MINERALOGY OF UPPER EOCENE SANDSTONES AT NILE VALLEY, EGYPT

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Sandstone samples of Upper Eocene age at Nile Valley were examined microscopically in terms of light and heavy fractions. Glass fragments were recorded in relatively coarser light fractions. The exoscopic and endoscopic features of quartz were described. The genetic significance of certain heavy mineral assemblages is also discussed.

Upper Eocene sandstones were studied mineralogically in three sections at Nile Valley. These sections are located at Faiyum, Maadi and Beni Suef Areas, in the Nile Valley south of Cairo. The exposed sediments in Faiyum Area, which comprises a well-representative section of Upper Eocene sediments, are classified to Wadi El-Rayan formation of middle Eocene age and formations of Birket Qarun and Qasr El-Sagha of Upper Eocene age, followed upwards with Oligocene clastics and more younger sediments. The Upper Eocene section at Faiyum begins at its lower part with the clastic sediments of sandstones and sandy shales. It changes in its middle part into an intercalation of clastic and calcareous layers. The shales in this section are of a bentonitic type.

The mineralogical study was carried out on 24 sand samples representing the sandstone layers distributed in the three sections mentioned early. According to the concepts of PettiJohn et al (1973), these sandstones can be classified into Arkosic wacke and Subarkosic arenite the main petrographic components of these sandstones are (in average) : quartz - 90.77 %, (including low percentage of polycrystalline quartz and chert) and feldspar - 8.9 %, (composed of microcline , orthoclase and plagioclase) rock fragments constitute very low percentage -0.4 % - whereas matrixhas an average amount of about 30.4 % of the whole bulk of the samples.

The mineralogy of the sandstone layers was described in terms of light and heavy fractions, after the removal of the intergranular binding material. Glass fragments, (fig. 1), were recorded in the relatively coarser light sand fractions, showing great variation in abundance between the sandstone layers of the studied sections. A mutual relation can be distinguished between the frequency of glass fragments of the sandstone layers and the montmorillonite content of the intercalated shale layers.

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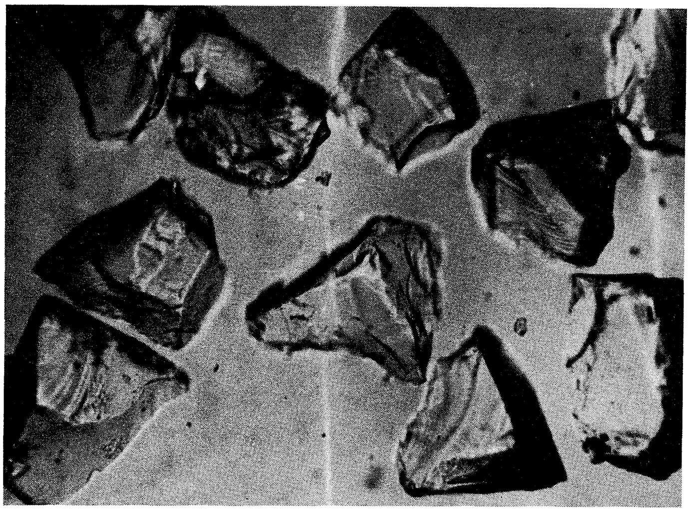

Fig. 2. – Glass fragments, from light fraction, mounted in glycerine ; notice its angularity and concoidal fracture, X 25, (P.P.L.).

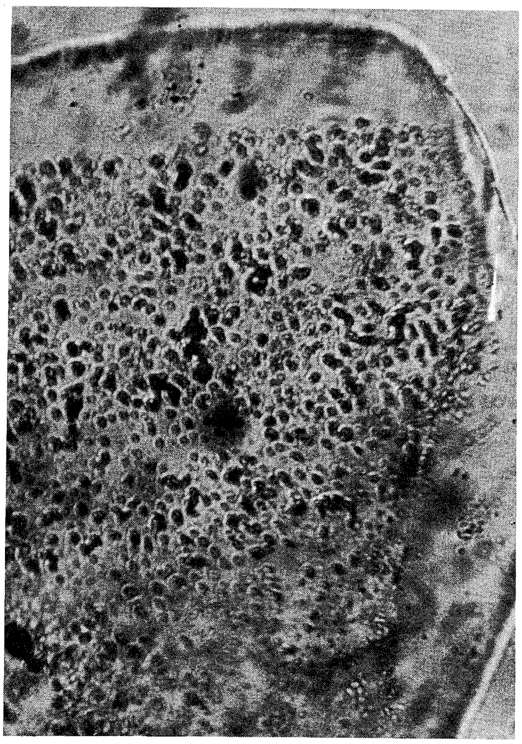

Fig. 1. – Fluid inclusions concentrate in the central area, X 50.

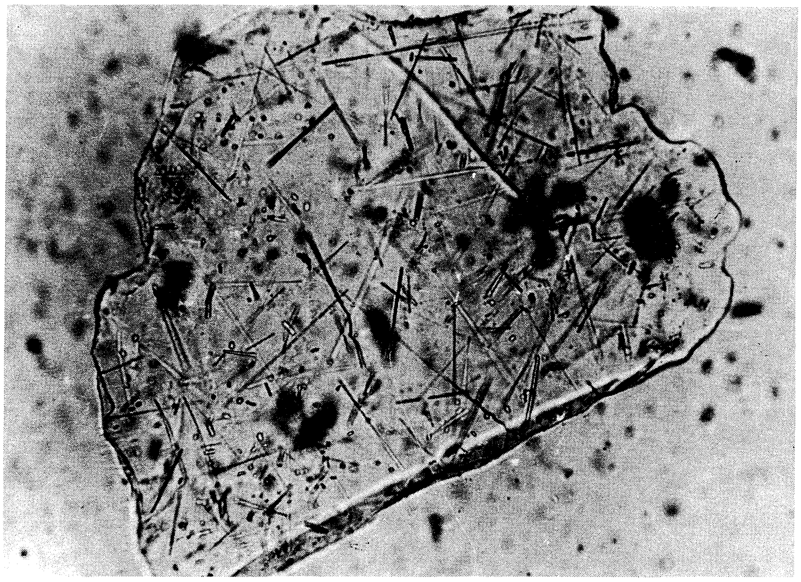

Fig. 3. – Inclusions of rutile needles – disoriented short to moderate, X 50.

Fig. 4. – Secondary overgrowth on quartz, X 50.

Quartz which is the main component of the light fractions was examined exoscopically and endoscopically. Exoscopy, represented by roundness and surface morphology, shows that quartz is mainly subrounded to sub-angular with an intermediate impressions between pitted and polished surface textures. This later feature may reflect variations in the transporting and depositing medium, most probably of wind and water agents. Solid and fluid-gaseous inclusions, (figs. 2) were recorded in some quartz grains either randomly distributed in quartz or aligned in cracks. The presence of these inclusions may indicate the derivation of quartz from mainly metamorphosed crystalline acidic rock.

The assemblage of mineral grains separated in the heavy sand fractions were identified and counted for the purpose of discussing their genetic relations. According to the relations deduced for certain heavy minerals and adopted by Hubert (1962), Folk (1969), and Sato (1969) it is concluded that these sandstones have immature assemblage which may refer to a source rock of mainly granitic and crystalline schists and that the deposition took place mainly in marine environment.

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