of early Pennsylvanian age by the outline of the ambulacral cross section alone.

BERGERON, ROBERT, Quebec Department of Natural Resources, Quebec, Canada

RELATIONSHIP OF MINERALIZATION TO PRECAMBRIAN STRATIGRAPHY IN THE ROCKS OF THE QUEBEC-LABRADOR TROUGH

Recent work and interpretation of age determinations now indicate that the rocks of the Quebec-Labrador Trough were laid down in a depression in granitic rocks and gneisses of the Superior Province. It is possible to correlate the stratigraphy for the southern and northern parts of the Trough. The following types of ore in relation to the stratigraphy have been established: (1) iron deposits related to the Sokoman (Iron) Formation; (2) pyrite deposits in sedimentary rocks with associated copper-zinc bodies containing some gold; (3) pyrrhotite-chalcopyrite deposits in gabbros with a low-to-moderate amount of nickel and small amounts of zinc and gold; and (4) chalcocite disseminated in dolomites.

BOISSONNAULT, JEAN, and PERRAULT, GUY, Ecole Polytechnique, Montreal, Quebec, Canada

SERANDITE FROM ST. HILAIRE, QUEBEC

Serandite from St. Hilaire, Quebec, has the following chemical composition: SiO_2 47.90, Fe_2O_3 0.08, FeO 0.86, Al_2O_3 1.20, MnO 33.8, CaO 5.56, MgO 0.03, Na_2O 6.40, K_2O 0.00, $H_2O^{-105^0\,C}$ .20, $H_2O^{+105^0\,C}$ 2.42, Y_2O_3 .27. Total 98.73%.

X-ray diffraction data show that this mineral is a pectolite-type mineral. The name serandite was originally given by Lacroix to the manganiferous end member of the series $Ca_2NaH(SiO_3)_3 - Mn_2NaH(SiO_3)_3$. Serandite from Las Archipelago (Lacroix, 1931) contained 28.99% MnO and 10.42% CaO, whereas serandite from St. Hilaire, Quebec, is closer to the end member with 33.8% MnO and 5.56% CaO.

BONHAM-CARTER, G. F., University of Toronto, Toronto, Ontario, Canada

PRELIMINARY REPORT ON SOME PENNSYLVANIAN REEFS FROM NORTHWEST ELLESMERE ISLAND

Pennsylvanian reefs as thick as 2,000 feet crop out nearly 10 miles along strike at Hare Fiord, Northwest Ellesmere Island. The reef flanks slope as much as 45°. There is no interfingering between the reefs and the overlying silty limestones. Stratification within the reefs is confined to planes parallel with the reef sides.

In order of relative abundance, the reef fauna consists of crinoids, brachiopods, bryozoa, corals, gastropods, ammonites, trilobites, and fusulinids. Fenestellid bryozoans may have provided a reef framework, but no clear zonation into reef barrier and lagoon is apparent.

A fore-reef is present, characterized by reef-derived conglomerates. A strange "internal" conglomerate, not readily explained as solution-breccia, is common. Recrystallization is widespread, particularly along intrusive dike margins.

Porosity of the main reef rock is low, but the conditions leading to the formation of "internal" conglomerate may have produced porous localities in parts of the reef area other than the accessible cross section.

The reefs probably formed in a climate not only warmer but also with more sunlight hours than that at the present latitude of northern Ellesmere Island.

BOUTCHER, S. M. A., and MOORHOUSE, W. W., University of Toronto, Toronto, Ontario, Canada

NATURE AND DISTRIBUTION OF IRON SILICATES IN THE GUNFLINT IRON FORMATION, PORT ARTHUR

The iron silicate minerals from more than 50 specimens of the Proterozoic Gunflint Iron formation, near Port Arthur, Ontario, were identified by X-ray powder methods and microscopic techniques. There appears to be a geographical and possibly a stratigraphical distribution of the mineral species. Chamosite and chlorite characterize the lower Gunflint, which contains relatively little iron silicate; the intermediate argillite-tuff member contains a glauconite-bearing calcareous horizon, along with chamosite, chlorite, and talc; and the upper Gunflint is characterized by abundant greenalite and stilpnomelane, with minor amounts of minnesotaite and chlorite, identified optically. The ratio of stilpnomelane to greenalite appears to increase in the vicinity of the Logan Sills.

BRAY, ELLIS E., Socony Mobil Oil Company, Inc., Dallas, Texas

HYDROCARBONS IN NON-RESERVOIR ROCKS—SOURCE BEDS

Environmental factors in a depositional basin may control the quantity and nature of hydrocarbons initially deposited with the sediments. The hydrocarbon mixtures in sediments increase in quantity and become more like petroleum after long periods of burial and compaction, providing evidence that petroleum hydrocarbons are generated in non-reservoir rock.

Ratios of odd to even carbon numbered heavy n-paraffins in shale may in some instances be regarded as indicators of conversion of organic material to hydrocarbons. This parameter, supplemented by infrared measurements, enables the detection of petroleum-like mixtures of hydrocarbons in possible "source beds." An estimated 30 per cent of the shales in petroleum provinces contain petroliferous mixtures of hydrocarbons. There is a parallelism between amount of organic carbon, quantity of hydrocarbons, frequency of occurrence of dispersed oil in non-reservoir rock, and the occurrence of petroleum accumulations. Although the statistical nature of this parallelism provides opportunity for exceptions, it appears that both kind and quantity of hydrocarbons are important parameters for recognition of source rock.

In a number of instances similarities as well as systematic differences have been observed between hydrocarbons in oil and the corresponding fractions in the presumed source rock.

BREWER, WILLIAM A., University of California, Berkeley, California

EXPLORATION POTENTIAL OF REMOTE SENSING

Remote Sensing is the detection and measurement of physical quantities at a distance, and the term covers such established fields as geophysical prospecting, aerial photography, and the various military reconnaissance systems. With passing time and increased specialization, these fields tend to become parochial.

The recent symposia on Remote Sensing show that there is also a strong interdisciplinary trend, and that collective development of new techniques and the rapid dissemination of information are likely to stimulate application of the resultant systems in widely separated technical fields. Eventually Remote Sensing should be-