A NOTE ON THE PALYNOLOGICAL INVESTIGATION OF THE PITCH LAKE, TRINIDAD, WEST INDIES*

The Pitch Lake in Trinidad is a circular depression, one mile south of Brighton on the southwestern coast. It rests as a flat cone on the Godineau beds which cuts across Miocene-Pliocene beds overlying discordantly a complicated thrust structure (SUTER, 1960). The elevation of the rim of the lake is about 139.5 feet, it covers an area of 126 acres, and is about 273 feet deep. There is no published report on the palynology of this lake (personal communication from Dr. J. M. Lammons of Texaco Trinidad Inc., Point-a-Pierre, Trinidad). Bronnimann in an oral communication to SUTER (1960) reported some fossil matter, mainly foraminifera. The oldest reported are of Oligocene-Narivaage.

The pitch is studied for its palynomorph content, and to recognise its possible source. A diversified flora is recovered, which includes pollen of both angiospermic and gymnospermic affinity, pteridophytic spores, fungal spores, and a large amount of tracheids, cuticles, and a few poorly preserved phytoplankton. The assemblage indicates that pitch was sourced from the Miocene bed. It contains some long ranging and older forms also. It is possible that in the process of seeping from the subsurface, oil passed through the younger strata incorporating their palynomorphs.

Fresh samples of dug pitch were collected at three different places in the lake, all of which contain similar assemblage. The extant contamination is ruled out as pollen falling over the pitch would rather get decayed than becoming a part of it. Besides, this assemblage also contains some marine phytoplankton, which precludes the possibility of extant contamination.

A detailed taxonomic study is underway. The following types of palynomorphs are recovered :

Angiospermous Pollen—Monoporate-psilate, Triporate-scabrate, reticulate, and retipilate, Tetraporate-psilate, echinate, verrucate, and baculate, Polycolpate-psilate, polycolporate-scabrate, Trisyncolpate-psilate, Monocolpate-reticulate and baculate.

Gymnospermous Pollen—Inaperturate-psilate, Bisaccate-*Podocarpus* type, Monosulcate-psilate, and pollen with concentric ring structures.

Pteridophytic Spores—Monolete-psilate, verrucate, inaperturate, Trilete-psilate, cicatricose, and finely verrucate.

In addition to these forms various types of fungal spores, marine phytoplankton, cuticles and tracheids are also recovered. Some of the pollen and spores could be assigned to the following families : Aquifoliaceae, Compositae, Cyrillaceae, Fagaceae, Graminae, Juglandaceae, Liliaceae, Myricaceae, Polygalaceae, Sapotaceae, Ulmaceae, Podocarpaceae, Polypodiaceae, Cyatheaceae, and Schizeaceae. The families recorded have mostly tropical and subtropical distribution, but some of them have temperate distribution also. Such temperate families also, inhabit the highlands of the tropical areas. On the basis of preliminary examination, tropical to subtropical climate can be envisaged for Miocene epoch in Trinidad. This assemblage contains many fossils common in the *Pachydermites diederixi* zone of middle and upper Miocene age in the Caribbean region (GERMERAAD, *et al.*, 1968) and can also be compared with Mio-Pliocene assemblage recovered from Rusizi Valley in Burundi (SAH, 1967). It is concluded that the pitch was sourced from the middle

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and late Miocene strata, and during the oil movement to the surface it also incorporated the palynomorphs from the younger strata.

The Miocene fossils are characteristically smaller (up to 25 microns only) in size. This is because of the "Filtering Effect" of the reservoir rock and of the overlying beds. This phenomenon is explained as the smaller fossils could easily migrate along with the oil through pore spaces of the rocks, whereas the larger forms could not. The larger forms of the present assemblege are from Pliocene or younger beds rather close to the surface. Thus, the size of the palynomorphs could indicate relative age of the rock in such studies.

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REFERENCES

GERMERAAD, J. H., HOPPING, C. A., & MULLER, J. (1968). Palynology of Tertiary sediments from tropical areas. *Rev. Palaeobot. Palynol.* **6** : 189-348.

SAH, S. C. D. (1967). Palynology of an upper Neogene profile from Rusizi Valley (Burundi). *Mus. Royal De L'Afrique Centrale-Teruwren, Belgiques* **8** (57) : 1-173.

SUTER, H. H. (1960). *The general and economic geology of Trinidad.* B. W. I. Overseas Geol. Surv., Mineral Resources Div., London.

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