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Tel el Farcha. Mineralogical investigation of stone raw materials used at the site.

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Determination of rocks discovered at archaeological sites help to understand the routes of transport and contact between human groups. Most of important various rocks sources are well-known in Egypt (Butzer 1960, 1976, Said 1962, Afia 1988, De Vitt, Pawlikowski 1988). But discussion concerns rare raw materials such as, for example, various types of metamorphic rocks (serpentinites, slides, etc.). Site Tel el Farcha is rich. A great deal of stony objects was discovered within its archaeological layers. Most of them are damaged, but small fragments are sufficient to determine petrographic characteristics of those rocks. Generally, one can distinguish magmatic, sedimentary and metamorphic rocks. Each of the mentioned groups is characterized below.

Characteristics of tested rocks were defined macroscopically as well as by using mineralogical methods i.e. polarizing light microscopy, digital microscopy and chemical methods. All these methods and the obtained characteristics were used for determination the sources and documenting the scale of importing stone materials into Delta, especially into the site Tel-el-Farcha.

Magmatic rocks.

Artefacts made of magmatic rocks are relatively rare. Small fragments of destroyed stone vessels are the most frequent once. They were made of diabase, basalts, syenite, granite.

Diabase are represented by small fragments of vessels. Macroscopically, the rock is black, shows fine crystalline texture and is mostly devoid of any structure. Sometime, one can distinguish small crystals of pyroxenes in the fine, crystallized mass. Diabase are known mostly from Sinai and East Desert.

Basalts are sometime very difficult to determine. Generally, the rocks show porphyritic texture, in which, one can see small crystals of dark minerals (pyroxenes, amphiboles or greenish olivine) in dark background. Basalts are generally out of structure (not seen in small fragments), but sometime, one can see traces of linear orientation of fenocrystals. Basalts as diabase are known mostly from Sinai and East Desert.

Syenite is very rare at this site. Only one small fragment of vessel documented the presence of the rock. Syenites are known from Syene (old name of Aswan - R. Said 1962) and coexist with classic pinkish Aswan granite there.

Granite is represented by the pink type i.e. characteristic Aswan granite. Generally, it is represented by small fragments or grains and is very rare at the site.

Sedimentary rocks

This type of rocks is most frequently represented in archaeological horizons. Various modification of flints (flint chipped artefacts), are very popular. Together with flints, agates are present (hydrothermal origin), gypsum and alabaster, quartz, sandstones and limestones.

Flints

Flints are represented by ten dominating modifications. Characteristic of every type is presented below.

Type E-TeF-F1 has beige colour (photo 1,). This type of flint is relatively frequent. Complete characteristics is given in the table 1. Microscopic picture of flint shows photo 1a.

Type E-TeF-F2 is represented by dark-beige flint, with rare, small, light spots. Sometime, it contains light-beige grains (photo 2). It is not very frequent. Complete characteristics of this flint is collected in the table no 2 and internal structure of material is shown at photo no 2a.

Type E-TeF-F3 represents beige grey flint, sometime with light cortex (photo 3). This type is not very frequent in archaeological deposits. Mineralogical data of this material are collected in the table no 3. Mineralogical structure of this flint shows microscopic picture no 3a.

Type E-TeF-F4. This type of flint is of brownish colour (photo 4). This raw material is not very frequent. It was discovered mostly in the lower layers of the site. It is transparent and light-brown and shows shining, glassy gloss in thin blades and flakes. Technological and mineralogical characteristic of this material is given in table no 4. Internal structure of flint is shown at photo no 4a.

Type E-TeF-F5. Flint of these type shows brownish, sometime having slightly reddish colour (photo 5). It is very rare. Mineralogical data of this

material are collected in table no 5. Was found it only in the lower layers of the site. Microscopically, it shows fine texture (photo 5a).

Type E-TeF-F6 is of brownish-greyish colour and is slightly transparent as small flakes (photo 6). Sometime contain concentration of well-crystallized chalcedony (tab. 5, photo 6a).

Type E-TeF-F7 represents grey flint showing very nice cleavage (photo 7). Mineralogical and technological data of this material are collected in table no 7, while microscopic picture is given at photo 7a.

Type E-TeF-F8 is greyish-beige flint with light points and spots of mat gloss. It is not transparent (Photo 8). Mineralogical is composed mostly of chalcedony and quartz (Tab. 8, photo 8a).

Type E-TeF-F9 is brown, but not transparent flint containing rare light small lamina. It is not transparent (photo 9). Generally, this type of flint is quite rare. Mineralogical and technological data of material are given in table no 9, and showed at photo 9a.

Type E-TeF-F10 is not very frequent in siliceous material chipped in the site. Macroscopically, one can see lamina and transition of grey and beige colours (photo 10). Sometime small, light spots are seen. Technologically, flint is of very good quality (tab. 10), due to fine crystalline texture (photo 10a).

Mineralogical and macroscopic observation the chipped flints lead to the conclusion, that origin of those flints is mainly connected with valley of the Nile. They were collected mostly from gravels. This is confirmed with rounded and naturally polished surfaces. Flints are generally out of cortex.

Siliceous material was of great value at the site, due to the distance of transport. The high value of flints is confirmed by maximal exploration of cores (Photo 11), re-utilization of implements as well as by treasures (collections) of flint blades etc. discovered during the excavation (photo 12).

There is one, rare type of flint unknown in valley of the Nile. It is represented by yellowish-brownish, transparent rock discovered within the lower Egyptian layers. Macroscopic features as well as absence of flint cores, may suggest, that it was imported to Tel-el-Farcha. Supposed area of exploration

is located on west Jordan – Palestine, where there occur flints of similar character, which were tested by author.

Agates

Agates were fund as separate pebbles as well as their collections (treasures) (photo 13). All grains of agates were imported from areas outside the Delta. Most grains of agates discovered in Tel el Farcha was not chipped and did not show traces of work.

Agates are known at secondary position in top part Qena sands (Upper Egypt). One can find occasionally agates between gravels of flints.

Quartz

Big grains of quartz discovered at Tel el Farcha are not of local origin and were imported from outside the Delta. Rounded gravels of milky quartz showing traces of chipping are rare. Sometime bigger rounded grains of milky quartz were used as hammer stones or grinding stones (Photo 14).

Chipped flakes made of mountain crystal are present in the siliceous material, but they are very rare. This type of crystals was imported most probably from East Desert.

Gypsum and alabaster

Gypsum is represented by fragments of vessels. The rock is delicately laminated. Macroscopically, separate, milky crystals of gypsum are seen within the fine background. The surface of fragments is weathered and very soft.

Alabaster represents very fine, crystalline and transparent variation of gypsum. It is represented by separate, small fragments of vessels or vessels themselves. Origin of gypsum, as well as of alabaster, is most probably connected with deposits of these minerals in Vadi Natrum or in west part of Sinai, where there are Miocene deposits of evaporates near of Sues present.

Limestones

Limestones are represented by small vessels used as bottles for perfumes. Microscopic picture of material confirms the origin of limestone i.e. the Nile Valley.

Sandstones

These rocks are very frequent at the site and are represented by two types. One is represented by siliceous quartzite sandstone (photo 15, 15a, 15b)

showing light (type A), cherry (type B), grey (type C) and brownish (type D) colours. All these variations are sometime present in a single fragment of stone.

Mentioned sandstones were used for preparing grinding stones of various size used by population of Tel el Farcha.

This type of sandstone is known as Miocene sands secondary cemented with silica. Deposits of those rocks accompany for petrified (by silica) woods at outcrops located about 35 km to the east from Cairo in direction to el Sokhna.

The second type of sandstones is very rare. It is represented by relatively soft, yellowish sandstone present mostly in form of small fragments, sometimes small vessels. This sandstone represent so-called Nubian Cretaceous sandstone with outcrops at west desert.

Metamorphic rocks

Serpentinite

This rock is represented by small flask containers for perfumes (photo 16) or by small pendant talismans. Serpentinites are of dark-green colour. The objects are polished. Serpenitnites are known from East Desert and Sinai.

Metamorphic slides

There are various types of metamorphic slides discovered in the site.

Pallets

Pallets, as well as small talismans, are made of fine, siliceous slide of light green (photo 17), light grey or yellowish slide. Under the microscope, these rocks show parallel structure due to orientated stress. They are relatively hard. Sometime surface of the pallets is covered with traces of pigments.

This type of rock is known from the East Desert and is present in zones of weak metamorphism. This type of rocks was observed at Carboniferous detrital sediments of Wadi Hammamat.

Bracelets

Bracelets are made of greenish or light brownish, siliceous slides (photo 18). The surface of objects show traces of preparation and polishing. The source of the material used for preparing the bracelets and pallets is similar, i.e.regions of the East Desert.

Conclusions

Obtained data showed, that stone raw materials discovered at the site represent similar rocks and minerals to those discovered at other sites of the same age (Buto, Tel el Daba and other – Lipińska, Koziński 1977). It mean, that exchange of stone materials (and most probably of pottery) was not local and limited to one site. Moreover, the data confirm the presence of relatively big exploration of some raw materials (flints, sandstones, etc.) and functioning of relatively well-developed mining at the verge of transition Nagada culture – early dynastic time.

Presented information document great activity of people inhabiting Tell el Farkha. They used, not only local raw materials, such as the Nile silts, but imported: flints from Nile Valley and West Jordan, limestones from the Nile Valley, sandstones from the West and East Desert, magmatic and metamorphic rocks from Sinai and East Desert. All mentioned facts confirm intensive contact with other regions of Egypt and the Near East. Obtained results document large contacts with inhabitants of regions of North Africa confirming the presence of rich group (administrative) at Tel el Farcha.

Photos of flint raw materials

Photo 1: Flint of beige colour - type E – TeF - F1.

Photo 2 Flint of dark-beige colour, type **E – TeF - F2.**

Photo 3: Flint of beige-grey colour, type E – TeF - F3.

Photo 4 Flint of brownish colour, type E-TeF-F4.

Photo 5 Flint of brownish-reddish colour, type E - TeF - F5**.**

Photo 6 Flint of brownish - grayish colour, type E – TeF – F6.

Photo 7 Grey flint – type E – TeF - F7.

Photo 8 Grey-beige flint with light spots – type E - TeF - F8.

Photo 9 Spotty brownish-grey flint – type E - TeF - F9.

Photo 9 Grey flint with lamelli – type E - TeF - F10.

Photo 10 Blades made of raw material type E - TeF - F4

Photo 11 Small grains of natural agates

Photo 12 Collection of small cores made of agates (imported)

Photo 13 Quartzites of various structure and colors used at the site as material for preparation of grinders

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