) and panel pattern (Zone C) also existed. Details of the Intermediate period are not clear, however, it is assumed a variety of combinations of painted patterns increased during this period. In the Painted and Early Incised period, many types of shape appear, and hence, there are various types of combinations. The most remarkable feature of these painted patterns is that the P6 pattern first appeared in this period. This pattern is regarded to have mainly appeared on the small to medium-sized jars with rounded body. The rules of combinations of P1 to P5 of Zone B and patterns of Zone C are mostly identical with those of Type 2 as discussed above.

Type 4 (large jar) In the Late Uruk period, only patterns P1,P3 and P5 are found. Specimens of patterns P2 and P4 are not found in the Painted and Early Incised period. Judging from this, these two patterns are regarded to have not arranged on this type of large jar. The P2 pattern is not suitable for the wide space of Zone B as already mentioned above. There are almost no specimens showing the whole layout of painted designs from the Transitional period. However, judging from the painted designs of potsherds, it is presumed that the P5 pattern is used frequently. Combinations of P5 pattern (Zone B) and panel patterns or concentric arcs (Zone C) are assumed to have existed. There is only one P8 pattern which came from Tell Fisna (No. 97). It is characterized by the design of its irregular abstracted motif. This pattern is considered to be the distinctive design pattern in the Transitional period.

Two specimens of combinations of P5 (Zone B) and concentric arcs (Zone C) are included in the Intermediate period. One of them, a specimen of combination of P5 (Zone B) and double concentric arcs is considered to have belonged to the Painted and Early Incised period in the last issue [Numoto 1991: 137]. However, judging by its features, shape and concentric arcs, it is concluded that this specimen should be included in the Intermediate period. Presumably, in this period, painted designs had not been so densely drawn all over Zone C, compared to those of the Painted and Early Incised period.

In the Painted and Early Incised period, the main painted patterns of Zone B are patterns P5 and P6. The most typical design layout is a combination of P5 (Zone B) and concentric arcs (lower part of Zone C). There are no specimens of large jars which have only concentric arcs are drawn on Zone C. The reason for this is that the dimension of Zone C of Type 4 vessels is too wide for drawing concentric arcs. If only concentric arcs are drawn a large blank space remaining in Zone C. Leaving blank spaces runs against the painting conventions of this period, as painted designs are drawn densely all over the vessel surface. Consequently, concentric arcs are always drawn on the lower half part of Zone C. This area is the most suitable for drawing concentric arcs. Thus, in Zone C of Type 4 vessel, suitable space was always arranged according to the type of design pattern. The same phenomenon is also common to all the vessels of the Painted and Early Incised period. P6 pattern is always arranged from Zone B through to Zone C. There are no specimens of P6 pattern drawn in either Zones B or C. P7 pattern is assumed to have first appeared in this period. Specimens which belong to this pattern do not have painted designs on Zones B

and C. Painted designs are mainly arranged on Zones A and D. This pattern can not be regarded as the distinctive pattern of this period, because similar examples are found in Type 3 vessels. Consequently, there is a possibility that the P7 pattern is a relatively common design pattern of the Painted and Early Incised period.

The genealogical diagram (Fig. 5) shows the whole layout of the painted designs of each type of pottery from the Late Uruk period to the Painted and Early Incised period. Specimens illustrated in Fig. 5 are the scale allowing us to compare the painted designs of vessels of different size and type. The classification of composition of painted designs was based on that of Fig. 4. Patterns P1 and P4 are regarded to be basically the same design pattern, therefore, here, these two patterns are included in the same group. The outline of the changes to the layout of painted designs in each vessel type have been mentioned above. Here, only those points which deserve a special mention are discussed.

Carinated bowl Patterns of P1, P3, P4 and P5 of carinated bowl developed from the Late Uruk period to the Transitional period. The detail of the Intermediate period is not known. Specimens Nos. 14 and 15 are considered to have features of both patterns P1 and P3.

Specimens of painted designs of the Painted and Early Incised period are roughly classified into patterns P1 and P3 (1G) and P5 pattern (2G). Prototype of the layout of painted design of specimen No. 20 (1Gc) is regarded to be that which is seen in specimen No. 11 the Transitional period. Painted style of specimens Nos. 23 and 24 (2Gc) does not change from those of specimens of the Transitional and the Intermediate periods. On the other hand, 2Ga (No. 21) and 2Gb (No. 22) patterns are a variety of the P5 pattern, and it is evident that they first appeared in this period. In this period, concentric arcs are presumed to have been mostly drawn on Zone C of the carinated bowl. Painted carinated bowls are commonly found in the Transitional period, and are few in the Painted and Early Incised period. Consequently, there is less variety of pattern on the carinated bowls than that seen on the footed bowls.

Footed bowl In the Transitional period, the painted patterns of footed bowls are roughly classified into three groups:

1. P1, P4 patterns.
2. P2 pattern.
3. P5 pattern.

Among these specimens, combinations of concentric arcs (Nos. 30, 31, 33, 36) or panel pattern (Nos. 37, 38) on Zones C are considered to be a new style of layout in the Transitional period. These two combinations are based on the designs of the Painted and Early Incised period.

There are very few specimens in the Intermediate period, it is therefore not clear how the layout of painted patterns developed from the Transitional period.

The layout of the painted designs in the Painted and Early Incised period are roughly classified into following three groups (3G, 4G, 5G).

1. **3G:** This group comprises of combinations of P1, P2 or P4 (Zone B)+horizontal belt patterns (Zone C). It can also be subdivided into the following three types:
   a. P1 or P2 (Zone B)+the same design pattern of Zone B (Zone C) (Nos. 41–47).
   b. P1 (Zone B)+the same P1 of Zone B and the different design pattern of Zone B (Nos. 48–51).
   c. P1 (Zone B)+the different design pattern of Zone B (Zone C) (Nos. 52–54)[8].
2. **4G:** The composition of the design patterns in this group is combined with concentric arcs in Zone C, and they are subdivided into following three types:
   a. P1 (Zone B)+concentric arcs (Zone C) (No. 55).
   b. P3 (Zone B)+concentric arcs (Zone C) (Nos. 56, 57).

c. P5 (Zone B)+concentric arcs (Zone C) (Nos. 58–62).

3. **5G:** The composition of the design patterns in this group is combined with P5 patterns either in Zones B or C. These can also be subdivided into three types as follows:

a. P5 (Zone B)+P5 (Zone C) (Nos. 63–66).

b. P1 (Zone B)+P5 (Zone C) (No. 67).

c. P5 (Zone B)+concentric arcs (Zone C) (Nos. 58–62).

There are very few specimens from the Intermediate period, it is therefore not clear how the painted layout of such specimens developed from the Transitional period. However, examples, which are considered to have clearly developed from the basic design layout of the Transitional period, are as follows:

1. 3G group developed from P1 and P2.
2. 4Ga group developed from specimen No. 31.
3. 4Gb group developed from specimen No. 33.
4. 4Gc group developed from specimen No. 36.
5. 5Ga group developed from specimen No. 37.
6. 5Gb group developed from specimen No. 38.

The most notable items from this period are mentioned below. There are almost no specimens of combinations of P1 or P4 (Zone B)+concentric arcs (Zone C) (Nos. 30, 31) and P2 (Zone B)+concentric arcs (Zone C) (No. 33) such as these commonly found in the Transitional period. The most common design combination in this period is a 4Gc group (P5+concentric arcs).

Lugged jar As the number of specimens of lugged jars are few in the Late Uruk and the Transitional periods, information regarding the changes to painted designs is scant.

The layout of the painted designs of the Painted and Early Incised period are roughly classified as follows:

1. **6G:** P2 or P3 (Zone B)+the same P2 or P3 of Zone B (Zone C) (Nos. 76–79).
2. **7G:** Combination of concentric arcs in Zone C, is subdivided into the following two types:

a. P1 or P4 (Zone B)+concentric arcs (Zone C) (Nos. 80–82).

b. P5 (Zone B)+concentric arcs (Zone C) (Nos. 83, 84).

3. **8G:** The composition of designs belongs to this group are characterized by roughly vertical design. They are divided into two types.

a. Panel patterns are vertically arranged continuously from Zones B to C (Nos. 85, 86).

b. Parallel vertical belt designs are arranged from Zone B through to Zone C (Nos. 87–89).

4. **9G:** There is almost no paint in Zones B and C (Nos. 90, 91).

Specimens of 6G are considered to have appeared based on patterns P2 and P3. Its prototype is presumed to have existed in the Intermediate period. Specimens of 7G are belived to have directly succeeded to the layout designs of specimens Nos. 71 and 72 of the Intermediate period. Specimens of 8Ga are regarded to have developed from the panel pattern of specimen No. 74. On the other hand, specimens of 8Gb are assumed to have developed from the evolution of panel patterns. There is a possibility that a prototype did exist in the Intermediate period. The origins of specimens of 9G are not known, it is however supposed to have appeared in the Painted and Early Incised period.

Large jar Three design patterns, which are P1, P3 and P5 are attributed to the Late Uruk period. However, P5 patterns are mainly found after the Transitional period. This fact suggests that patterns of P1 and P3 vanished after the Late Uruk period. There are no examples which have succeeded to the design pattern of specimen No. 97.

The layout of the painted designs of the Painted and Early Incised period are classified as follows:

1. **10G:** The composition of these designs are basically a panel pattern.

Table 4. List of Fig. 5

No	Site	Type	Zone	RD(cm)	MD(cm)	Literature
1	Mohammed Arab	Type 1a	B	8.7	9.3	after Killick in press: Fig.1-9
2	Mohammed Arab	Type 1	B	12.9	17.8	after Killick in press: Fig.1-11
3	Nineveh	Type 1b	B	10.7	14.0	after Thompson and Hamilton 1932: Pl.53-15
4	Mohammed Arab	Type 1	B	8.2	10.9	after Roaf and Killick 1987: Fig.2
5	Mohammed Arab	Type 1	B			after Roaf and Killick 1987: Fig.2
6	Nineveh	Type 1c	B	9.6	11.8	after Thompson and Hamilton 1932: Pl.53-7
7	Jigan	Type 1d	B	6.6	10.5	Fujii 1987: Fig.5-12
8	Fisna	Type 1c	B	8.6	11.1	Numoto 1988: Fig.16-21
9	Nineveh	Type 1c	B	8.7	12.3	after Thompson and Hamilton 1932: Pl.53-11
10	Nineveh	Type 1d	B	8.7	11.6	after Thompson and Mallowan 1933: Pl.54-4
11	Brak	Type 1	B,C	9.2	12.0	after Oates 1986: Fig.5-107
12	Nineveh	Type 1c	B	6.6	8.7	after Thompson and Hamilton 1932: Pl.53-6
13	Nineveh	Type 1d	B	7.5	11.4	after Thompson and Hamilton 1932: Pl.53-13
14	Fisna	Type 1e	B,C	7.1	11.1	Numoto 1988: Fig.16-28
15	Chagar Bazar	Type 1f	B,C	8.8	9.8	after Mallowan 1936: Fig.25-1
16	Karrana 3	Type 1	B	8.8	9.5	after Fales et al. 1987: Fig.11-33
17	Mohammed Arab	Type 1	B	4.0	5.4	after Killick in press: Fig.4-13
18	Mohammed Arab	Type 1g	B,C	7.2	8.8	after Killick in press: Fig.4-12
19	Nineveh	Type 1g	B	8.1	9.5	after Thompson and Hamilton 1932: Pl.70-2
20	Thalathat	Type 1g	B,C		11.5	after Fukai et al. 1974: Pl.47-1
21	Nineveh	Type 1h	B,C		13.9	after Thompson and Hamilton 1932: Pl.53-8
22	Nineveh	Type 1h	B,C	6.9	10.7	after Thompson and Hamilton 1932: Pl.53-2
23	Nineveh	Type 1g	B,C	7.7	9.4	after Thompson and Hamilton 1932: Pl.53-14
24	Mohammed Arab	Type 1g	B	7.3	10.0	after Killick in press: Fig.4-9
25	Mohammed Arab	Type 2b	B	15.3	15.6	after Killick in press: Fig.1-13
26	Karrana 3	Type 2a	B	12.0	12.6	after Fales et al. 1987: Fig.9-15
27	Mohammed Arab	Types 1 or 2	B	14.2	15.3	after Killick in press: Fig.1-10
28	Nineveh	Type 2c	B	11.3	12.3	after Thompson and Hamilton 1932: Pl.54-5
29	Karrana 3	Type 2c	B	17.1	18.2	after Fales et al. 1987: Fig.10-21
30	Nineveh	Type 2d	B,C	9.2	9.3	after Thompson and Hamilton 1932: Pl.54-3
31	Fisna	Type 2d	B,C	14.3	15.4	Numoto 1988: Fig.16-58
32	Jigan	Type 2	B	15.7	16.7	Numoto 1991: Fig.26-5
33	Karrana 3	Type 2	B,C	20.3	22.1	after Rova in press: Fig.5-7
34	Nineveh	Type 2	B	14.3	15.1	after Thompson and Hamilton 1932: Pl.54-8
35	Nineveh	Type 2c	B	14.8	17.4	after Thompson and Hamilton 1932: Pl.54-1
36	Karrana 3	Type 2	B,C	14.2	14.8	after Rova in press: Fig.5-8
37	Nineveh	Type 2d	B,C	15.6	16.9	after Thompson and Hamilton 1932: Pl.54-2
38	Nineveh	Type 2	B,C	22.7	24.0	after Thompson and Hamilton 1932: Pl.54-7
39	Kutan	Type 2	B,C	18.4	20.5	after Bachelot in press: Type 15, K 155
40	Karrana 3	Type 2e	B,C	16.7	18.2	after Rova in press: Fig.6-1
41	Kutan	Type 2g	B,C,D	8.6	8.9	after Bachelot 1987: Fig.7
42	Mohammed Arab	Type 2h	B,C,D	8.2	8.6	after Roaf 1983: Fig.3-6
43	Nineveh	Type 2i	B,C	12.8	13.6	after Thompson and Hamilton 1932: Pl.54-4
44	Kutan	Type 2j	B,C,D		16.8	after Bachelot 1987: Fig.7
45	Nineveh	Type 2i	B,C	12.5	13.9	after Thompson and Hamilton 1932: Pl.54-6
46	Rijm	Type 2j	B,C	17.7	18.2	after Bielinski in press: Fig.10-3
47	Mohammed Arab	Type 2j	B,C	17.8	18.9	after Roaf and Killick 1987: Fig.3
48	Rijm	Type 2f	B,C,D	7.8	8.3	after Bielinski in press: Fig.11-2
49	Rijm	Type 2j	B,C	13.8	13.8	after Bielinski in press: Fig.10-4
50	Rijm	Type 2j	B,C	20.5	20.8	after Bielinski in press: Fig.10-2
51	Billa	Type 2k	B,C,D	18.5	20.5	after Speiser 1933: Pl.48-2
52	Nineveh	Type 2e	B,C	14.7	15.6	after Thompson and Mallowan 1933: Pl.54-5
53	Nineveh	Type 2m	B,C	20.7	21.6	after Thompson and Hamilton 1932: Pl.56-3
54	Nineveh	Type 2m	B,C	33.1	34.8	after Thompson and Hamilton 1932: Pl.56-1
55	Thalathat	Type 2e	B,C			after Fukai et al. 1974: Pl.48-7
56	Nineveh	Type 2e	B,C	14.3	15.0	after Thompson and Hamilton 1932: Pl.54-9
57	Thalathat	Type 2j	B,C	30.6	30.2	after Fukai et al. 1974: Pl.48-1
58	Mohammed Arab	Type 2i	B,C	12.0	13.1	after Roaf and Killick 1987: Fig.3
59	Mohammed Arab	Type 2	B,C,D		12.4	after Roaf 1983: Fig.3-4
60	Billa	Type 2j	B,C,D	20.3	19.5	after Speiser 1933: Pl.48-1
61	Rijm	Type 2j	B,C	19.7	19.3	after Bielinski in press: Fig.10-1
62	Thalathat	Type 2j	B,C,D	24.0	24.0	after Fukai et al. 1974: Pl.48-3
63	Mohammed Arab	Type 2j	B,C	16.8	17.5	after Roaf 1983: Fig.3-2
64	Mohammed Arab	Type 2j	B,C	22.1	23.2	after Roaf 1983: Fig.3-1
65	Thalathat	Type 2l	B,C,D	41.7	39.0	after Fukai et al. 1974: Pl.48-19
66	Rijm	Type 2n	B,C,D	35.0	33.5	after Bielinski in press: Fig.4, Fig.5-B
67	Leilan	Type 2	B,C		40.2	after Weiss and Mayo in press: Fig.7-5
68	Nineveh	Type 3b	B		12.8	after Thompson and Hamilton 1932: Pl.55-9
69	Mohammed Arab	Type 3a	A,B	9.7	16.4	after Roaf and Killick 1987: Fig.2
70	Fisna	Type 3c	B,C		10.0	Numoto 1988: Fig.17-64
71	Chagar Bazar	Type 3e	A,B,C	7.1	11.5	after Mallowan 1936: Fig.25-3
72	Kutan	Type 3d	A,B,C	6.3	10.3	after Forest 1987b: Fig.114
73	Kutan	Type 3d	B,C		10.0	after Forest 1987b: Fig.114
74	Fisna	Type 3d	B,C		16.0	Numoto 1988: Fig.17-70
75	Kutan	Type 3j	A,B,C,D	10.0	14.3	after Bachelot in press: Type 14

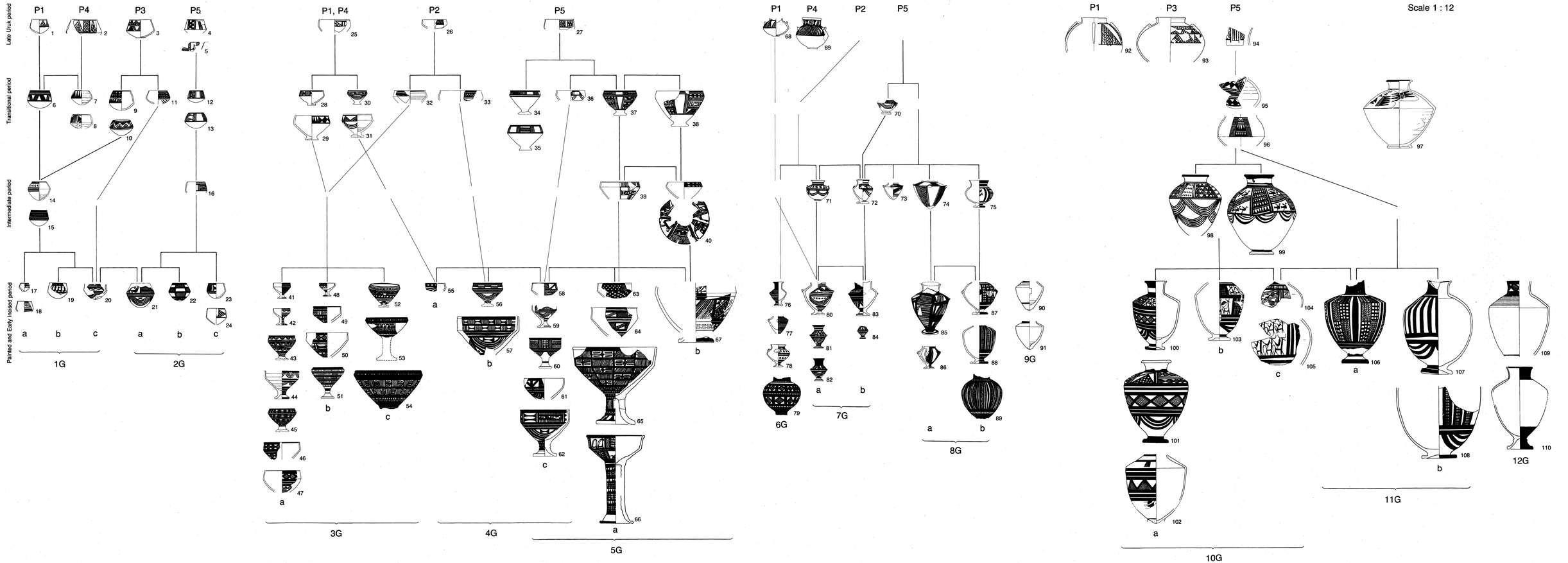

Fig. 5 Changes of the Layout of the Painted Designs—Part 2

76 Nineveh	Type 3g	A,B,C,D	5.4	7.2	after Thompson and Hamilton 1932: Pl.55-8	
77 Kutan	Type 3f	B,C		10.1	after Bachelot in press: Type 15	
78 Kutan	Type 3i	A,B,C,D	7.6	11.5	after Forest 1987a: Fig.8	
79 Nineveh	Type 3j	B,C		18.6	after Thompson and Hamilton 1932: Pl.57-3	
80 Mohammed Arab	Type 3f	B,C,D		14.8	after Roaf and Killick 1987: Fig.3	
81 Nineveh	Type 3g	A,B,C,D	6.3	8.1	after Thompson and Hamilton 1932: Pl.55-7	
82 Nineveh	Type 3g	A,B,C,D	4.5	6.9	after Thompson and Hamilton 1932: Pl.55-1	
83 Nineveh	Type 3f	A,B,C,D		13.7	after Thompson and Hamilton 1932: Pl.55-6	
84 Nineveh	Type 3g	B,C,D		5.2	after Thompson and Hamilton 1932: Pl.55-2	
85 Nineveh	Type 3f	B,C,D		18.4	after Thompson and Mallowan 1933: Pl.54-3	
86 Mohammed Arab	Type 3f	B,C,D		10.0	after Roaf 1983: Fig.3-7	
87 Kutan	Type 3h	B,C,D		17.5	after Forest 1987b: Fig.114	
88 Mohammed Arab	Type 4d	B,C,D		16.6	after Roaf 1983: Fig.3-8	
89 Nineveh	Type 3j	B,C		20.0	after Thompson and Hamilton 1932: Pl.57-9	
90 Thalathat	Type 3	B,C		14.0	after Fukai et al. 1974: Pl.51-4	
91 Thalathat	Type 3	B,C		14.0	after Fukai et al. 1974: Pl.51-3	
92 Mohammed Arab	Type 4a	B	12.8	28.2	after Roaf 1983: Fig.2-2	
93 Karrana 3	Type 4a	B	15.2	34.0	after Rova in press: Fig.3-5	
94 Mohammed Arab	Type 4	B			after Killick in press: Fig.1-6	
95 Fisna	Type 4	B			Numoto 1988: Fig.17-65	
96 Kutan	Type 4	B		25.0	after Bachelot in press: Type 15	
97 Fisna	Type 4	A,B	12.0	36.2	Numoto 1988: Fig.17-71	
98 Nineveh	Type 4d	A,B,C	13.3	25.7	after Thompson and Hamilton 1932: Pl.57-6	
99 Thuwaij	Type 4c	A,B,C	15.2	34.5	Fujii et al in press: Fig.6-1	
100 Rijm	Type 4d	A,B,C,D	14.0	30.5	after Bielinski in press: Figs.4, 5-A	
101 Nineveh	Type 4d	B,C,D		34.3	after Thompson and Hamilton 1932: Pl.57-1	
102 Thalathat	Type 4d	B,C		31.0	after Fukai et al. 1974: Pl.50-3	
103 Kutan	Type 4d	B,C,D		25.5	after Forest 1987b: Fig.114	
104 Thalathat	Type 4f	B,C			after Fukai et al. 1974: Pl.51-2	
105 Thalathat	Type 4f	B,C			after Fukai et al. 1974: Pl.56-78	
106 Nineveh	Type 4d	A,B,C		30.5	after Thompson and Hamilton 1932: Pl.57-5	
107 Thalathat	Type 4d	A,B,C,D	12.6	35.3	after Fukai et al. 1974: Pl.50-1	
108 Kutan	Type 4d	C,D		45.2	after Forest 1987a: Fig.8	
109 Thalathat	Type 4d	A		30.5	after Fukai et al. 1974: Pl.50-4	
110 Mohammed Arab	Type 4e	A,B,C,D	13.0	28.0	after Killick in press: Fig.4-1	

RD: Rim diameter; MD: Maximum diameter

a. P5 (Zone B)+P1 (Zone Ca)+Concentric arcs (Zone Cb) (Nos. 100–102).

b. P5 (Zone B)+P5 (Zone Ca)+Concentric arcs (Zone Cb) (No. 103).

c. P5 (Zones B, C) (Nos. 104, 105).

2. **11G:** The composition of these designs are basically vertical belt patterns.

a. Vertical panels and thick vertical lines alternately arranged from Zone B through to Zone Ca (No. 106).

b. One type of vertical belt design being repeated parallel to one another (Zones B and Ca)+concentric arcs (Zone Cb) (Nos. 107, 108).

3. **12G:** Paint is not applied to Zones B and C (Nos. 109, 110).

Specimens of 10G show a variety of composition of P5 patterns (Nos. 98, 99) of the Intermediate period. It is evident that specimens of 10G appeared based on designs of the P5 pattern of the Intermediate and the Transitional periods. Specimens of 12G are presumed to have appeared in the Painted and Early Incised period and are identical with specimens of 9G as mentioned above.

Difference and common features of painted designs between each type of vessel (Figs. 4, 5)

The questions I would like to address are:

—Are there any common features of painted designs between each type of vessel?

—Is there any borrowing or introduction of painted designs between each type of vessel?

First of all, similar or homogeneous design layout among the specimens of the Painted and Early Incised period will be discussed. As the footed bowls specimens are numerous, basic design layouts of these vessels can be compared to those of other types of vessel. Design layouts of each type of vessel common to design layouts of footed bowl are summarized below:

1. Horizontal belt patterns (P1–P4) (Zone B)+the same horizontal belt patterns of Zone B (Zone C)

(3Ga, 3Gb, 6G).

2a. P1 or P4 (Zone B)+concentric arcs (Zone C) (4Ga, 1Gc, 7Ga).

2b. P5 (Zone B)+concentric arcs (Zone C) (4Gc, 2Ga, 7Gb).

3. P5 (Zone B)+P5 (Zone C) (5Ga, 2Gb, 8Ga).

The three types of design layout above are recognized as types of carinated bowl, footed bowl and lugged jar. Consequently, these three design layouts can be the typical three compositions of painted designs of the Painted and Early Incised period. There are no examples identical with the design layout of the large jar. However, compositions of design layout of 10Ga and 10Gb are basically common to the design layout of No. 2b. The design layouts of Nos. 1, 2a and 3 are considered to be unsuitable for the large jar, because of the large size of its painted zones.

The differences between the design layouts of each type of vessel will be discussed here. The design layouts of 9G and 12G are found in only lugged jars and large jars. Judging from this fact, these design layouts were arranged specially for these types of jars. Design layouts of 10Ga and 10Gb which have concentric arcs in the lower half of Zone C (Nos. 100–103) are not found in the lugged jars. Also the design layout of No. 1 which is based on a P2 pattern is rare in large jars. The reason for this has already been discussed. It is concluded that the former design layout is suitable for large-sized vessels, and the latter design layout is suitable for small to medium-sized vessels. Design layouts of 8G and 11G which have roughly vertical belt patterns are found only in types of jar, and not in the carinated and footed bowls. This fact shows that these design layouts are not suitable for vessels with shorter and wider shaped bodies, but rather, they are suitable for vessels with relatively long body shape. The design layouts of footed bowls are roughly horizontal, because their bodies have wider shape. Thus, as mentioned above this fact suggests that the differences in vessel shape and size are closely related to the style of painting employed. Potters always chose the most fitting painted designs according to each vessel's type and shape.

The differences and common features in painted designs compared with the variations in shape and size whithin the same type of vessel

Different types of carinated bowl and footed bowl in the Intermediate period are few, and, therefore, there is no great difference among each type of vessel. Moreover, there is no great difference in the size of specimens of each type. Here, the present author wishes to discuss the main characteristics of the footed bowls, lugged jars and large jars of the Painted and Early Incised period.

1. *Characteristics of footed bowls* The main characteristic features of footed bowls are as follows:

a. In the design layouts of 3Ga and 3Gb, there are found many small to medium-sized vessels.

b. The design layout of 3Gc is found on vessels with a narrow Zone B.

c. The design layout of 5Ga is mainly found on middle to large-sized types.

In the case of item *a*, the cause of this is width of Zone B. That is, the Zone B of large-sized types is too wide for drawing P1 and P4 patterns. In the case of item *b*, chronological differences are relevant. As for item *c*, the relevant issue is the size of painted zone. The drawing of panel patterns needs relatively large spaces, because each panel is filled with some complex design elements. It is technically difficult to draw panel designs on the surface of small types of bowls. Accordingly, panel design is regarded to have been not suitable for the small-sized type of footed bowl.

2. *Characteristics of lugged jars* The most notable features of lugged jars are as follows:

d. The design layout of 6G is mainly found in the small-sized type.

e. The design layout of 8Gb is mainly found in shapes with rounded body.

In the case of item *d*, the reason having similar with that of item *a* as mentioned above. As for item *e*, vertical designs can be smoothly drawn on the rounded shape of body.

3. *Characteristics of large jars*

f. The design layout of 10Gc is found on shapes with a rounded body.

This design is assumed to have not appeared on jars with carination on the body. It is evident that the painted designs have been chosen according to the differences in shape and size within the same type of vessels.

Among the same type of vessel, there are examples of painted patterns which are found in the Transitional period, but not found in the Painted and Early Incised period. On the other hand, there are examples of painted patterns which are found in the Painted and Early Incised period, but not in the Transitional period. For example, the appearance of P3 pattern of design layout in 4Gb or the increase of panel pattern design layouts 5Ga and 5Gc in the Painted and Early Incised period. The emergence and increase of these design patterns is considered to have clearly influenced the development of the type of footed bowl with wide Zone B. This fact also clearly shows that painted designs change according to changes in vessel shape.

5. Conclusions

The present author has discussed the differences, common features and changes of painted designs from the Late Uruk period through to the Painted and Early Incised period. Their features can be summarized as below. Similar types of painted designs tend to be drawn on all types of vessel in the Late Uruk period. Compositions of painted design are simple. Painted designs are arranged according to the difference of shape and size of vessels from the change to the Transitional and the Painted and Early Incised periods. The repetition and complexity of combinations of the painted designs are more advanced. As a rule, painted designs of the Painted and Early Incised period are regarded as the typical painted style in the whole of Ninevite 5 period. However, the basis of these combinations of painted designs has already been established in the Transitional period, as discussed above.

There are many unanswered questions regarding the Ninevite 5 painted designs. The present author would like to address some of them here.

First of all, is there any regional variation among painted designs?; are there characteristic or original painted designs which existed within each tell?

These points are important for understanding whether or not any tells are related to each other. Specimens must be taken from each site in order to carry out comparisons and understand the characteristics of painted designs from each site. However, it is difficult to make comparisons between different sites because of the small amount of painted pottery from each tell. Accordingly, only the particularly remarkable features within the specimens of the Painted and Early Incised period are examined here. The author has also researched the chronological differences and the originality of painted designs within the Painted and Early Incised period. The specimens examined here are from Tells Thalathat, Mohammed Arab and Kutan, as all of these tells have a relatively large number of specimens, excavated from pure occupation levels. Specimens from Tell Kutan are regarded to be of the same period as those of Tell Talathat [Bachelot in press]. However, since there are several specimens which have features predating the Painted and Early Incised period, the author has included these specimens in the Intermediate period [Numoto 1991: 108–116]. There is no major difference between the specimens of Tell Kutan and those of Tell Mohammed Arab. With the exception of these specimens, both have specimens common to each other. The reason for this is presumed to be the proximity of the two tells. There are various differences between the specimens of these two tells and those of Tell Thalathat. Among the latter specimen special features can be discerned. These are summarized as follows [Numoto 1991]:

1. Characteristics of design elements:
   a. Concave lens-like motifs are commonly found.
   b. The motif of flying birds and zigzag spaces filled with slanting lines are hardly found.
2. Characteristics of combinations of painted designs:
   a. Combinations of P5 (Zone B)+concentric arcs (Zone C) are mostly found in the footed bowls.
   b. Examples of combinations of incised motifs exist.
   c. Specimens with simplified painted designs exist (Nos. 102, 107).
3. Characteristics of types and shapes of painted ware:
   a. Only a few painted carinated bowls are found.
   b. There are almost no footed bowls with inclined rims. Most of the footed bowls have upright or slightly everted rims.

As mentioned above these characteristics show chronological differences, regional variation or variation within the same period. Their characteristics can be attributed to these causes:

1. Chronological difference: 1b, 2b, 2c, 3a, 3b.
2. Regional variation: 1b.
3. Variation of same period: 1a, 2a.

However, this classification can only be an assumption. Actually, these three features of variation have become entangled with each other. However, it is evident that these characteristics of painted ware from Tell Thalathat indicate chronological difference within the Painted and Early Incised period. On the other hand, there are no clear characteristics which show regional variation. Roaf and Killick proposed to place the specimens from Tell Thalathat in the latter half of the Painted and Early Incised period [1987, Killick in press]. According to their view, the characteristics of Tell Thalathat painted pottery show the new style of painted pottery from the Painted and Early Incised period. It is difficult to determine whether differences in the same type of pottery and their painted designs are chronological or regional variaitions or variation of same type of pottery.

Relationship of incised ware What influence did the appearance of grey or incised wares bring to bear on painted wares? It is presumed to have strongly influenced the decline of painted wares [Numoto 1991: 147]. Various types of incised ware clearly show the chronological variations within the Painted and Early Incised period. According to the research results of Tell Mohammed Arab [Roaf and Killick 1987: 223], the simple style of incised ware such as notched band pattern were found from the earlist phase of Period 2, and after this phase a complex style of incised ware appeared. Painted wares found together with the former incised wares, clearly are deemed to be older than those found together with the latter incised wares. The occupation of Ninevite 5 level of Tell Thalathat is belived to be one single period. Accordingly, there is almost no chronological difference between its painted and incised wares. According to the details of Tell Mohammed Arab period 2, mentioned above the incised wares of Tell Thalathat are identical with the latter type of incised wares of Tell Mohammed Arab period 2. Consequently, the painted wares of Tell Thalathat can be also regarded to display the new style of the Painted and Early Incised period. This view supports the foregoing assumption that the painted wares of Tell Thalathat should be chronologically placed in the latter half of the Painted and Early Incised period.

The uses of painted pottery There is a possibility that the painted designs are different according to the purpose of the pottery. For example, some are used for household articles, and others are used for storage or working vessels. In other words, the use of pottery was roughly classified into two types: one is always used for moving or carrying, and the other is mainly fixed. This begs the question whether or not there are any differences in these types of pottery. Furthermore, it is belived that potters decided whether to paint or not according to the purpose of the pottery. Painted wares are presumed to have been

mainly used in the room for necessary daily chores. The others, especially, painted large footed bowls and painted large jars are regarded to be principally vessels, and they are thought to have had a fixed position in the living room. Accordingly, it is assumed that attractive elegant designs were drawn on these painted wares rather than those other types of vessels. Artistically, painted designs on small vessels are not as good as those on the larger ones. This fact shows that delicate and elegant painting was difficult to execute on small vessels. The small carinated and footed bowls are thought to have been mainly used for the purpose of individual tableware, and it can be seen that the painted designs were not as carefully drawn as those on the large vessels. In the case of jars with no paintings on Zones B and C from the Painted and Early Incised period, they are supposed to have been mainly used for the purpose of practical tasks.

Finally, it is considered that the changes of political, economic and social systems has had a great influence on the changes of painted designs. Also changes in the system of pottery production are supposed to have taken place. Painted pottery from each tell is considered to have been produced in individual sites. The appearance of grey carinated and footed bowls of the Painted and Early Incised period shows that it is possible to have made mass-produced pottery, before the invention of kiln control [Killick in press]. And, it is evident that the produce of painted ware tended to decrease with the appearance of grey or incised wares. However, it is not known how the production of painted wares in this period changed with social background. In the latter half of the Ninevite 5 period, ornamentations of pottery are simplified, and pottery tended to be more important for practical use. Roughly speaking, the style of ornamentations of pottery of the whole Ninevite 5 period can be classified into two groups: the showy or bright style of the first half of the period; and followed by a simple style in the latter half of the period. The same phenomenon is assumed to have influenced changes in the social system of the Ninevite 5 period. Furthermore, it is necessary to conduct more research on whether or not painted pottery had position or importance among the Ninevite 5 pottery as a whole. This topic must be saved for future investigation.

Acknowledgement

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Notes

1) As has already been mentioned in the last issue, this suggests that several kinds of brush were used than those of the Late Uruk and the Transitional periods [Numoto 1991: 108, 123].
2) Many of these are found on Tell Thalathat specimens, and only on the footed bowl.
3) The importance of carination will be discussed. Most carination on carinated bowls is found in the lower part of middle height of the body, during the Late Uruk and the Transitional periods [Numoto 1989]. Therefore, the upper part of the body has wide spaces (Zone B) and it is possible to subdivided into some horizontal painted zones. On the other hand, during the Painted and Early Incised period most carination is found in the upper part of middle height of the body; thus the upper part of the body has narrow spaces (Zone B). It follows, that it is hard to subdivide this area into horizontal painted zones. All of the painted carinated bowls and footed bowls have carinations on their bodies. This fact suggests that the potters used carination for division of painted zones in the body. The carination serving to clearly divide Zones B and C on the body, and helping with the painting of standardized design patterns.
4) These classifications were divided into six types in the last issue [Numoto 1991: 124].
5) Type AS consists of some 15 pieces, while Type BS has 7 recognized pieces.
6) The combinations of geometric panels are mainly illustrated on the left side in the figure, while the combinations of naturalistic and geometric panels are illustrated on the right side in the figure.
7) This specimen P1 (Zone B)+P5 (Zone C), came from Tell Leilan [Weiss and Calderone in press]. This specimen is thought to be peculiar to this site and region, and is therefore excluded from this classification.
8) Although the painted patterns of specimens Nos. 52 and 54 are regarded to have belonged to the Intermediate period in Fig. 4, there is no firm evidence for this. Consequently, their specimens are included in this period.

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NINEVITE 5 POTTERY FROM TELL JIGAN AREA C

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Introduction

The Japanese Archaeological Expedition from Kokushikan University excavated archaeological tells in the area of Eski-Mosul from the autumn in 1983, where the Saddam Dam was under construction and would go under water. Tell Jigan was largest tell in this region. The excavations were conducted in two seasons: the first season from February to July 1984 (Areas A and B) and second season from October 1984 to February 1985 (Area C). The reports on the research in the first season have already published in the *al-Rāfidān*, and the *Researches on the Antiquities of Saddam Dam Basin Salvage and Other Researches* [Ii and Kawamata 1984/85; Fujii et al. 1987]. As for research in the second season, a published report mainly referred to its levels and structures of Area C [Fujii 1987], but has little mentioned other findings in this area. Detailed reports are needed. In Area C, we excavated five small grids, each size of which is four square meters (G03, G1, G4, G8 and G10)[1]. The Ninevite 5 occupation levels were found at G4 and G10, however, the Ninevite 5 pottery collected was small quentity, and was all fragmentary.

Drawings and observations of pottery in the present paper were under taken by Kazumi Oguchi and Hiromichi Oguchi of the expedition. Tracing of drawings were completed by the present author.

Ninevite 5 Pottery from Grid 4 (Figs. 1–5)

Pottery from levels 4a, 4b and 5 (Figs. 1, 2)

Structures: Each level of 4a and 4b is accompanied by a mud-brick wall. Each size of the mud-bricks is measured in 30 cm×15 cm[2]. We classified a phase accompanied by the upper part of the wall as level 4a, and the other phase come with the lower part of the wall was level 4b. The wall of level 4b is considered to be a foundation of the wall of level 4a. Walls of these two levels seems to surround a room. It seems that levels 4a and 4b belong to the same period. Any differences between pottery from level 4a and those from level 4b are not found. Although previous paper reported that [Fujii 1987] large stones, which were found at the level 4b, belonged to the Ninevite 5 period, these stones seems to be accompanied with the Akkadian period. Because Akkadian potsherds were found at the east half of level 4b phase where the stratum had been disturbed.

The level 5 is composed of a ash soil which is nearly 50 cm to 60 cm in thickness. It had been accumulated under level 4b phase. Pottery from level 5 do show little difference in the features from those of level 4b. It seems that there is only a little gap between the period of level 4b and that of level 5.

Pottery: Specimens Nos. 1 to 3 are small cups, all of which are almost same size. These are characterized by wide open rims and flat bases. At the surface, potter's wheel traces out clear horizontal lines. Bottoms of Nos. 1 and 2 are flattend by a string, while bottom of No. 3 is finished by potter's wheel scraping. Similar features' cups were found at the moat in Area A and at the Grave 15 in Area B [Ii and Kawamata 1984/85: fig. 25]. As for used techniqes, any difference is not found between specimens Nos.

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1 to 3, and cups from Areas A and B, but the shape and clay are slightly different. Clay used for pottery from Areas A and B contains much fine sand, while clay for specimens Nos. 1 to 3 has a little fine sand. The ratio of diameter of rim to height of cups is a little difference in the case of cups from Areas A and B, while specimens Nos. 1 to 3 show the great difference of the ratio. In other words, the former shape has a tall and slim body, and the latter has a wider body. The bottom of latter is thinner in thickness than those of cups from Areas A and B. Specimen No. 1 was found with an incised bowl, specimen No. 8. Specimen No. 2 was found with an incised bowl, specimen No. 9. The features of specimens Nos. 1 to 3 are similar to those of cups from level IIa in Tell Leilan and Late ED III level of Area ST in Tell Brak [Weiss and Calderone in press: fig. 13; Oates 1986: fig. 5–85, 86].

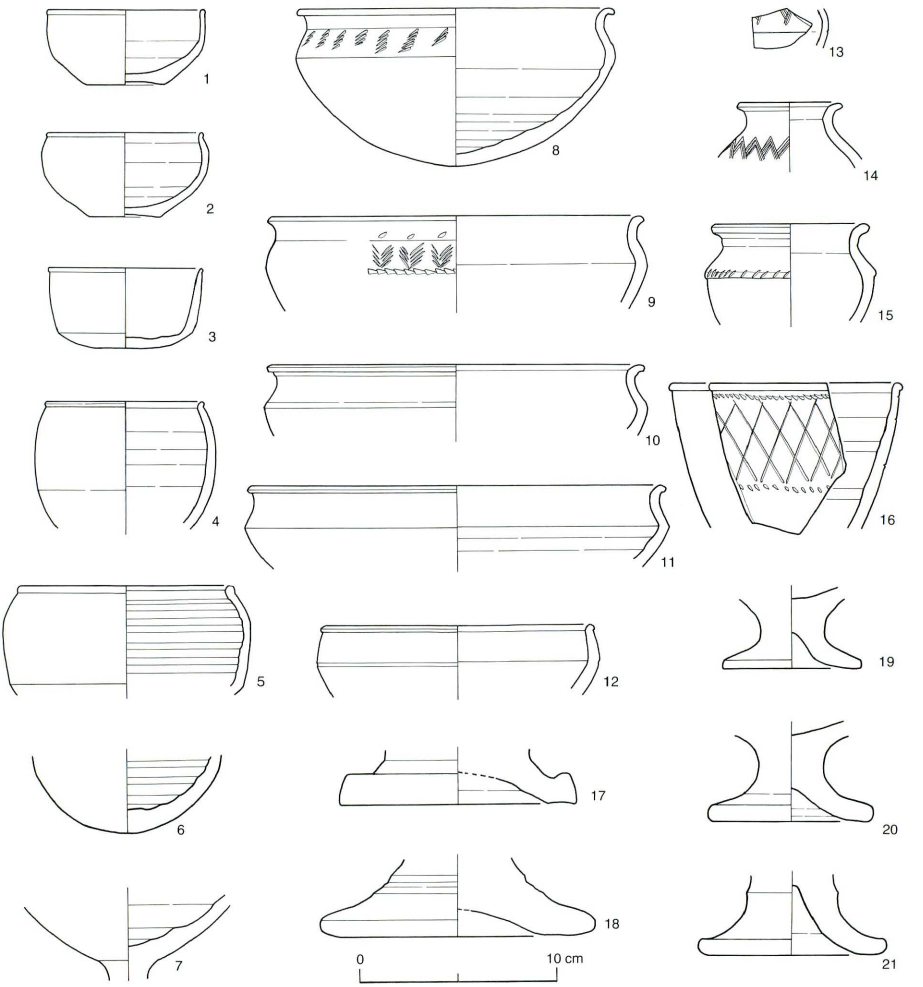


Fig. 1 Pottery from Levels 4 and 5 at Grid 4—Part 1

Although the base of specimen No. 4 is missing, it seems to have had a rounded base which specimen No. 6 has. A cup which shape is similar to this specimen is excavated from a level of the period II in Tell Leilan [Schwartz 1988: fig. 29–3].

Specimen No. 5 is larger than specimens Nos. 1 to 4. Horizontal lines are densely existed on inside the body. The lines are traced by a pallet, turning the body on a potter's wheel. Since this was excavated from level 5, it is, therefore, clear that this specimen is ordered chronologically older than specimens Nos. 1 to 4.

Specimens Nos. 8 to 11 are incised bowls and plain bowls, all of which show almost the same kind of shape. These are characterized by flare everted rims and keen carinations on the upper part of the bodies. Specimens Nos. 9 to 11 are supposed to have rounded bases such as a base of specimen No. 8. Although bowls which were similar to these specimens were found at Grave 16 in Area B [Ii and Kawamata 1984/85: fig. 26–2], any similar bowls have not been reported from other sites in Eski-Mosul region. The shape of these bowls is thought to be distinctive. As for specimen No. 8, it is incised one by one without using comb-like tool. Motif of the incision is according to numbers of lines, which each motif contains; a motif composed of three lines, a motif which four lines, a motif which five lines and a motif which seven lines. These lines are incised from the upper right to the lower left. Feather-like motif of specimen No. 9 is also incised one by one. On its carinated part, cuneiform-like incisions are continuously drawn, directed from the left to the right. These types of incisions are completely different from incision motif in the Late Incised and Late Excised period, which are more complicated and heavy which were excavated at level 7, as mentioned later.

Specimens Nos. 13 to 16 are incised sherds. Specimen No. 14 is a fragment of a small jar with serrated incisions on its shoulder, which are composed of two to six lines. Each line is incised one by one. The same kind of incision is often found in incised ware of the Late Incised and Late Excised period. Specimen No. 15 is a jar with notched incisions on its carinated shoulder. Specimen No. 16 is a bowl characterized by straight opened rim and cross-hatched incision on its outer surface. In this motif, firstly, lines are incised from the upper left to the lower right, and then, lines from the upper right to the lower left are added. Bowls which shape is similar this bowl are found at level 3 of Tell al-Raqā'i [Curvers and Schwartz 1990: figs. 20, 21].

Specimens Nos. 17 to 21 are fragments of feet. Except for specimen No. 17, all of them are supposed to be feet of bowls. No. 17 seems to be a foot of a jar. Taking its morphological features into consideration, this specimen should be held by the lower levels. Feet with string-cut base, which have been excavated a lot from the moat of Area A, were not found in this square. Features of the feet, except for No. 17, show characters of bowls' feet in the final stage of the Ninevite 5 period.

<in Fig. 1>

1. Cup; level 4a; pinkish buff; fine sand and sparse vegetable temper; wet-smoothed surface; string-cut base; incomplete; Rim diam.: 8 cm; Height: 3.7 cm.
2. Cup; level 4b; light greenish buff surface; buff core; fine sand and sparse vegetable temper; wet-smoothed surface; string-cut base; incomplete; Rim diam.: 7.9 cm; Height: 4.2 cm.
3. Cup; level 4a/4b; light grey; fine sand and sparse vegetable temper, scraped on bottom of outer surface using the wheel-turn; incomplete; Rim diam.: 7.7 cm; Height: 4 cm.
4. Rim of cup; level 4a/4b; pinkish buff outer surface; reddish pink inner surface and core; fine sand and sparse vegetable temper.
5. Rim of cup; level 5; pinkish buff; much fine sand and sparse vegetable temper.
6. Base of bowl; level 4b; pinkish buff; fine sand and sparse vegetable temper.
7. Body of footed bowl; level 5; light greenish buff; fine sand and sparse vegetable temper.
8. Incised bowl; level 4a; pinkish buff; fine sand and sparse vegetable temper; burnished on lower part of outer surface; incomplete; Rim diam.: 16 cm; Height: 7.7 cm.

9. Rim of incised bowl; level 4b; pinkish buff; fine sand temper.
10. Rim of bowl; level 4a/4b; creamy buff surfaces; dark pinkish buff core; fine sand temper.
11. Rim of bowl; level 5; dark pinkish buff; fine sand temper.
12. Rim of bowl; level 5; pinkish buff; much fine sand and sparse vegetable temper.
13. Incised sherd; level 4a; cream outer surface; pinkish buff inner surface and core; fine sand and sparse vegetable temper.
14. Incised jar sherd; level 5; pinkish buff; fine sand temper.
15. Incised jar sherd; level 4b; buff, partly light greenish buff outer surface; much fine sand temper.
16. Rim of incised bowl; level 4a; pinkish buff; fine sand and sparse very fine vegetable temper.
17. Foot sherd; level 4b; blackish brown; much vegetable temper.
18. Foot sherd; level 4b; greyish surfaces, partly light greenish grey; sand and vegetable temper.
19. Foot sherd; level 5; cream; fine sand and vegetable temper.
20. Foot sherd; level 5; buff outer surface; greenish buff inner surface and core; fine sand and vegetable temper.
21. Foot sherd; level 4b; greyish; fine sand and fine vegetable temper.

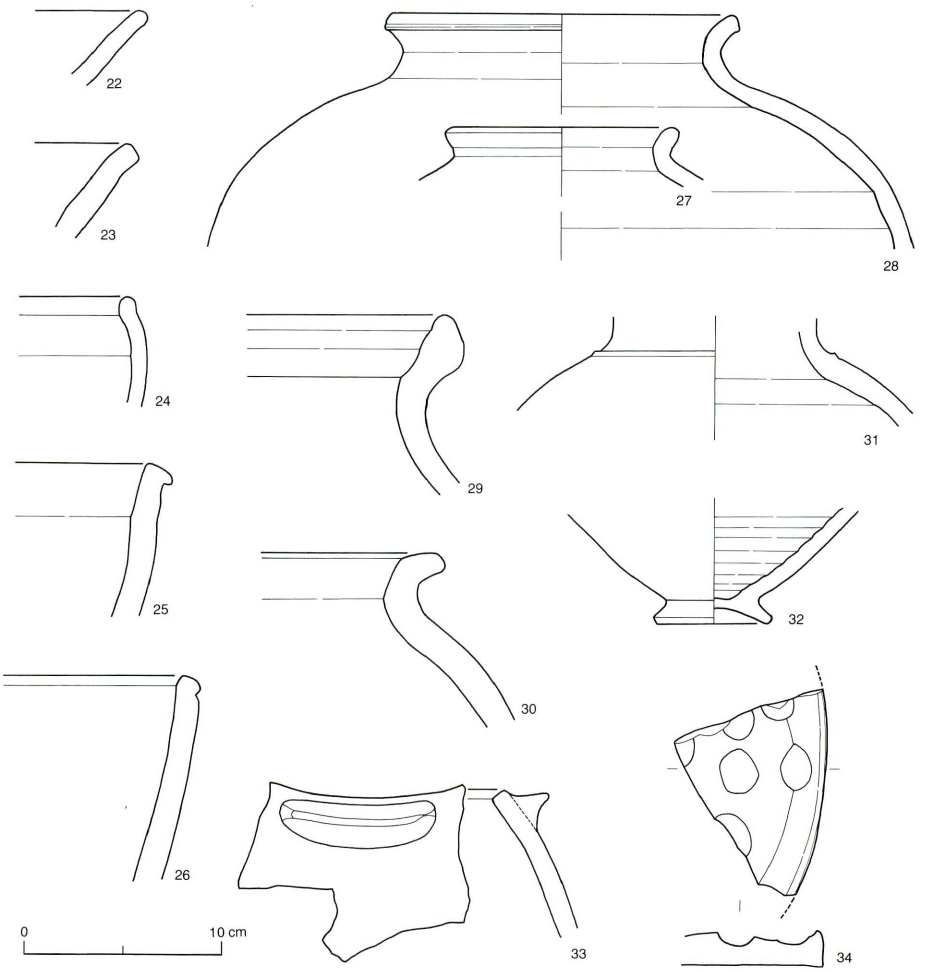


Fig. 2 Pottery from Levels 4 and 5 at Grid 4—Part 2

Pottery illustrated in Fig. 2 are large-sized vessels made of coarse clay which are tempered with sand or vegetable. Specimens Nos. 22 to 26 are rims of bowls. Specimens Nos. 22 and 23 are rims of large open bowls, and specimens Nos. 25 and 26 are rims of large deep bowls adjusted its shape by rough scraping. Specimens Nos. 27 to 30 are rims of jars. Specimens Nos. 27 and 28 are supposed to have had a globular shape of bodies. Diameter of specimen No. 29 measured about 50 cm in the rim. Specimen No. 30 is a large jar which diameter of the rim measured about 40 cm. In the lower part of surfaces, both specimens are finished by scraping. Specimen No. 32 is an unique base sherd of a jar with a pedestal-like ring-base. A base of jars in this period is usually flat or round. Specimen No. 32 type is, therefore, not common in this period. Specimen No. 33 is a coarse ware which is common in any time of the Ninevite 5 period. It is belived that this type of coarse ware was used as cooking ware. Specimen No. 34 is a fragment of a lid, which has ornamentation of small dimples on its surface.

The chronological order of pottery excavated from levels 4a, 4b and 5 are as follows: Pottery assemblage from level 5 are considered to have belonged to the final stage of the Ninevite 5 period. It is parallel to the periods of Tell Leilan IIId, Tell al-Raqā'i level 3 and levels 1 to 3 in Tell Thuwaij. Pottery assemblage of levels 4a and 4b show similar characters to pottery from Tell Leilan period IIa and Tell Brak "Late ED III" contexts in Area ST. It leads to the supposition that this level belongs to either Late ED III period or the final stage of the Ninevite 5 period. In the preliminary report, we concluded that these levels belonged to the Akkadian period. However, judging from this comparison, our previous argument should be altered.

<in Fig. 2>

22. Rim of open bowl; level 5; greyish; very fine sand temper; fine fabric.
23. Rim of open bowl; level 4b; reddish pink outer surface; pinkish buff inner surface; fine sand and vegetable temper.
24. Rim of bowl; level 4a; pinkish buff slip all over; sand and fine vegetable temper.
25. Rim of bowl; level 5; reddish buff slip all over; greyish brown core; sand and fine vegetable temper.
26. Rim of bowl; level 5; pinkish buff slip all over; grey core; sand and vegetable temper.
27. Rim of jar; level 4a; pinkish buff; fine sand temper.
28. Rim of jar; level 4b; pinkish buff slip all over; reddish pink core; sand and fine vegetable temper.
29. Rim of jar; level 4b; reddish buff; coarse sand and small limestone temper.
30. Rim of jar; level 4b; reddish pink surface; greenish buff core; sand and vegetable temper.
31. Shoulder of jar; level 4b; pinkish buff slip outer surface; brownish grey inner surface; sand and vegetable temper.
32. Base of jar; level 4a; pinkish buff slip all over; sand and vegetable temper.
33. Rim of coarse jar; level 5; reddish pink surface; blackish brown core; coarse sand and sand temper; burnished surface; hand made.
34. Lid sherd; level 4b; reddish pink; sand and much vegetable temper; hand made.

Pottery from level 7 (Fig. 3)

The pottery collected from this level is only a small amount, due to the limited area of excavation, that is, only 2 square meters. No structures are found between the level 5 and natural soil. Level 7 is composed of greyish brown soil and is 60 cm to 70 cm in thickness. Incised and Excised wares are worthy of attention among pottery excavated at this level. Specimen No. 35 is a fragment of an incised small lugged jar characterized by keen carination and its pointed base. Only one lug is remained. The incision on its shoulder, is quite similar to that of an incised bowl from ST Trench at Tell Brak [Oates 1986: fig. 5–104]. Specimens Nos. 36 to 38 are excised sherds, all of which are made of fine clay. Their color is mostly grey. Specimen No. 36 is a rim of a bowl. It has zigzag incision on its upper part, and on its lower part, excised motif which is supposed to have been ladder-like motif, are drawn. The space between excised bands are filled with both of vertical and horizontal fine combing incisions. The same excised design is found from the period 3 in Tell Mohammed Arab [Killick in press: fig. 8–4]. Specimen No. 37 is a body sherd which

whole shape could not be restored. Vertical excised bands were arranged between two bands incised feather-like pattern, and moreover, horizontal fine incised combing lines are drawn between the two excised bands. Similar motif is found in a body of a jar from the period 3 in Tell Mohammed Arab [Roaf 1983: fig. 4–07]. Specimen No. 38 is also a body sherd, which shape could not be reconstructed. The excised bands are different from those of two specimens as just mentioned above. Three excised band are composed of lines inclined to the right and lines inclined to the left. These incised lines construct cross section which is triangular form shown in illustration. The left band has zigzag incision. Fine horizontal combing lines and cross-hatched incision are placed between these excised bands. Similar type of excised ware is found from the level II at Area B [Ii and Kawamata 1984/85: 206]. It means that the occupation levels in this period may be spread to Area B.

Foregoing incised and excised ware is quite similar to those from the period 3 in Tell Mohammed Arab [Roaf and Killick 1987: 222]. The same type of excised ware is numerously found from Nineveh and stratum 6 in Tell Billa [Thompson and Hamilton 1932: pl. LX; Thompson and Mallowan 1933: pl. LXII; Speiser 1933: pls. LXX, LXXI]. According to this facts, this type of excised ware are used to be popularized in Mosul area. Such an elaborate excised ware has not been found from Khabur area.

Specimens Nos. 39 to 42 are plain ware. Specimen No. 39 is one of the common large bowls in the Ninevite 5 period, which has rough scraping or whisking on its surfaces [Fukai et al. 1974: pl. LIII; Bachelot in press]. Specimen No. 40 is a rim of large plate which fabric is tempered with large amount of vegetables. Specimen No. 41 is a jar which is relatively smaller size among this type of jars. Its lower part of outer surface is scraped off and wet-smoothed, while the inside is finished by scraping. Specimen No. 43 is supposed to be a fragment of a lid, decorated with dimples measured about 8 mm in diameter. Specimen No. 42 is a ring-base sherd of either a jar or a bowl found from levels 8 or 9. It belongs to older

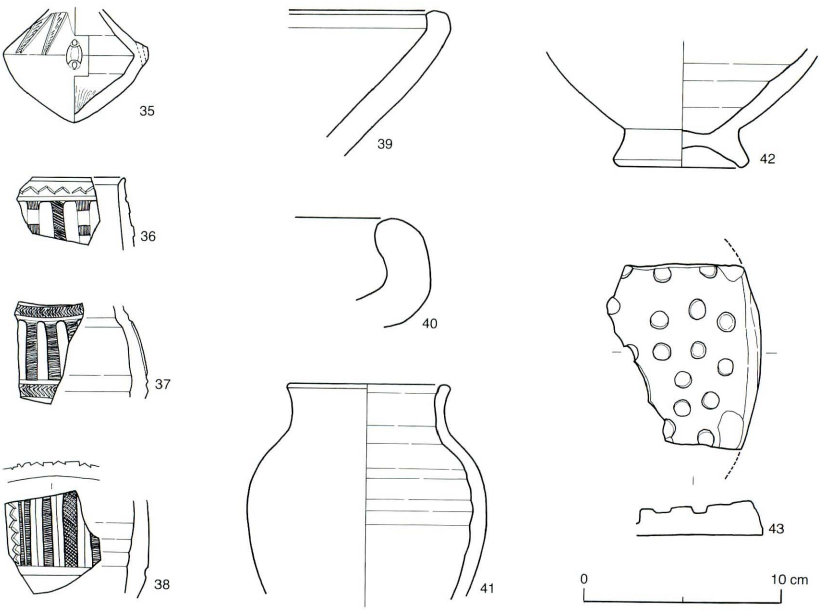


Fig. 3 Pottery from Level 7 at Grid 4

period than the other specimens. There is a possibility that this specimen belong to level 10. Jars with ring-bases are rare in the Ninevite 5 period. Only two examples are reported from Tell Fisna, which seems to belong to the Transitional period [Numoto 1988: fig. 17]. It is assumed that jars with ring-bases in the Transitional period had been succeeded its characters from those in the Late Uruk period. Bowls with ring-bases are common in the Late Uruk period. On the contrary, it is rare to be seen in the Ninevite 5 period. If this ring-base sherd were a part of bowl, it is should belong to the Late Uruk period.

<in Fig. 3>

35. Incised small jar; level 7; light greenish buff; fine sand and fine vegetable temper.
36. Excised rim sherd; level 7; greyish; fine sand temper.
37. Excised body sherd; level 7; greyish; very fine sand temper; fine fabric.
38. Excised body sherd; level 7; greyish; very fine sand temper; fine fabric.
39. Rim of bowl; level 7; pinkish buff surface; reddish pink core; sand and vegetable temper.
40. Rim of coarse bowl; level 7; pinkish buff outer surface; reddish pink inner surface; blackish grey core; sand and much vegetable temper.
41. Small jar; level 7; light greenish buff slip outer surface; buff inner surface and core; much sand and fine vegetable temper.
42. Base sherd; level 8/9; reddish pink/pinkish buff surface; dark grey core; fine sand and fine vegetable temper.
43. Lid sherd; level 7; reddish pink surface; blackish grey; sand and vegetable temper; hand made.

Pottery from levels 9 and 10 (Fig. 4)

Levels 9 and 10 are deposited layers on natural soil which are about 1.2 m in thickness. However, there is no structure in these levels. Ninevite 5 pottery unearthed from these levels are mainly bowls. These specimens are chronologically placed in the Transitional period. Pottery and structures belonged to the Transitional period are found from Tells Fisna and Karrana 3 which are in Eski-Mosul region [Numoto 1988; Fales et al. 1987]. Many pottery belonged to this period are reported from Nineveh [Thompson and Hamilton 1932: pls. LIV, LII].

Specimens Nos. 44 to 47 are painted and plain carinated bowls, which are characterized by keen carinations and inclined rims. Horizontal cross-hatched band and ladder-like motifs are drawn on specimen No. 44. Motifs composed of elongated triangles and cross-hatched triangles are drawn on the upper part of specimen No. 46. However, the whole layout of painted designs is not possible to restore, because parts of the body are missing. It is supposed that elongated triangles and cross-hatched triangles had been drawn alternately. Specimen No. 47 has a large body, comparing with other carinated bowls. Elongated triangles are drawn on its upper part. Similar motif is found in a carinated bowl from Nineveh [Thompson and Hamilton 1932: pl. LIII-9]. Specimens Nos. 48 to 51 are fragments of painted and plain footed bowls both of which have beaded rims and carinations. Herring bone motif is horizontally drawn on No. 48. Butterflies and vertical lines were drawn on specimen No. 49. These two design elements are supposed to have been drawn one after another. This composition is common in the Transitional period. Similar designs are found in the carinated and footed bowls from Nineveh, Tells Fisna and Karrana 3 [Numoto 1988: fig. 16–21, 51; Rova in press fig. 5–6; Thompson and Hamilton 1932: pls. LIV-5, LIII-4]. Specimens Nos. 52 and 53 are rims of bowls. The present author affirms that specimen No. 53 belongs to the Late Uruk period from the point of shape of the lip and the fabric. This shape of lip is found in carinated bowls from the Late Uruk level in Tell Thuwaij [Fujii et al. in press]. Taking features of this specimen into consideration, it is supposed that level 10 would belong to the Late Uruk period. Specimen No. 54 is a sherd of a coarse ware with a crecent lug. This is one of the most typical coarse ware in the Ninevite 5 period.

Pottery from these levels show the same features as pottery from levels 3a and 3b at G10 as it will be treated later. This fact proves that the occupation level of the Transitional period is spread from the area

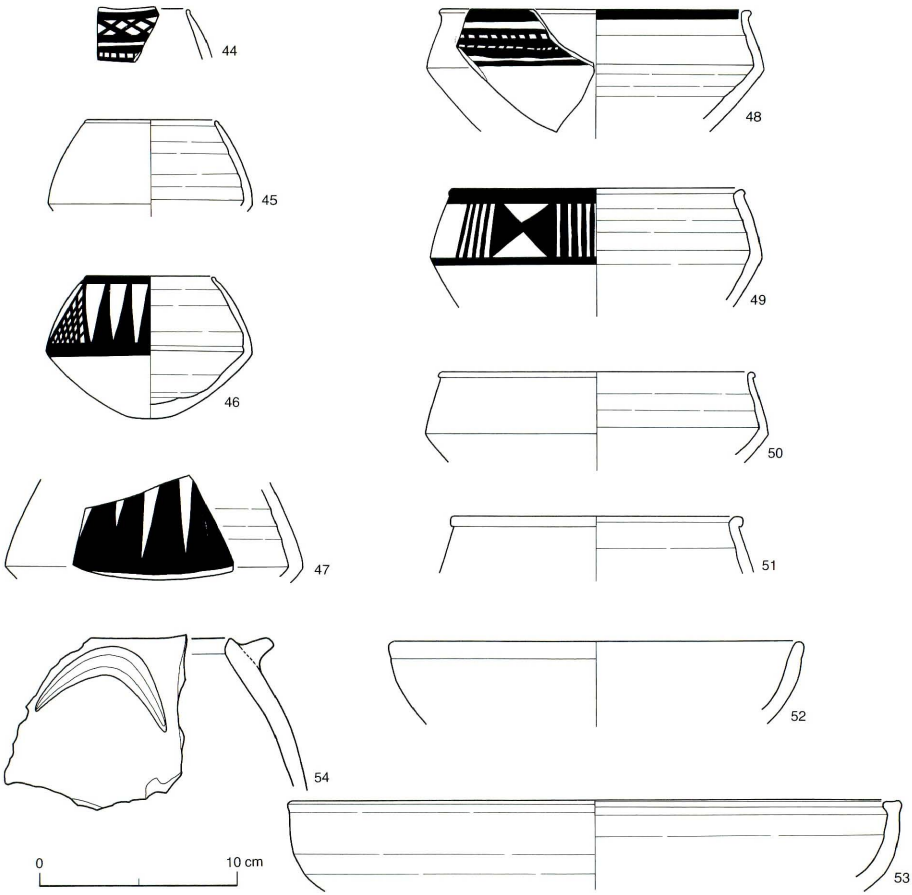


Fig. 4 Pottery from Levels 9 and 10 at Grid 4

of G4 to G10. Pottery of the Transitional period was not found in Area A.

Characteristics of the painted carinated bowls and painted footed bowls in the Transitional period had been already discussed in another paper [Numoto 1991].

<in Fig. 4>

44. Painted rim sherd; level 9/10; reddish purple paint; pinkish buff slip all over; sand and fine vegetable temper.
45. Rim of carinated bowl; level 9/10; buff surface; pinkish buff inner surface and core; sand temper.
46. Painted carinated bowl; level 9/10; reddish purple paint; light greenish buff; fine sand and fine vegetable temper; incomplete.
47. Body of painted carinated bowl; level 10; reddish purple paint; pinkish buff slip outer surface; fine vegetable and much fine sand temper.
48. Rim of painted footed bowl; level 10; dark brown paint; pinkish buff slip all over; reddish pink core; sand and fine vegetable temper.
49. Rim of painted footed bowl; level 10; orange purple paint; pinkish buff slip all over; reddish pink core; vegetable and much

fine sand temper.

50. Rim of footed bowl; level 9/10; pinkish buff slip all over; reddish pink core; sand and vegetable temper.
51. Rim of footed bowl; level 10; light greenish buff; fine sand and fine vegetable temper.
52. Rim of bowl; level 9/10; reddish pink; much sand and fine vegetable temper.
53. Rim of bowl; level 9/10; buff slip all over; pinkish buff core; much sand and fine vegetable temper.
54. Rim of coarse ware; level 10; buff slip all over; reddish pink core; coarse sand, small stone and vegetable temper.

Other painted, incised and excised wares from Grid 4 (Fig. 5)

Specimen No. 55 is an excised sherd characterized by repetition of vertical fine excised bands and horizontal fine excised bands. Stitch-like incisions are drawn between these excised bands. Specimen No. 56 is an incised sherd which is considered to be a part of body of a bowl. Its incision is composed of a feather pattern band and combing zigzag motifs. This incised design is one of the most typical designs in the Late Incised and Late Excised period. Specimen No. 57 is a rim of a painted footed bowl with a row of sideways cross-hatched triangles. Similar painted design is found in Tell Thalathat [Fukai et al. 1974: pl. 29–1]. This specimen is regarded as one belonged to the Painted and Early Incised period from the point of the design and the shape. Shape of specimens Nos. 58 and 59 is not able to be restored. Cross-hatched circular motifs are drawn on specimen No. 58. Specimen No. 60 is a pedestal sherd of a painted jar which is supposed to have belonged to the Painted and Early Incised period.

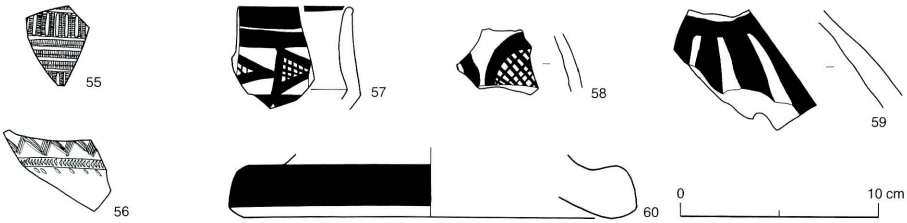


Fig. 5 Other Painted, Incised and Excised Wares from Grid 4

Any occupation levels belonged to the Painted and Early Incised period are not found at G4. However, specimens of Nos. 57 to 60, which features pottery of the Painted and Early Incised period, were excavated at G4. It is might be possible to judged that occupation level of the Painted and Early Incised period could exist at G4 and its surrounding area.

<in Fig. 5>

55. Excised sherd; surface soil; grey; fine sand temper; fine fabric.
56. Incised sherd; level 2 at G1; greenish; fine sand temper.
57. Rim of painted footed bowl; level 4b; brownish purple paint; buff slip all over; pinkish buff core; fine sand and fine vegetable temper.
58. Painted sherd; level 4b; dark green paint; light greenish buff surface and core; fine sand temper.
59. Painted sherd; level 4b; orange-red paint; pinkish buff slip all over; reddish core; sand and vegetable temper.
60. Painted pedestal sherd; level 4b; reddish purple paint; pinkish buff slip all over; reddish buff core; sand and vegetable temper.

Ninevite 5 Pottery from Grid 10 (Figs. 6–10)

Pottery from unstratified level to level 2 (Figs. 6, 7)

G10 is 2 square meters grid, which is set up 20 m east from G4 descending slowly toward the out skirt of

the tell. Unstratified level is composed of light brown soil accumulated about 60 cm to 70 cm in thickness below the surface soil. The soil is very loose, because it contains a large amount of small stons, sand and gravels. It seems to have been deposited naturally. There are no occupation levels in this soil. Most of pottery unearthed are belived to have belonged to the Ninevite 5 period. Specimens of three pottery are illustrated in Fig. 6 (Nos. 65, 68, 69). Specimen No. 65 is an incised Ninevite 5 sherd characterized by feather motifs and cross-hatched motifs. These motifs look like those of incised jars in the Late Uruk period or in the Akkadian period. This feather motif, however, characteristic in the Late Incised and Late Excised period [Roaf and Killick 1987][3]. Specimens Nos. 68 and 69 are painted sherds. Specimen No. 68 is a part of body of a jar with combination of a ladder and lozenges motifs, which are drawn horizontally. A part of a hole remained at the edge suggested that this specimen was re-cycled. Specimen No. 69 is a lower part of a carinated bowl with cross-hatched triangular motif.

Leve 1: The thin floor was found in level 1. All the pottery from above the floor belong to the Ninevite 5 period (Nos. 61–64, 66, 67, 70–72). They are classified into an excised rim sherd (No. 61), rims of carinated bowls (Nos. 62, 63), a potstand sherd (No. 64) and painted sherds (Nos. 67, 70–72). These specimens do not belong to the same period as being treated later. This level is also regarded as an unstratified level. Specimen No. 61 is a rim of an excised bowl. Its excised motif is composed of a row of horizontal dots, vertical excised bands and fine slant combing lines. This excision is identical with that from

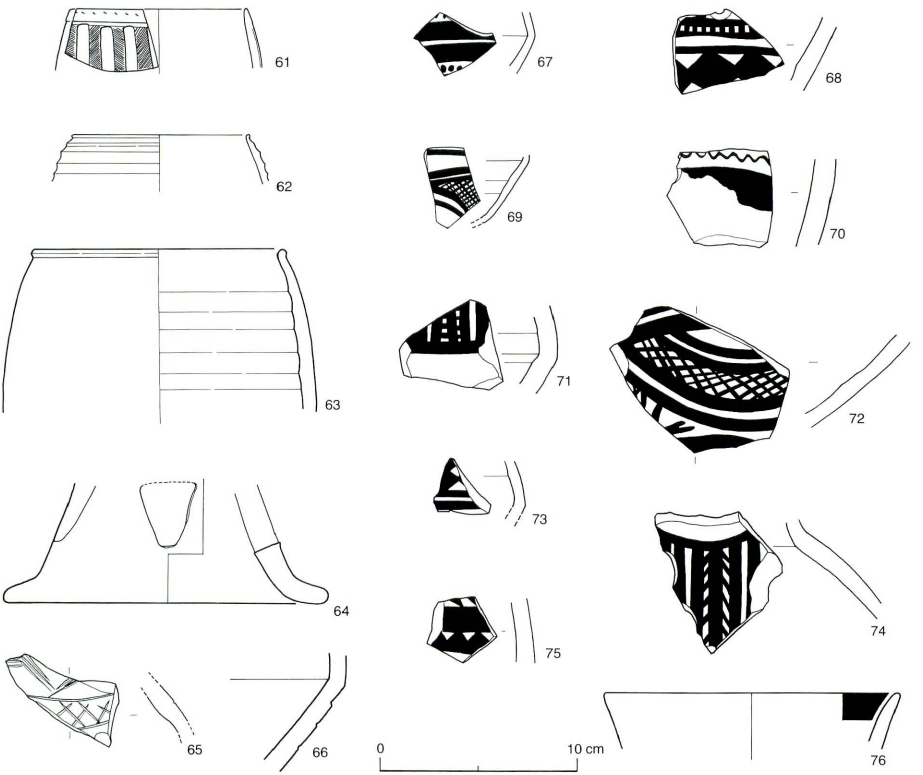


Fig. 6 Pottery from Unstratified Level and Levels 1 and 2 at Grid 10

G4 as discussed above (Nos. 36, 37). It belongs to the Late Incised and Late Excised period. Specimen No. 62 has horizontal excised grooving lines. Its shape of section is ribbed. Judging from this features, it is supposed to have belonged to nearly the Painted and Early Incised period. Specimen No. 63 is a rim of a large carinated bowl. Complete bowls which are similar to this specimen are found from Tell Thalathat [Fukai et al. 1974: pl. 47–36]. Specimen No. 64 is considered to be a fragment of a potstand. It has reverse triangular opening. Similar example to this has not yet been found. This cannot be chronologically ordered yet. It is assumed that this might belong to the later period than the Late Incised and Late Excised period. Specimen No. 66 is a part of body of a large bowl. It is characterized by grooving lines on its outer surface. Specimen No. 67 is either a body of painted carinated bowl or a footed bowl. It has horizontal lines and dots motifs. Specimen No. 70 is a painted body sherd with a waving line. Specimen No. 71 is a fragment of a large footed bowl. Its painted design is only on the upper part of the body. Specimen No. 72 is either a shoulder of a painted jar or a body of a painted footed bowl. Curved cross-hatched band and naturalistic motifs are drawn on it.

Level 2: Level 2 is consist of tight floor and stratum composed of reddish brown soil on the floor. A hearth which is about 50 cm in diameter and 10 cm in depth was found on the floor. Fired mud and carbonized objects are filled in the hearth. Many animal bones were spread to the hearth. Pottery unearthed from this level are fragments both of painted and plain Ninevite 5 ware. Specimen No. 73 is either a painted carinated bowl or a footed bowl, which has horizontal parallel bands and butterfly motifs. Specimen No. 74 is a shoulder of a painted jar. It is characterized by a vertical herring bone motif. Specimen No. 75 contains a row of triangles painted on the outer surface. Specimen No. 76 is a painted rim sherd. Judging from the features of its fabric and the shape, it is supposed to have belonged to the Halaf period.

It is clear that this level belongs to the painted Ninevite 5 period. The amount of pottery collected in this level are small, and therefore, it is not enough to define whether this level belongs to the Painted and Early Incised period or the Transitional period. It is supposed that the floor had been constructed on abandonment structures of level 3a some time later on. There might be chronological gap being between levels 2 and 3a. Since level 3a belongs to the Transitional period, level 2 is ordered in the Painted and Early Incised period.

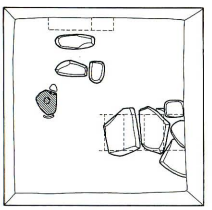
<in Fig. 6>

61. Rim of excised bowl; level 1; light greenish; fine sand temper.
62. Rim of ribbed bowl; level 1; light greenish; fine sand temper.
63. Rim of carinated bowl; level 1; pinkish buff; very fine sand and vegetable temper.
64. Potstand sherd; level 1; light greenish surface; reddish pink core; fine sand and vegetable temper; hand made.
65. Incised sherd; unidentified level; reddish pink; sand and vegetable temper.
66. Body sherd; level 1; reddish pink; fine sand and vegetable temper.
67. Painted sherd; level 1; purplish dark brown paint; light greenish surfaces and core; very fine sand temper.
68. Painted sherd; unidentified level; dark purplish red paint; creamy slip outer surface; fine sand and vegetable temper.
69. Painted sherd; unidentified level; dark brownish green paint; light greenish surfaces and core; sand temper.
70. Painted sherd; level 1; purplish dark brown paint; cream slip outer surface; reddish pink core; fine sand and vegetable temper.
71. Painted sherd; level 1; dark purplish brown paint; light greenish surface; greyish black core; fine sand and vegetable temper.
72. Painted sherd; level 1; reddish purple paint; cream slip outer surface and partly inner surface; reddish pink core; fine sand and vegetable temper.
73. Painted sherd; level 2; dark purplish brown paint; light greenish surface and core; fine sand and fine vegetable temper.
74. Painted sherd; level 2; dark green paint; light greenish outer surface and light brownish inner surface; sand and vegetable temper.
75. Painted sherd; level 2; dark reddish purple paint; creamy pink slip outer surface; reddish pink core; fine sand and fine vegetable temper.

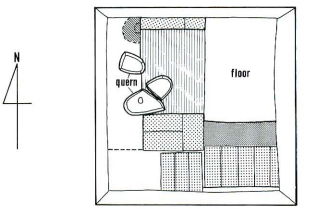
76. Painted sherd; level 2; reddish pink; sand and mica temper; hand made; Halaf ware.

Pottery from levels 3a and 3b (Figs. 7–9)

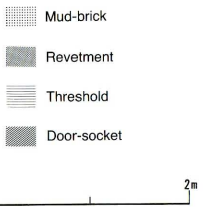
Structures: Levels 3a and 3b are consists of two floors with a mud-brick wall (1 m in extant height and, about 60 cm in width) at the north section. Plan of structures on level 3a is almost identical with

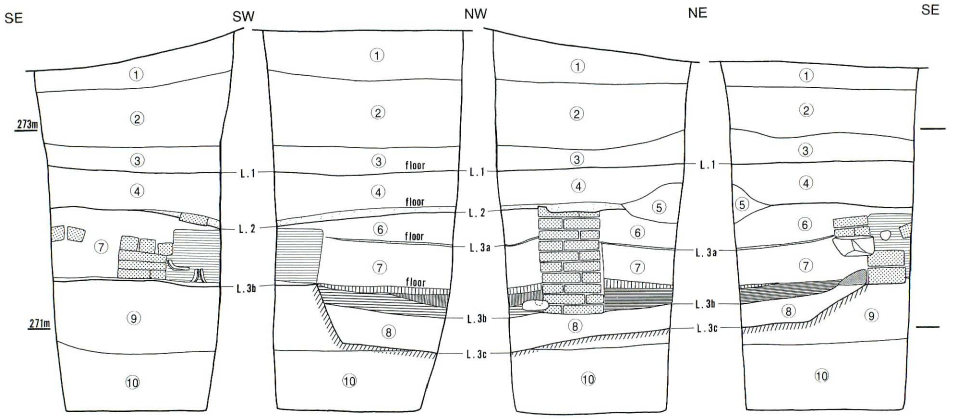


Plan of Level 3a



Plan of Level 3b





① Surface soil (blackish brown soil).
② Light brown loose soil with large amount of gravel and stones. There are no occupation levels.
③ Light brown sandy soil.
④ Reddish brown viscous soil with stones, carbide particles, ash and fragments of mud-brick.
⑤ Dark reddish brown viscous soil.
⑥ Dark brown solid soil with stones, carbide and fired mud particles.
⑦ Similar to soil of No. 6. Containing much fragments of mud-brick.
⑧ Light brown silty solid soil with a little ash and carbide particles.
⑨ Dark brown very solid soil.
⑩ Blackish brown very solid soil. Similar to soil of No. 9. The quality is resemble to the natural soil.

Mud-brick.
Mud revetment, yellowish brown sandy mud.
Light brown sandy mud.
Ash soil. Containing carbide particles.
The soil mixed with reddish brown mud, ash, fired mud and carbide particles.
The soil mixed with ash and reddish brown mud. Containing carbide and clay particles.
Silty solid soil. Containing reddish brown sandy mud and ash.

Fig. 7 Plans and Sections of Grid 10

structures on level 3b: The both walls run from the south to the north. The door-ways are in the same place. The structure of level 3a are succeeded to structures of level 3b. Great chronological difference is not found between two levels. Besides, there is no clear difference about pottery between these two levels.

Characteristics in level 3a: The foundation of the wall, which runs from the east to the west, was made of stones. In the Ninevite 5 period, walls made of stones are very few. It is, therefore, distinctive[4]. The door-way is about 80 cm in width. It contains a door-socket and three river stones, which are to the door-way.

Characteristics in level 3b: The door-way is about 80 cm in width with mud-brick threshold. Three fragments of stone querns were found on the threshold. A part of door-socket was found at the north section. The most remarkable features in this level are as follows:

1. Foundation of the north wall running from the east to the west, was supported by yellowish brown sandy mud, which was 25 cm in width (revetment). The cross-section forms a quarter of a circle.

2. At the south-west part of the square, there are thin wall-like structures. It was burned and turned to black. This structures seems to be used as moget.

The floor of level 3b is composed of large amount of ash, fired mud and carbon, which accumulated about 10 cm to 30 cm in thickness.

Most of mud-bricks used for wall are sandy, and do not contain any vegetable at all. Its dimensions are 40 cm×17–20 cm×10 cm[5].

Painted pottery: Painted Ninevite 5 pottery from levels 3a and 3b belong to the Transitional period. Chronologically, they are ordered in the same period as those from levels 9 and 10 at G4. These specimens are small and medium-sized pottery. The clay is tempered with fine sand and fine vegetable. The most remarkable thing is that they contain chalky particles. They are painted mainly reddish purple, purplish brown and reddish orange after being applied creamy slip to them.

Specimens Nos. 77 to 85 are rims of either painted carinated bowls or painted footed bowls. All of them are beaded rims. Painted designs of carinated and footed bowls in the Transitional period are mainly applied in their upper part of the bodies. Specimens Nos. 77 and 78 are rims of carinated bowls. Specimen No. 77 has two vertical lines, while specimen No. 78 has a cross-hatched triangle and a slightly slanted ladder motif. Design painted in a carinated bowl with spout from the period 1 in Tell Mohammed Arab is similar to the latter [Raof and Killick 1987: fig. 2]. Specimens Nos. 79 to 83 are rims of painted footed bowls. The diameters are from 13 cm to 15 cm. Gentle carination and thinner body make specimen No. 79 separate from other specimens. The painted motif on the upper part of carination seems to be a row of solid right-angled triangles. A rough cross-hatched triangle is drawn on specimen No. 80. The lip is not painted. The features common through painted bowls of the Late Uruk period. Painted design of specimen No. 81 consists of a vertical ladder motif and a panel with a cross-hatched rectangle and lozenges. Carinated bowls from the Transitional level in Tells Karrana 3 and the Late Uruk level in Tell Mohammed Arab show similar composition of painted designs to specimen No. 81 [Roaf and Killick 1987: fig. 2; Rova in press]. Specimen No. 82 has a butterfly motif between the horizontal lines. Specimen No. 83 is characterized by a extremely inclined rim and an everted lip. The design is similar to that of specimen No. 49, which is composed of a butterfly motif and vertical lines. This type of painted design is common in the Transitional period.

Specimens Nos. 84 and 85 are considered to be rims of carinated bowls. Motifs of specimen No. 85 seems to be composed either butterflies or lozenges. Specimens Nos. 86 to 89 are body sherds of either painted carinated bowls or plain carinated bowls. All of them have keen carinations. Scraped traces are clear on the lower part of carinations. The painted design of specimen No. 87 is supposed to be a

cross-hatched rectangle. A row of cross-hatched triangles are drawn on specimen No. 88, although most of them has been exfoliated. Painted body sherd of specimen No. 90 is considered to be apart of a footed bowl, judging from inclination of its carination. A part of vertical lines are remained. Specimen No. 91 is a rim of a painted large footed bowl. A unit of vertical lines, which are composed of around ten lines, and a blank space have been drawn one after another. The clay contains a large amount of vegetable for the size of holding its large body. The lower part are roughly scraped. An example which shows similar

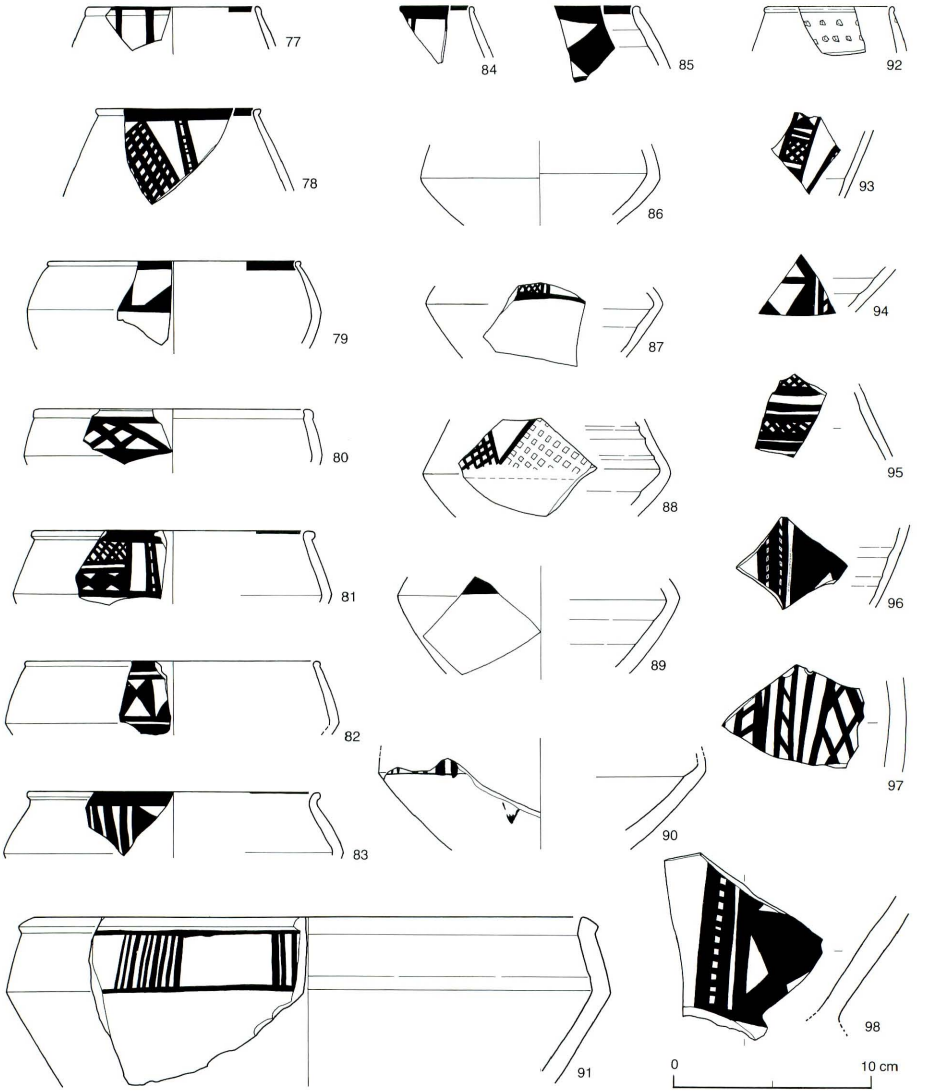


Fig. 8 Pottery from Levels 3a and 3b at Grid 10

characteristics to this specimen is found from phase G in Tell Thuwaij [Numoto in press].

Specimen No. 92 is an incised rim sherd, on which rough stab-like motifs are incised irregularly. It is entirely different from typical incision in the Painted and Early Incised period. This type has not reported yet from the other sites.

Specimens Nos. 93 to 98 are painted sherds which are parts of body of either footed bowls or jars. Most of them have butterfly design elements (Nos. 93, 94, 96, 98). Specimen No. 93 contains butterfly motifs combined with a cross-hatched rectangle. The horizontal butterfly motifs are drawn with herring bone motifs on specimens Nos. 94 and 96. Specimen No. 98 is a base of a jar. Its motifs are made up of vertical butterfly motifs and ladder motifs together. Specimen No. 95 has horizontal cross-hatched bands. Rough cross-hatched lines and ladder motifs put together in specimen No. 97. Similar examples to this cross-hatched motif have not yet been found among the Ninevite 5 pottery. This design, however, drawn on the painted jars of the Late Uruk period [Raof and Killick 1987: fig. 2; Raof 1983: fig. 2–2][6]. It seems that specimen belongs to the Late Uruk period.

Some specimens of these levels are considered to have belonged to the Late Uruk period. Especially, painted carinated bowl, specimen No. 88, show characteristics of bowls in the Late Uruk period, taking its painted motif and shape into consideration[7].

<in Fig. 8>

77. Painted rim sherd; level 3b; dark purplish brown paint; light greenish grey to reddish pink surface and core; fine sand temper.
78. Rim of painted carinated bowl; level 3b; purplish brown paint; buff surface and core; chalky sand and fine sand temper.
79. Rim of painted footed bowl; level 3b; dark orange paint; reddish pink surface and core; fine sand temper.
80. Rim of painted footed bowl; level 3b; reddish orange paint; reddish pink surface and core; fine sand and chalky sand temper.
81. Rim of painted footed bowl; level 3a; dark purplish red paint; creamy slip all over; red to reddish pink core; sand and chalky sand and fine vegetable temper.
82. Rim of painted footed bowl; level 3a; purplish dark brown paint; creamy slip all over; light reddish pink core; fine sand and fine vegetable temper.
83. Rim of painted footed bowl; level 3a; reddish purple to reddish orange paint; light reddish buff slip all over; light greyish core; chalky sand and fine vegetable temper.
84. Painted rim sherd; level 3b; orange-red paint; reddish pink outer surface; dark reddish pink inner surface; light reddish brown core; fine sand temper.
85. Painted rim sherd; level 3a; orange-red paint; reddish pink surface and core; sand, chalky sand and vegetable temper.
86. Body of carinated bowl; level 3a; light greenish; fine sand and fine vegetable temper.
87. Body of painted carinated bowl; level 3b; greenish red-purple paint; cream slip outer surface; reddish buff inner surface and core; sand, chalky sand and fine vegetable temper.
88. Body of painted carinated bowl; level 3b; reddish brown paint; cream slip outer surface; buff inner surface and core; sand and fine vegetable temper.
89. Body of painted carinated bowl; level 3b; brownish orange paint; buff surface and core; fine sand and vegetable temper.
90. Body of painted footed bowl; level 3a; reddish purple paint; creamy buff slip all over; reddish pink core; sand and vegetable temper.
91. Rim of painted footed bowl; level 3b; dark reddish purple paint; creamy slip all over; grey to reddish buff core; fine sand, chalky sand and much vegetable temper.
92. Rim of incised carinated bowl; level 3b; light grey to reddish pink outer surface; grey inner surface and core; sand and chalky sand temper.
93. Painted sherd; level 3b; reddish purple paint; creamy slip outer surface; reddish pink inner surface and core; fine sand and chalky sand temper.
94. Painted sherd; level 3b; reddish orange paint; creamy slip outer surface; reddish pink inner surface and core; sand temper.
95. Painted sherd; level 3b; reddish orange paint; cream slip outer surface; reddish pink inner surface and core; fine sand and fine vegetable temper.
96. Painted sherd; level 3b; orange-red paint; cream slip outer surface; reddish pink inner surface and core; sand and fine vegetable temper.
97. Painted sherd; level 3b; dark reddish purple-brown paint; creamy slip outer surface; reddish pink inner surface and core; fine

sand temper.

98. Painted sherd; level 3a; reddish orange paint; cream slip outer surface; reddish pink inner surface and core; fine sand, chalky sand and much vegetable temper.

Plain pottery: All of the plain pottery are fragments of bowls' rims. Specimens Nos. 99 to 101 are large bowls characterized by beaded rim and its curve inclined to inside. Specimen No. 100 is characterized by the carination, which is similar to those from Tell Fisna [Numoto 1988: fig. 20–111–116]. Specimen No. 102 is characterized by the top of the rim slantingly cut into inside. Fabrics, which are used for all the specimens mentioned here, are tempered with either fine sand, or sand and vegetable. Creamy slip is always recognized on their surface. Specimens Nos. 103 to 105 are hand-made coarse ware which clay tempered with coarse sand, small stones and vegetable. Specimen No. 104 has a circular projection with convex top. Specimen No. 105 has a crecent lug on the upper part of its rim.

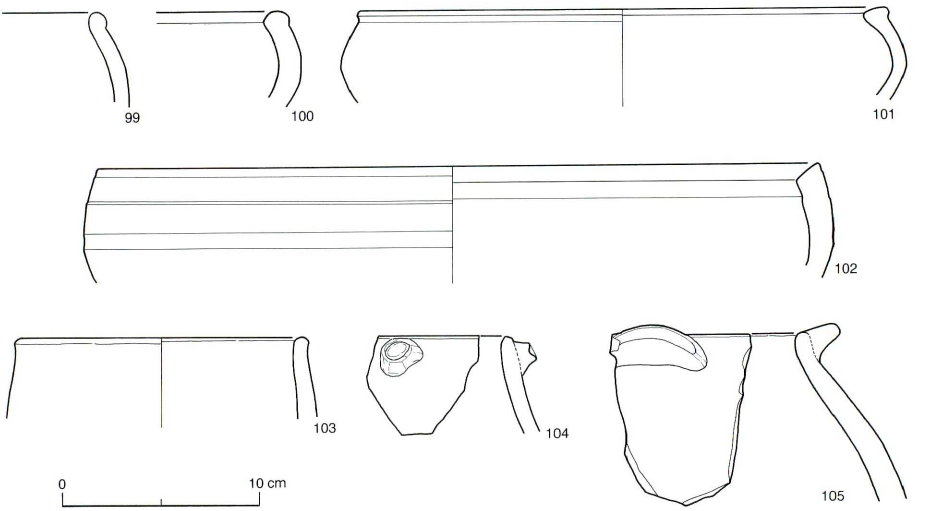


Fig. 9 Plain Pottery from Levels 3a and 3b at Grid 10

<in Fig. 9>

99. Rim of bowl; level 3b; creamy slip all over; reddish pink core; sand and vegetable temper.
100. Rim of bowl; level 3a; light creamy brown outer surface; greyish brown inner surface and core; sand and vegetable temper.
101. Rim of bowl; level 3b; creamy slip all over; reddish pink core; fine sand and fine vegetable temper.
102. Rim of bowl; level 3b; creamy slip all over; red to reddish pink core; sand and vegetable temper.
103. Rim of coarse ware; level 3a; reddish pink to light brownish grey outer surface; light brown inner surface; grey core; coarse sand and small stone temper; hand made.
104. Rim of coarse ware; level 3b; greyish red outer surface; reddish inner surface; grey core; sand and vegetable temper; hand made.
105. Rim of coarse ware; level 3b; light brown to reddish pink-brown surface; greyish brown core; sand, small stone and fine vegetable temper; hand made.

Pottery from level 3c (Figs. 7, 10)

Structure: Taking away walls and floors of level 3b, it became clear that the nine stratum was artificially cut. The cutting line was directed from the east to the west, and its depth is from 40 cm to 60 cm. Level 3c is composed of solid light brown silty soil, which had been accumulated on the cutting surface. Pottery from this level shows characteristics of the Late Uruk pottery as being treated later. The section, which runs from the east to the west, is shown in Fig. 7. The cutting structure had not been completely deposited at that time when level 3b had been constructed. The east to the west wall of level 3b, therefore, had been constructed along the cutting line. Chronologically, there is no great gap between levels 3b and 3c. Pottery from level 3c is considered to have belonged to the Late Uruk period. This fact also shows that there is little chronological gap between these two levels.

Pottery: From level 3c, rims of bowls (Nos. 106, 109, 110), ring-base sherds (Nos. 107, 108) and a rim sherd (No. 111) were excavated. Specimen No. 106 is a rim of a carinated bowl. Specimens Nos. 109 and 110 are rims of footed bowls. These rims show the same shape as painted carinated and painted footed bowls as discussed above. Both of these use the same fabrics. There are traces of painting on specimen No. 110. Specimens Nos. 107 and 108 are belived to be of bases of bowls. Specimen No. 107 is a low ring-base, while specimen No. 108 is characterized by a stuck ring-base. No similar shape of bases in the Ninevite 5 period are found. On the other hand, the same type of bowl bases are found from the Late Uruk level in Tell Mohammed Arab and Tell Karrana 3 [Killick in press; Rova in press]. Pottery with a ring-base is one of the remarkable features in the Late Uruk period. Specimen No. 111 is a fragment of an open bowl with an everted rim. Taking into the features of its fabric and the shape, it seems to belong to the Late Uruk period.

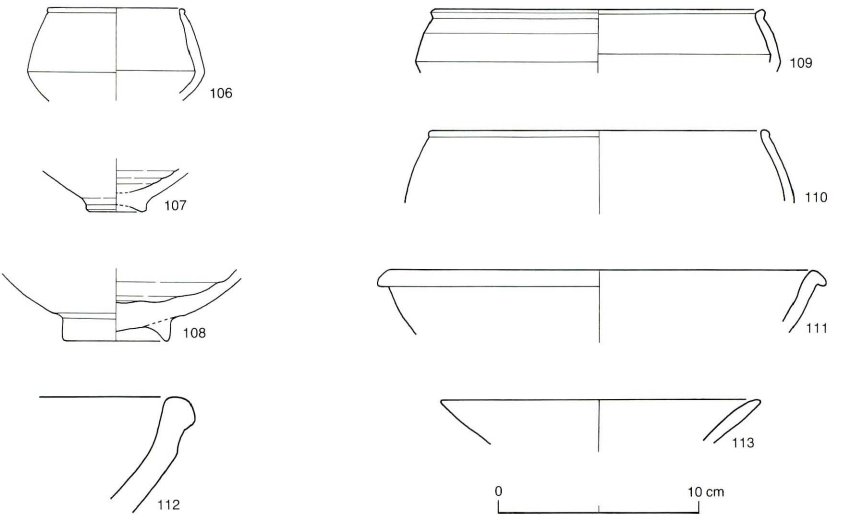


Fig. 10 Pottery from Level 3c and below the Level 3c at Grid 10

Pottery from below the level 3c (Strata of Nos. 9 and 10) (Fig. 10)

Strata of Nos. 9 and 10 are composed of the same kind of solid brown soil with little mixtures like natural soil. There are no occupation levels in these strata. Specimen No. 112 is a rim of a large bowl which was

found in stratum No. 9. This sherd colors grey, and contains a large amount of coarse sand and vegetable. A rim sherd which is similar to specimen No. 112, was found from the Late Uruk level in Tell Thuwaij [Fujii et al. in press]. Stratum No. 10 is considered to accumulated on natural alluvium soil. A few small potsherds were found from this soil. Among the rest, specimen No. 113 is a rim of an open bowl, which fabric and shape are peculiar to pottery in the Halaf period. Since a occupation level of the Halaf period was found at Area A, there is a great possibility that a occupation level of the Halaf period would be found near to G10.

<in Fig. 10>

106. Rim to body of carinated bowl; level 3c; pinkish buff surface; light grey core; fine sand temper.
107. Ring-base sherd; level 3c; reddish pink; sand and mica temper.
108. Ring-base sherd; level 3c; creamy slip all over; reddish pink core; sand, small stone and vegetable temper.
109. Rim of bowl; level 3c; creamy slip all over; reddish pink core; sand, chalky sand and vegetable temper.
110. Rim of bowl; level 3c; reddish pink; fine sand temper; probably painted on outer surface.
111. Rim of bowl; level 3c; pinkish buff; sand temper; hard.
112. Rim of bowl; No. 9 stratum; grey surface; greyish black-brown core; much coarse sand, sand and vegetable temper.
113. Rim of bowl; No. 10 stratum; creamy slip all over; reddish pink core; fine sand temper; Halaf ware.

Summary

Tell Jigan is the largest tell in Eski-Mosul region. It is supposed that it had been a center of this region through all the period. Especially, occupation levels of the Painted and Early Incised period in the Ninevite 5 period spread over the tell. On the other hand, the sphere of occupation levels in the Late Incised and Late Excised period is slightly reduced than that of the Painted and Early Incised period [Ii in press]. The sites, near to Tell Jigan, which contain the Ninevite 5 occupation levels are as follows: Tells Karrana 3, Fisna, Kutan, Mohammed Arab, Khirbet Hatara and Jam bur. The occupation levels of the Ninevite 5 period in these tells are smaller than those of Tell Jigan. These are satellite tells of Tell Jigan. It is supposed that these tells had been always influenced by Tell Jigan. Tell Jigan had been a center of the east upper reaches of the Tigris river in the north of Nineveh.

The occupation level of the Hassuna period was on alluvium soil in Area A. The same level was found in the area where Iraqi expedition excavated [Al-Aswad 1987]. On the other hand, the first occupation level of G4 is identified with layer of either the Transitional period or the Late Uruk period.

G10 was the only area in which the Late Uruk occupation level was found. We reach the conclusion that the sphere of the Late Uruk occupation level is smaller than that of the Ninevite 5 period.

Level 3 at G10 and levels 9, 10 at G4 are almost the same hight above sea level. To sum up, the occupation levels being held from the Late Uruk to the Transitional periods horizontally spread throughout Area C.

Any occupation level, which belongs to the Painted and Early Incised period, is not found in G4. It may not have existed in this area. Potsherds, which belonged to the Painted and Early Incised period, were found almost all the area in Tell Jigan. It is supposed that the occupation levels should be widely spread. The occupation levels of this period were recognized at Area A [Ii and Kawamata 1984/85] and the area in which Iraqi expedition excavated [Al-Aswad 1987].

The fortified moat in Area A did not reach throughout Area C, because the Ninevite 5 levels were excavated at G8 and G10[8].

Finally, Tell Jigan has been occupied from the Hassuna period to the present age. Our expedition predicted that Tell Jigan had been occupied throughout the Ninevite 5 period, taking account of potsherds distributed over the tell. Unfortunately, only two seasons, during which our expedition were permitted to

be engaged in excavation, are not enough to solve the problems found in previous studies about the Ninevite 5 period, and establish chronological order in that period.

Notes

1) See figures in pp. 62–65 *Researches on the Antiquities of Saddam Dam Basin Salvage and Other Researches* for the details of Area C [Fujii 1987].
2) The size is nearly equal to that of levels IIa and IIb at Area B, and level 1 of Trench A at Tell Thuwaij [Ii and Kawamata 1984/85; Fujii et al. in press].
3) In the preliminary report, these motifs were regarded as the Akkadian ones. Therefore, this level was mentioned as the Akkadian one.
4) A wall based on stones is found from the lowest level of Tell Selal. It is proposed by researchers concerned that this level belongs to nearly the Painted and Early Incised period (parsonal communication).
5) The size of a mud-brick is the same as a mud-brick which constructs a platform in Tell Fisna [Numoto 1988]
6) In the Late Uruk period, cross-hatched motifs are rough comparing with those of the Ninevite 5 period.
7) Cross-hatched motif is common design of painted carinated bowls in the Late Uruk period [Killick in press]. The keen carination, and the low height in proportion to maximum diameter are common characters between specimen No. 88 and painted carinated bowls in the Late Uruk period [Numoto in press].
8) Area C gently sloped down, while Area A steeply sloped down to the edge of the tell. We assumed that the fortified moat had not existed in Area C before our starting excavation.

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「ラーフィダーン」編集委員会
電　話：0427－36－2343
ＦＡＸ：0427－36－5482

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   〔大岡　1987: fig. 12; Naharagha 1981: 45ff〕
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Guideline to writing

1. The manuscript should be typed on one side only of A-4 size paper.
2. On the front page, to the exclusion of the text, the title of article should be written as well as the name, address and position of author(s).
3. Please be sure to prepare necessary drawings and tables on separate papers one by one (less than 23.5×16.0 cm each in size of completion of printing), with explanations and consecutive numbers respectively, and compile them aside from the text. In addition, designate on the margine of the text where each one should be inserted.
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6. Explanatory notes should be written on separate papers, each with a consecutive number to be given to the relevant sentence in the text.
7. In the text, specify the literature for reference as below; writer's name, publication year, and quoted pages are arranged in order, enclosed in brackets:

   〔Childe 1956: 30–32〕
   〔Annahar 1943: 123; Agha 1946: pl. 15〕

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8. Put all the references that have been quoted in the text and notes, and write them as follow: (1) The writers' names are to be listed in alphabetical order. The names of Japanese, Arabs, etc. must be arranged among the Europian names based on the supposition of their having been rewritten in Latin. (2) The writer's name, issue year, title, volume name, volume number, issue number and publisher's name (place) are to be filled in the references in regular sequence. The title of journals or independent publications should be specified, with underline or by the use of Italic letters.
9. As a rule, the first proofreading shall be done by the original author.

正 誤 表 CORRIGENDA

(Vol. XII)

	誤 errors	正 corrections
p. 3 ℓ. 15	MaCown	McCown
p. 5 ℓ. 22		
Fig. 3		
p. 53 ℓ. 29		
p. 41 Fig. 39	(タイプ4：5, 6)	(タイプ4：4, 5)
p. 82 ℓ. 17	1971	1973
p. 83 ℓ. 20		
p. 101 Fig. 5	No. 105, Type 3	No. 105, Type 4
p. 115 Table 6: No. 142	Type 3f	Type 3e
p. 141 Table 13: No. 337	Fuji et al.	Fujii et al.
p. 267 ℓ. 19	Conical ball	Conical bowl
p. 290 ℓ. 32	MacCown	McCown
ℓ. 34		
pp. 233–236 Figs. 4–7	0 20 cm	0 15 cm

On p. 83, a supplemental description is to be given as follows.

Additional note:

After the final proofreading, a copy of Ghirshman's "The Island of Kharg" (Tehran, 1960) came to hand by courtesy of Dr. Warwick Ball, to whom I express my best thanks. According to the description by Ghirshman, the above-mentioned orientation of the Kharg church (see p. 79), which followed the incorrect indication presented by Whitehouse *et al.*, has proved to be upside-down.

編集後記

Ⅸ～ⅩⅡ巻と何れも300ページを越すボリュームであったが，本号はそれらの約半分の量となった。編集者の作業量も前任者達に比べ比較的少なくて済んだ。量的にはこのくらいの分量が研究所紀要としては相応しいと思う。以前の本誌が膨大な量となった原因の一つには我隊による発掘調査の報告を掲載していた点が上げられる。調査報告の掲載や出版の方法については，再度検討する必要があろう。 (沼本)

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