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EGYPTIAN PREDYNASTIC STONE VESSELS¹

By A. LUCAS

The aspects of the subject that it is proposed to consider are, first, the nature of the stones used, second, their place of origin and, third, the bearing of the facts upon the problem of the home of the people who made the vessels.

The materials of which the vessels consist are shown in Table I, which is based upon the description given in the archaeological reports to which reference is made, but includes several modifications introduced by the writer. Thus, in order to simplify the matter as much as possible, related materials are grouped together under one general heading, the separate materials so treated being indicated in every case. Also, what is termed porphyry in the archaeological reports is called by the writer porphyritic rock. The name porphyry (derived from a word meaning purple) was originally applied to a certain kind of purple tinted rock (imperial porphyry), but in geology this primary significance has given place to one in which structure and not colour is the guiding characteristic, a porphyritic rock being any kind of igneous rock in which there are conspicuous crystals scattered throughout a differently coloured ground-mass or matrix of apparently homogeneous material.

One specimen of emery has been omitted, as this is not an Egyptian stone; also one of gypsum, as the date is probably protodynastic, and several others, because either the nature of the stone is not specified or the description is not sufficient for identification.

The writer has examined as many as possible of the stones used for vessels both in Predynastic and early Dynastic times, but, as they were mostly museum specimens, the examination was often necessarily limited to a naked eye inspection, or, at most, an examination with a lens. This, however, is not always sufficient to establish the identity of a stone, for which purpose a microscopic study of a thin section is sometimes requisite. In a comparatively large number of cases of the more doubtful materials broken fragments of early Dynastic date were fortunately available², and then a microscopic examination was made³. In a few instances, too, a chemical analysis was also carried out to assist further in the identification.

The various localities in Egypt where the stones mentioned in Table I occur and the places from which they were probably obtained for making vessels in Predynastic times are shown below.

The first two columns of Table II need no justification; the nature of the various stones is that recorded in the archaeological reports quoted in connexion with Table I, and the occurrence of the stones is vouched for by the geologists in the reports to which reference is made. The statements in the third column, however, which are those of the writer, require proof, and this will now be given. First, however, the term "Nile Valley cliffs" used in that column must be defined.

¹ Includes Badarian and Neolithic.

² The writer is particularly indebted to Mr. C. M. Firth and Mr. R. Engelbach for these fragments.

³ In many cases the writer's identification has been kindly checked by Dr. W. F. Hume, of the Geological Survey of Egypt and by Mr. G. W. Grabham, Geologist to the Sudan Government.

TABLE I.

NATURE OF STONE	REMARKS
Alabaster ^{1-5, 7-9}	Calcite
Basalt ^{1-5, 7-9, 11, 12}	Includes fine-grained dolerite
Breccia ^{1, 2, 4-9, 11}	Chiefly red and white
Diorite ^{1, 2, 9, 11, 13}	Speckled
Granite ^{1-3, 9}	Includes red granite, black-and-white granite and syenite
Limestone ^{1-5, 7-10, 13}	Amorphous and variously coloured
Marble ^{1, 2, 4, 8, 11}	Includes all varieties of crystalline limestone except calcite
Porphyritic rock ^{1-4, 9}	Includes porphyritic diorite
Schist ^{2, 4, 7-9}	Includes various metamorphic rocks, such as tuff (volcanic ash), mudstone and slate
Serpentine ^{1, 3, 9}	Includes steatite

In contrast to the far desert, the home of the nomad, out of sight of the Nile and at a considerable distance from it, there is a desert border lying within easy reach of the river, often within sight of it and readily accessible to the valley dwellers. Any stone occurring in this border could easily have been worked by the Predynastic valley people from their homes, in the same manner as gypsum for plaster and limestone for building purposes and for lime-making are now worked. The villages, too, at that period would have been farther from the Nile and nearer the cliffs than are the villages to-day, on account of the marshes then fringing the river. No wholly satisfactory name to express this region has been found, but the term "Nile Valley cliffs" has been adopted as the best available, although it is not sufficiently comprehensive, since the area it is meant to describe includes not only the face of the cliffs that border the valley but the desert side also, with the plateaux and low hills immediately behind, as well as the land for a short distance up the side valleys.

For the small amount of stone of any one sort worked in any particular locality in Predynastic times in order to make vessels extensive quarry operations would not have been needed, and traces of this working are not likely to have persisted to the present day. Doubtless, too, the stone used was often taken from blocks that had fallen from the cliffs, rather than from the cliffs themselves.

The various stones may now be dealt with separately and this will be done in the alphabetical order in which they are given in the tables.

¹ Petrie, *Prehistoric Egypt*, 35, 36; Pls. xxxiv-xlii.

² Petrie and Quibell, *Nagada and Ballas*, 10, 36.

³ Petrie, Wainwright and Mackay, *The Labyrinth, Gerzeh and Mazghuneh*, 21, 22.

⁴ G. Brunton and G. Caton-Thompson, *The Badarian Civilisation*, 28, 57, 58; Pl. li.

⁵ G. A. Reisner in *Arch. Survey of Nubia, Rpt. for 1907-1908*, 116, 119, 125, 128; Pl. 64.

⁶ C. M. Firth in ditto for 1910-1911, 192.

⁷ R. Engelbach, *Harageh*, 7, 14.

⁸ D. Randall-MacIver and A. C. Mace, *El Amrah and Abydos*, 16-24, 48; Pls. viii, xvi.

⁹ Petrie, *Diospolis Parva*, 19.

¹⁰ Ayrton and Loat, *Predynastic Cemetery at El Mahasna*, 11, 12, 16.

¹¹ E. Naville, and others, *The Cemeteries of Abydos*, I, 14; Pls. ii, iii.

¹² Miss Caton-Thompson writes: "...the Neolithic Fayumis were using local basalt for stone vases as well as axes." Private letter, dated 1st Feb. 1930.

¹³ Quibell and Green, *Hierakonpolis*, II, 50; Pl. lxiv.

TABLE II.

STONE	OCCURRENCE	WHERE OBTAINED
Alabaster	Nile Valley cliffs ² ; Cairo-Suez desert ³ ; Sinai ⁴	Nile Valley cliffs
Basalt	Near Cairo ^{1,2} ; Cairo-Suez desert ^{1,3} ; Fayyûm ^{1,5} ; Aşwân ⁶ ; Baharia Oasis ^{1,7} ; E. desert ^{1,2,8,9} ; Sinai ^{1,2,10,11}	Fayyûm
Breccia	Nile Valley cliffs ² ; E. desert ⁸	Nile Valley cliffs
Diorite	Aşwân ⁶ ; E. desert ^{1,8,9} ; Sinai ^{1,10,11,12}	Aşwân
Granite	Aşwân ^{1,6} ; E. desert ^{1,8,9} ; Sinai ^{1,10,11,12} ; W. desert ¹³	Aşwân
Limestone	Nile Valley cliffs ^{1,2}	Nile Valley cliffs
Marble	E. desert ^{2,8,9}	E. desert
Porphyritic rock	Aşwân ⁶ ; E. desert ^{8,9} ; Sinai ^{10,11}	E. desert
Schist	E. desert ^{1,8,9} ; Sinai ^{10,11}	E. desert
Serpentine	E. desert ^{1,8,9}	E. desert

Alabaster (Calcite).

Alabaster is reported from four areas only¹⁴, one in the Cairo-Suez desert, where it was worked for a short period in modern times¹⁵, but where there is no trace of ancient working; a second in Sinai, where there is no evidence of its ever having been worked; and the third and fourth near Ḥelwân and in the district extending from about Miniah to a little south of Asyût, respectively. In both places there are ancient quarries, those at Ḥelwân dating certainly from the Old Kingdom¹⁶, and others near Tell El-'Amarnah from at least the Third Dynasty¹⁷. A quarry in Wâdî Asyût was worked at the beginning of

¹ Geological Survey of Egypt, *Geol. Map*.

² W. F. Hume, *Explan. Notes to Geol. Map*, 1912; alabaster, 46; basalt, 32, 33; breccia, 46; limestone, 46, 47; marble, 47.

³ T. Barron, *The Topog. and Geol. of the District between Cairo and Suez*, 1907; alabaster, 20, 93; basalt, 103-7.

⁴ H. J. L. Beadnell, *The Wilderness of Sinai* (1927), 83.

⁵ *Id.*, *The Topog. and Geol. of the Fayum Province of Egypt*, 1905; basalt, 15, 28, 34, 53, 56, 62.

⁶ J. Ball, *A Description of the First or Aswan Cataract of the Nile*, 1907; basalt, 69, 86, 88, 89; diorite, 69, 79-80, Pl. v (2); granite, 68, 69-77.

⁷ Ball and Beadnell, *Baharia Oasis; its Topog. and Geol.* (1903), 40, 63-4.

⁸ Barron and Hume, *The Topog. and Geol. of the Eastern Desert of Egypt, Central Portion*, 1902; basalt, 52, 225, 228-9, 263; breccia, 169, 171; diorite, 59, 118, 221, 230, 233, 239, 247, 265; granite, 49, 62-3, 118-19, 225, 234, 247, 265; marble, 32, 119, 240, 266-7; porphyritic rock, 118, 227-8, 236, 238-40, 245, 262; schist, 217-21, 224, 226, 236, 238-9, 249, 264; serpentine, 224, 265.

⁹ J. Ball, *The Geog. and Geol. of South-Eastern Egypt*, 1912; basalt, 310-13; diorite, 286-93; granite, 267-76; marble, 348-9; porphyritic rock, 276, 283-5; schist, 337-50; serpentine, 320-30.

¹⁰ T. Barron, *The Topog. and Geol. of the Penin. of Sinai (Western Portion)*, 1907; basalt, 198-9; diorite, 195-6; granite, 185-95; porphyritic rock, 185-6, 189-90, 192, 195, 197; schist, 203-4.

¹¹ J. Ball, *The Geog. and Geol. of West-Central Sinai*, 1916; basalt, 10, 122-4; diorite, 163-4; granite, 163-4; porphyritic rock, 163-4; schist, 164.

¹² W. F. Hume, *The Topog. and Geol. of the Penin. of Sinai (South-Eastern Portion)*, 1906; diorite 71-2, 168, 240, 242-3; granite, 154-62, 239-44.

¹³ F. W. Moon, *Notes on the Geol. of Hassanein Bey's Exped. to Sollum-Darfur in Geog. Journ.*, LXIV (1924), 388-93.

¹⁴ See Table II.

¹⁵ T. Barron, *The Topog. and Geol. of the District between Cairo and Suez*, 20, 93.

¹⁶ Petrie and Mackay, *Heliopolis, Kafr Ammar and Shurafa*, 39, 40.

¹⁷ G. W. Fraser in *Proc. Soc. Bibl. Arch.*, XVI (1893-4), 73-82; Petrie, *A History of Egypt*, I (1923), 45.

the Eighteenth Dynasty¹ and was possibly re-opened in the time of Mohammed Ali to supply the stone required to ornament the Citadel mosque in Cairo^{1,2}. From the above considerations it may be accepted as practically certain that all the alabaster employed anciently, including that for the predynastic vessels, was obtained from the Nile Valley cliffs.

Basalt.

This includes fine-grained dolerite, which is merely a coarse basalt. Comparatively large quantities of basalt were employed in the Old Kingdom; thus a pavement in the Fourth-Dynasty mortuary temple of Kheops at Gîzah was of basalt, as also the pavements of a court, of a causeway, of two small chambers and of a small offering place in a Fifth-Dynasty mortuary temple at Saqqârah³, and pavements in the mortuary temples of two Fifth-Dynasty pyramids at Abuşîr (between Gîzah and Saqqârah), the remains of all of which may still be seen. A sarcophagus found in the Fourth-Dynasty pyramid of Mykerinos at Gîzah was also of basalt⁴. As this stone occurs plentifully both in the Fayyûm⁵ and in the neighbourhood of Cairo⁵—at Abu Za'bal, about halfway between Cairo and Bilbeis (Bubastis); to the north-west of the Gîzah pyramids (in the Abu Rwâsh area) and in the Cairo-Suez desert, respectively—it is highly probable that the supply was obtained locally, and, although the particular spot from which it came cannot be fixed with absolute certainty, all the evidence points to the Fayyûm as the source. This evidence may now be considered.

Petrie states that the brown basalt of the early dynastic vessels "is of the same quality as that used in the Fourth Dynasty for building, coming from El-Khankah near Bubastis⁶." There is, however, no proof of this and no evidence of ancient working at Khankah (or rather at Abu Za'bal near Khankah, where the quarries are situated). So far as is known to the writer, the Fayyûm basalt is the only one near Cairo for which there is evidence of ancient working. The paved road leading to the quarry is mentioned by Beadnell⁷ and described in detail by Miss Caton-Thompson⁸, the latter of whom tentatively suggests that it may be Roman. The neighbouring small temple, however, according to Miss Caton-Thompson, possibly dates from the Old Kingdom^{8,9}, which period is well represented in the northern Fayyûm¹⁰. The writer, therefore, ventures to think that both the quarry and the road are also of that date. Miss Caton-Thompson points out that "none of the Graeco-Roman towns and temples of the Fayyûm show any trace of basalt in structure or decoration" and she cannot suggest for what purpose it was required⁸. The writer, too, does not know of any use of basalt in quantity in Egypt during the Roman period, but during the Old Kingdom, as already stated, this stone was largely employed. It is true that the Romans exported imperial porphyry and speckled granite from the eastern desert to Italy, and Miss Caton-Thompson raises the question of the possible export of basalt⁸; but imperial porphyry and speckled granite are

¹ A. E. P. Weigall, *The Alabaster Quarries of Wady Assiout*, in *Ann. Serv.*, xi (1911), 176.

² W. F. Hume, *The Alabaster Quarry of Wâdi Asiût*, in *Cairo Sci. Journ.*, vi (1912), 72.

³ C. M. Firth in *Ann. Serv.*, xxix, 65, 68.

⁴ H. Vyse, *The Pyramids of Gizeh*, II (1840), 84. This sarcophagus was lost at sea, but a small fragment exists at the British Museum.

⁵ See Table II.

⁶ Petrie, *Royal Tombs*, II, 43.

⁷ Beadnell, *The Topog. and Geol. of the Fayum Province of Egypt*, Pl. xviii.

⁸ G. Caton-Thompson in *Antiquity*, I (1927), 338-40.

⁹ G. Caton-Thompson and E. W. Gardner in *Geog. Journ.*, LXXIII (1929), 45.

¹⁰ *Op. cit.*, 42, 43.

special stones used for ornamental purposes that do not occur in Italy, whereas basalt does occur and there is neither evidence nor probability of this having been exported.

Miss Caton-Thompson has shown that the good quality gypsum used during the Old Kingdom at the Gîzah necropolis for mortar and plaster was obtained in all probability from the Fayyûm¹, and the gypsum vases of Old Kingdom date found by Petrie at Gîzah² were probably from the same place, since at that period such vases and dishes were being made on a large scale in the Fayyûm¹. Thus intercourse is denoted between the two places, which are only about 30 miles apart and easily accessible one from the other, it being at the present time possible to traverse the intervening desert by motor car.

Hand specimens of four of the basalts mentioned, namely, those from the Fayyûm³, Abu Za'bal, the Gîzah pavement and the Saqqârah pavement⁴ respectively, and microscopic sections of the Abu Za'bal and the Gîzah material have been examined and compared.

As seen in the hand specimens, the stone from all four places is very similar, the most notable difference being one of colour, some pieces being black and others brown, thus that from the quarry, whether from the Fayyûm or from Abu Za'bal, may be either black or brown, whereas that employed anciently is generally brown. This difference, however, is not fundamental, the brown being merely weathered surface material. Another difference is the size of grain, which varies in different specimens, some of the Abu Za'bal material being slightly coarser than the rest. If the Fayyûm and Abu Za'bal basalts are from the same flow, which is possible, a great similarity between them is only to be expected.

As seen in the slides, the Abu Za'bal and Gîzah specimens, though both typical olivine dolerites and generally much alike, are not identical, the former showing a yellow alteration product with little or no green, while the latter has a considerable amount of green and very little yellow⁵.

The evidence, therefore, for the Fayyûm having been the source of the Old Kingdom basalt, although entirely circumstantial, is strong. To recapitulate, during the Old Kingdom basalt was employed in large quantity in the necropolis stretching from Gîzah to Saqqârah. In the Fayyûm, within fairly easy reach of this necropolis, there is a basalt quarry approached by a made road, and therefore, manifestly worked on a large scale, and near the quarry is a small temple possibly of Old Kingdom date. There is no evidence of the use of basalt in Egypt in large quantities, except during the Old Kingdom, and export is unlikely; there is, moreover, no evidence of the ancient quarrying of basalt near Cairo, except in the Fayyûm. The basalt employed in the Old Kingdom, when carefully examined, is found to be more nearly like that from the Fayyûm than that from Abu Za'bal⁶. During the Old Kingdom, too, another material (gypsum), employed for plaster and mortar in the Gîzah necropolis, was almost certainly procured,

¹ Caton-Thompson in *Mam*, xxviii, No. 80, 110-11.

² Petrie, *Gîzeh and Rifeh*, 7; Pl. vi B.

³ Kindly supplied by Miss Caton-Thompson.

⁴ Kindly supplied by Mr. C. M. Firth.

⁵ Any more detailed examination than that here attempted is a matter for the petrologist. Dr. J. W. Evans, Past President, Geological Society of London and Dr. W. F. Hume, Geological Survey of Egypt, both very kindly made a cursory examination of the material, both hand specimens and slides, and expressed agreement with the writer's conclusions.

⁶ [Miss Caton-Thompson writes:

"Miss Gardner and I agree with Mr. Lucas' inference that the basalt used in Old Kingdom monuments comes from the Fayyûm, a view which we proposed to advance independently in our full publication, now

in part at least, from the Fayyûm, and probably certain gypsum vases found at Gîzah were also obtained from the Fayyûm.

But, if basalt was obtained in large quantity from the Fayyûm during the Old Kingdom for paving purposes and for making a sarcophagus, it is not unreasonable to suppose that the small amount required for the early dynastic vessels was procured from the same place, and, if so, then it becomes exceedingly probable that this was also the source of that employed for the predynastic vessels. This is rendered still more probable by the fact that this basalt was actually used in small quantity for vases¹ and other purposes² as early as the Neolithic period, which is proved by the basalt objects of that date found by Miss Caton-Thompson near the quarry.

Beadnell states³ that the basalt, although generally hard and black, is frequently decomposed, soft and of a brown colour at the base. The Abu Za'bal basalt, which is now employed for road metal in Cairo, is also mostly black, with the inferior weathered surface material brown.

At a comparatively late date, occurrences of dolerite (coarse basalt) in the eastern desert became known, since in one place (Wâdî Atollah, roughly midway between Kenah and Koşêr) this rock bears inscriptions of Ramesses III⁴ (Twentieth Dynasty), and in another locality, in about the same latitude as Asyût, but much nearer the coast than the Nile and close to the imperial-porphry quarry of Gebel Dokhân, there are dolerite quarries almost certainly of Roman date⁵. There is no evidence to show whether this stone was worked on a large scale or for what purpose it was required, though it may have been for purely local use, for example, for building houses for those engaged in the porphyry quarrying or stations and watch towers for those guarding the workmen. The ruins of a temple and of a small town enclosed by a fortified wall (the town containing a bath establishment with an eight-pillared hall and a plunge bath) still exist⁶, but the nature of the stone employed is not mentioned, though in a chamber in a small stone building near the quarry there are seats consisting of large dolerite blocks resting on dolerite slabs⁵.

in hand, on the Fayyûm. We can, indeed, considerably strengthen this assumption as a result of our work in 1927-28.

Mr. Lucas refers to the road from the basalt flow of Widân el-Faras to Kasr es-Sagha, an account of which I published in *Antiquity*, September, 1927. I agree with him that the probabilities are in favour of an Old Kingdom date, and some day, when I again hold that concession, the matter shall be gone into fully. But this road leads south down from the scarp, a direction which does not elucidate the question of transport to the north. We think it more probable that an ancient and well-defined road, 25 yards wide, which we followed for 12 continuous miles between the modern King's Road and Dahshûr, is the route used.

A western continuation of this road, which we could not trace owing to obliteration by wadys, would lead direct to the Widân el-Faras "quarries." Investigation of the eastern terminus at Dahshûr might settle the matter.

Microscopical examination of the Fayyûm basalt and a specimen from the Fifth-Dynasty pavement at Sakkarah shows them to be indistinguishable; and although the rock type is a common one, the presence of similar inclusions in both supports their community of origin. This, in our opinion, would be established beyond doubt if a comparison were made with a specimen of basalt from Abu Za'bal, the alternative source. To this end we are sending Mr. Lucas specimens of Fayyûm basalt." Ed.]

¹ G. Caton-Thompson, see reference No. 12, Table I.

² G. Caton-Thompson in *Antiquity*, I, 331, and in *Journ. Royal Anthropol. Inst.*, LVI (1926), Pl. xxxv, Fig. 1, No. 4.

³ Beadnell, *op. cit.*, 61.

⁴ Barron and Hume, *op. cit.*, 52, 263.

⁵ *Op. cit.*, 26.

⁶ A. E. P. Weigall, *Travels in the Upper Egyptian Deserts*, 106, 107.

Breccia.

A red and white breccia and another with little or no red colour are found abundantly on the west bank of the Nile in several localities, for instance, north of Miniah, near Asyût, at Thebes and near Esnah. A red and white breccia also occurs in the eastern desert¹. There is no evidence to show from what source the small amount of this stone required for the few predynastic vessels was obtained, but the balance of probabilities is strongly in favour of the Nile Valley cliffs, where it occurs plentifully.

Diorite.

The particular kind of diorite used for the few predynastic vessels made of this material was a speckled variety, in which the component minerals (white felspar and black hornblende) are fairly evenly distributed, the banded, mottled and often slightly translucent varieties not being used, so far as is known, until Dynastic times. Diorite occurs near Aşwân, in the eastern desert and in Sinai¹, and, although in the eastern desert it is largely developed in the hills north of the Kenah-Ḳoşêr road and was worked in Wâdî Semnah (north-west of Ḳoşêr) by the Romans², there is no evidence of earlier working. Aşwân, where the speckled variety similar to that used for the predynastic vessels is known to occur³, and where another stone (granite) was being worked from an early date, seems the most probable source of the predynastic supply. Sinai, although a possible source, appears very unlikely and no record of any stone-working in Sinai is known to the writer⁴.

Granite.

Granite, including both the red and black-and-white varieties and also syenite, is very widely distributed in Egypt¹, but, as all kinds occur near Aşwân and were worked there in early Dynastic times, it appears highly probable that it was from this source that the granite for the few predynastic vessels was obtained. The only other granites known to have been worked anciently are the red granite of Wâdî Foakhir⁵ (a continuation of Wâdî Hammâmât, between Kenah and Ḳoşêr), the date of the working of which is unknown but probably late (Weigall says Roman)⁶, and the black-and-white granite quarried by the Romans at Mons Claudianus⁷.

Limestone.

As the cliffs bordering the Nile Valley from Cairo to a little beyond Esnah, a distance of about 500 miles, are of limestone, which includes almost every kind and colour, except possibly black, there is no need to look elsewhere for the source of the limestone used for the early vessels, even those of Predynastic date.

The colours of the limestone used for the predynastic vessels comprise white, grey, yellowish, pink and black, the three first mentioned being very common colours in limestone and occurring in most limestone areas; pink and black limestone, however, are less usual and may be specially considered. Pink limestone has been noted in several places

¹ See Table II.

² Barron and Hume, *op. cit.*, 221, 265.

³ J. Ball, *The Aswan Cataract*, Pl. v (2).

⁴ See p. 207.

⁵ Barron and Hume, *op. cit.*, 265.

⁶ Weigall, *Travels in the Upper Egyptian Deserts* (1909), 50.

⁷ Barron and Hume, *op. cit.*, 39, 264.

in the eastern desert¹, but it is not necessary to go so far afield as this, since some of the limestone of the Nile Valley also weathers pink², one example being that of the walls in the tomb of Tutankhamūn³. A black crystalline limestone occurs near the convent of St. Antony in the eastern desert⁴, where at some period it has been worked, and also in the Cairo-Suez district⁵ and possibly elsewhere. The workings at the convent are not likely to be connected with the few black limestone vessels of Predynastic date⁶, since the cutting of such a small amount of material as was required to make these vessels would not leave marks lasting several thousands of years.

Marble.

So far as is known, marble only occurs in the eastern desert, where it is recorded from several localities⁷, a grey saccharine variety from Wādī Dib (west of Gebel Zēt and fairly close to the coast) and both a white and a colour-banded kind from Gebel Rokham (near the upper part of Wādī Miah⁸, east of Esnah and roughly two-thirds of the way between the Nile and the Red Sea), the latter of which was exploited to a small extent in Arab times⁹. It was doubtless from one or both of these sources that the small amount of marble used anciently was, at least in part, obtained, since a third occurrence in the far south-eastern desert is a very unlikely source. A crystalline limestone, however, that is practically marble occurs in localities other than those mentioned and probably even in the Nile Valley cliffs.

Porphyritic Rock.

Porphyritic rocks, varying considerably both in the nature and size of the conspicuous crystals and also in colour, are widely distributed in Egypt¹⁰ and occur near Aṣwān, in the eastern desert and in Sinai. Although this material was used in the Predynastic period for making vessels, it was not employed to any great extent, the particular variety generally chosen being black and white (white crystals in a black matrix). There is no evidence to show from where this stone was obtained, though it was almost certainly either from Aṣwān or from the eastern desert, and, as the latter offers more opportunities, it seems the more probable source. Sinai, although possible, appears unlikely, chiefly because most of the other stones employed for the predynastic vessels can be shown, with a high degree of certainty, to have been obtained elsewhere, some of them from the eastern desert; had one kind of stone been obtained from Sinai, it seems probable that others, also, would have been procured from the same place. Further, no record or trace of stone-working in Sinai can be found at any period, whereas in the case of the materials that did come from Sinai (copper ore and turquoise) records and proofs of the mining exist. In the hope of obtaining direct evidence on the problem, the porphyritic rocks in the Cairo Geological Museum have been carefully examined, but no specimen identical with the stones employed anciently could be found, though Dr. Hume informs me that similar rocks do occur in the eastern desert.

¹ Barron and Hume, *op. cit.*, 167, 169, 170, 177.

² *Op. cit.*, 171.

³ A. Lucas in Carter, *The Tomb of Tut-ankh-Amen*, II, 164.

⁴ Hume, *Explan. Notes to Geol. Map*, 47.

⁵ Barron, *Cairo-Suez District*, 27, 99, 100, 101.

⁶ Petrie, *Diospolis Parva*, 19.

⁷ See Table II.

⁸ Wādī Miah enters the Nile Valley near Edfu.

⁹ J. Barthoux in *Mém. de l'Inst. d'Égypte*, v (1922), 33.

¹⁰ See Table II.

Schist.

There are many varieties of schist, but that used by the ancient Egyptians was principally a fine-grained, compact, hard, crystalline, quartzose, metamorphic rock, very like slate in appearance and generally of various shades of grey, ranging from light to dark, with sometimes a greenish tint. The term schist is also here used to include tuff (volcanic ash), mudstone and slate. The former is a fine-grained, bluish-grey, crystalline stone, consisting of consolidated volcanic ash, which is sometimes calcified, that is to say, has undergone alteration resulting in the formation of calcium carbonate as one of the products. Mudstone, which is a compact clay rock, is probably the material for which Petrie coined the term "Durite"; he describes it as an "indurated mud or ash, which is of the composition of slate but without a slaty fracture¹." Slate is generally a hard, fissile clay-schist, though slate formed from volcanic dust and not from clay is known. Schist occurs in various localities in Egypt², being particularly plentiful in the neighbourhood of Wâdî Hammâmât on the main road between Kēnah and Kōṣêr, where there are ancient quarries that were worked certainly in the Fifth Dynasty³ and probably earlier. Weigall found one inscription stated to be of the First Dynasty⁴. Slate occurs in the low hill region to the west and north-west of Kōṣêr; at Gebel Mongul (west of Gebel Zêt) and elsewhere in the eastern desert⁵.

Serpentine.

The serpentine employed anciently was almost necessarily obtained from the eastern desert², since no other Egyptian source is known. A green variety occurs in Wâdî Umm Disi⁶ (which is situated between Wâdî Kēnah, into which it opens, and the Red Sea) and at the foot of Gebel El-Rebshi⁶, and a black variety in Wâdî Sodmên⁶, both these latter places being north-west of Kōṣêr. In the far south-eastern desert serpentine is much more plentiful and covers an area of about 400 square miles⁷. Steatite, which is very similar in composition to serpentine, is found at Hamr near Aṣwân⁸ and at Gebel Fatirah⁸ (about the latitude of Taḥtah, but much nearer the coast than the Nile). In the former locality there are ancient mines, and the mineral is still worked at the present day by the local "Arabs," who fashion it into bowls and pipes.

It would be valuable if we could determine what proportion of the vases made consisted of each kind of stone, but this is hardly possible, as some of the archaeological reports concerned do not give the number of vessels of the different materials. The following table includes all that can be found. Although figures from reports published earlier than Petrie's *Prehistoric Egypt* are given in cols. *e-k*, these are not included either in the totals or in the percentages, as they have probably already been incorporated by Petrie. The sources of the figures given in the nine columns *a-k* are indicated immediately after the table.

¹ Petrie, *Amulets*, 8.

² See Table II.

³ J. Couyat and P. Montet, *Les inscriptions hiéroglyphiques et hiératiques du Ouâdî Hammâmât*, in *Mém. de l'Inst. franç. d'arch. orient. du Caire*, xxxiv (1912), 122, 123.

⁴ Weigall, *Travels in the Upper Egyptian Deserts*, 39.

⁵ Barron and Hume, *op. cit.*, 217-8, 221, 226, 238, 264.

⁶ *Op. cit.*, 265.

⁷ J. Ball, *South-Eastern Egypt*, 320-30.

⁸ Mines and Quarries Dept., *Report on the Mineral Industry of Egypt* (1922), 37.

TABLE III.

STONE	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	Total	%.	<i>e</i>	<i>f</i>	<i>g</i>	<i>h</i>	<i>k</i>
Alabaster	27	16	...	4	47	17·0	...	2	5	...	...
Basalt	47	1	...	9	57	20·0	...	9	3	...	1
Breccia	14	1	1	2	18	6·5	...	2	3	...	2
Diorite	1	...	...	...	1	0·5	1	...	...	...	1
Granite	7	...	...	...	7	2·5	...	...	...	...	...
Limestone	83	4	...	15	102	36·0	1	6	1	2	...
Marble	14	...	...	1	15	5·0	...	1	...	...	1
Porphyritic rock	5	...	...	1	6	2·0	...	...	...	...	...
Schist	...	6	...	4	10	3·5	...	1	...	...	...
Serpentine	19	...	...	...	19	7·0	...	...	...	...	...
	217	28	1	36	282	100·0	2	21	12	2	5

a. Petrie, *Prehistoric Egypt* (1920), 35, 36: Pls. xxxiv–xlii.

b. R. Engelbach, *Harageh* (1923), 14.

c. C. M. Firth, *Arch. Survey of Nubia, Rpt. for 1910–1911* (1927), 192.

d. Brunton and Caton-Thompson, *The Badarian Civilisation* (1928), 28, 57, 58; Pl. li.

e. J. E. Quibell and F. W. Green, *Hierakonpolis, II* (1902), Pl. lxiv.

f. MacIver and Mace, *El Amrah and Abydos* (1902), 16–24.

g. G. A. Reisner, *Arch. Survey of Nubia, Rpt. for 1907–1908* (1910), 116, 119, 125, 128.

h. Ayrton and Loat, *El Mahasna* (1911), 11, 16.

k. E. Naville and others, *Abydos, I*, 14; Pls. ii, iii.

The information in Tables II and III may now be combined in tabular form. The percentages can only be regarded as a rough approximation.

TABLE IV.

STONE	FAYYÛM, NILE VALLEY, AŞWÂN	E. DESERT
Alabaster	17·0 %.	...
Basalt	20·0	...
Breccia	6·5	...
Diorite	0·5	...
Granite	2·5	...
Limestone	36·0	...
Marble	...	5·0 %.
Porphyritic rock	...	2·0
Schist	...	3·5
Serpentine	...	7·0
	<u>82·5 %.</u>	<u>17·5 %.</u>

A statistical summary showing the Sequence Dates of the occurrence of the different kinds of stone employed for the predynastic vessels would be most useful, but unfortunately is not possible, owing to the absence in the archaeological reports of sufficient data. The following table, however, has been compiled.

TABLE V.

EARLY PREDYNASTIC ¹	MIDDLE AND LATE PREDYNASTIC
Alabaster ^{2, 3, 5, 7}	Alabaster ^{3, 4, 6, 7}
Basalt ^{2, 3, 5, 6, 7, 10}	Basalt ^{3, 4, 6, 7}
Breccia ^{3, 4, 5, 6}	Breccia ^{2, 3, 7}
.....	Diorite ^{2, 9}
Granite ^{2, 4}	.....
Limestone ^{2, 5, 6, 7, 8}	Limestone ^{2, 3, 6, 7, 8}
Marble ³	Marble ^{3, 7}
Porphyritic rock ^{2, 4}	Porphyritic rock ^{3, 6}
.....	Schist ^{2, 6, 7}
.....	Serpentine ^{2, 3, 4}

Putting together the information contained in Tables IV and V, it is evident that the stones employed for making vessels during the early Predynastic period included, not only the comparatively soft alabaster, breccia and limestone, but also the slightly harder marble and the much harder basalt, granite and porphyritic rock, and that by far the greater proportion of these stones was obtained from the Fayyûm, the Nile Valley cliffs and Aşwân, only two (marble and porphyritic rock) being probably procured from the eastern desert. During the middle and late Predynastic periods, most of the stones used were identical with those of the earlier period and were doubtless obtained from the same sources, but, in addition, three kinds (diorite, schist and serpentine) not used earlier, so far as is known, were also employed. Of these, diorite and schist are hard and serpentine soft, the diorite being probably procured from Aşwân and the schist and serpentine from the eastern desert.

Certain statements found in the literature of archaeology having reference to the early stone vessel industry may now be quoted. These are:

“But as early as S.D. 38 a fresh influence came in... Its origin has been provisionally assigned to the Red Sea district as it introduced hard stone vases...¹¹.”

“The home of this second civilization must have been mountainous by the supply of stone instead of clay for vases...¹².”

“Petrie has rightly insisted that the home of the stone vase industry can ultimately only be sought in the mountains between Egypt and the Red Sea where all the stones used for the purpose do actually occur...¹³.”

¹ Includes Badarian and Neolithic.

² Petrie, *Diospolis Parva*, 19.

³ Id., *Prehistoric Egypt*, 35, 36; Pls. xxxiv–xlii. In this report Sequence Dates are given for the different types of vessels, but for only a few of the materials. Among these, the breccia vessel (No. 167; Pl. xli) and the pink marble vessel (No. 174; Pl. xli) may specially be noted, as both these are early, namely S.D. 34 (p. 36).

⁴ Petrie and Quibell, *Nagada and Ballas*, 10.

⁵ G. A. Reisner, *The Early Dynastic Cemeteries of Naga ed-Der*, I, 129.

⁶ *The Badarian Civilisation*, 28, 57, 58; Pl. li.

⁷ *El Amrah and Abydos*, 16–24.

⁸ *El Mahasna*, 11, 16.

⁹ Although not employed for vessels in the earliest age, diorite was used for other purposes, both in the early Predynastic period and even in Neolithic times, a disc mace-head and a worked piece (probably part of a palette) of these respective dates being known. (*Prehistoric Egypt*, 23; Pl. xxv (6); Caton-Thompson in *Journ. Royal Anthropol. Inst.*, LVI (1926), 313.)

¹⁰ Caton-Thompson; see reference No. 12, Table I.

¹¹ Petrie, *Egypt and Mesopotamia*, in *Ancient Egypt* (1917), 33.

¹² *Prehistoric Egypt*, 48.

¹³ A. Scharff in *Journal*, xiv (1928), 273.

“The only definite indication as to their home is the fact that their most characteristic contributions to the prehistoric civilization are the stone vases and their pottery imitations; and the region which is most likely to have bred people knowing how to work stone and which is near enough to Egypt to allow permanent intercourse with the Nile Valley...is the Arabian desert along the western shore of the Red Sea¹.”

The above statements are contrary to the evidence that has been adduced, which points to the home of the stone vessel industry being, not in the eastern desert, but in or near the Nile Valley, whence the greater proportion of the material was obtained, two of the three principal stones, alabaster and limestone, being typical of the Nile Valley, and the third, basalt (which was one of the earliest² and hardest stones used), being obtained almost certainly from the Fayyûm.

As a rule, the Nile Valley people of the present day dislike and fear the desert and the desert dwellers, and rarely leave the valley unless obliged. In certain districts, however, a comparatively small number, in order to gain a livelihood, are forced to make daily excursions into the desert border to collect gypsum for plaster, limestone for building and lime-burning and nitrous earth for their crops. Anciently, conditions were very different, and during the Predynastic period the inhabitants of the Nile Valley were not the specialized agriculturists they have now become, but were in part hunters and akin to the desert dwellers; there can be little doubt that many of them were in the habit of going considerable distances into the desert to hunt animals for food and skins, and it was possibly during these expeditions that the earliest gold and other minerals, including semi-precious stones, were found in small quantities and brought back to the valley. There was constant intercourse, too, between the Nile Valley and the Red Sea coast, as is proved, for example, by the Red Sea shells that are found in the earliest graves. These wanderings in the desert in search of game and this intercourse with the Red Sea could hardly have failed to bring the hunters and others into the localities where the few stones (marble, porphyritic rock, schist and serpentine) that were procured from the eastern desert occur, most of these places being either on or about the Koptos-Ḳoşêr road or in or near the large wadys leading from the Nile Valley.

It should not be forgotten, too, that not only was stone (including hard stone) employed for making vessels, but that it was also used, even in the earliest Predynastic period, for palettes and mace-heads, the earliest palettes being of slate and the earliest mace-heads (disc form) being of the very stones (soft alabaster, breccia and limestone, and hard diorite, granite and porphyritic rock) that were used for vessels³, and wherever the home of the stone vessel industry may have been, there also was the home of stone mace-heads and stone palettes.

The fact that stone objects are made by certain desert “Arabs” at the present day is sometimes quoted⁴ as evidence of the eastern desert origin of the stone vessel industry, but it has no bearing on the problem. Thus, the stone employed by these people for making bowls and pipes is steatite, a material so soft that it may be cut with a knife, and it is obtained from the neighbourhood of Aşwân⁵.

¹ H. Frankfort, *Studies in Early Pottery of the Near East*, I, 100.

² See reference No. 12, Table I; also *The Badarian Civilisation*, 28.

³ *Prehistoric Egypt*, 23; Pl. xxv.

⁴ Frankfort, *op. cit.*, I, 101.

⁵ Mines and Quarries Dept., *Report on the Mineral Industry of Egypt* (1922), 37.

Conclusion.

The Nile Valley dwellers from the earliest period made and used vessels and other objects of stone (some very hard), most of which was procured from the Nile Valley cliffs, Ašwân and the Fayyûm¹. The few stones from the eastern desert that were employed to a very limited extent may easily have been procured by the inhabitants of the valley in their excursions into the desert in search of game, gold and minerals. There is no need, therefore, to postulate a desert stone-vessel-making race and there is no evidence of any break in the continuity of the stone vessel industry, but only evolution and progress, more kinds of stone being used and more vessels being made as time passed, until the culminating point in numbers, material and workmanship was reached in the early Dynastic period.

¹ There is no evidence to show whether the predynastic basalt vessels found in the Nile Valley were made in the Fayyûm, or whether occasionally some of the Fayyûm basalt in use in the valley for building and other purposes was there shaped into vessels.