ABSTRACTS

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GEOPHYSICAL INVESTIGATION IN THE NORTHERN ADIRONDACKS

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ABSTRACT

In conjunction with a summer field study, gravity and seismic measurements were made in the Adirondacks along a traverse extending north from Paul Smiths to McColloms. The alluvium covering the bedrock was investigated and the effects of saturated versus unsaturated alluvium and granite are shown. The seismic and gravity data include the contact of the anorthosite body with a granite gneiss and a possible transition zone.

FOSSIL INVERTEBRATE GROWTH AS A GEOCHRONOLOGICAL TOOL

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ABSTRACT

The growth patterns of recent and fossil Coelenterata and Brachiopoda reflect variations in food abundance, water temperature, and percentages of biogenic salts, in temperate oceans, caused by cyclic passages of time. These variations give rise to definite biological seasons, which remain constant from year to year due to their dependency on light intensity; the passage of these seasons is recorded on the exoskeletons of these organisms. The resulting growth features are grouped into annual increments, seasonal markings, monthly markings, and daily growth increments.

Lower Silurian Coelenterata and Brachiopoda indicate that the length of the year during this period was 421 days; the length of the synodic month was 32.4 days, with 13 synodic months per year. Upper Silurian Coelenterata and Brachiopoda indicate that the length of the year was 416 days; the length of the synodic month was 32.2 days, with 13 synodic months per year. Studies on similar Devonian invertebrates indicate that the length of the year during this period was 410 days, with 31.5 days per month, and 13 synodic months per year.

Paleontological data indicate that the length of the year throughout geologic time has decreased, though not at a uniform rate. These results are contrary to previous assumptions based upon geophysical computations. Also, evidence suggests that the moon originally was closer to the earth, resulting in a magnification of the earth's tidal forces. This might be a contributing cause for the scarcity of fossils representing the earlier geological periods and, as Lamar and Merifield (1967) suggest, a stimulating factor for the evolution of organisms with hard parts.

PETROGENESIS AND EMPLACEMENT OF THE ALKALINE INTRUSION OF CUTTINGSVILLE, VERMONT: A REEVALUATION

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ABSTRACT

Detailed mapping in the field, and petrographic and X-ray analyses of rocks in the laboratory were carried out to determine the origin and evolution of the igneous complex at Cuttingsville (Rutland County), Vermont.

The northwest trending intrusion (2.25 km. long; 1.65 km. wide) consists of alkaline plutonic and hypabyssal rocks typical of the White Mountain Magma Series, which intruded the Precambrian core of the Green Mountain Anticlinorium during the Middle to Upper Mesozoic time.

Two petrographic suites and eight phases of intrusion have been recognized and are listed below in order of emplacement:

A. Saturated magma suite

1. Monzogabbro
2. Hornblende syenite and biotite syenite (pulaskite)
3. Monzogabbro porphyry
4. Quartz syenite (perthitic)
5. Quartz syenite (non-perthitic)

B. Undersaturated magma suite

6. Essexite (feldspathoidal gabbro)
7. Sodalite syenite

Injection of numerous late dikes (eighth phase of intrusion), ranging in composition from lamprophyres to felsite porphyries, was facilitated by the prior development of steeply dipping sets of radial and tangential joints.

Spatially these units form a ring structure, having been emplaced as concentrically arranged lenticular bodies. The contact between the discordant intrusion and the Precambrian metamorphic country rock is sharp but irregular, and is characterized by a zone of abundant gneissic xenoliths and injections of syenite.

The evidence indicates that the intrusion was emplaced by ring-fracture stoping, as other stocks in Vermont of the same magma series. The intrusion of two distinct petrochemical suites, however, seems unique to Cuttingsville.

UNUSUAL THRUST FAULTING AND OVERTURNING, FLY MOUNTAIN, ULSTER COUNTY, NEW YORK

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ABSTRACT

The south end of Fly Mountain is located at the southwestern end of the Kingston arc complex, within the Appalachian fold belt.

Devonian, Silurian, and Ordovician, shales, carbonates, and sandstones are variously incorporated in the overturned limb of a recumbent fold overthrust by a syncline which forms the bulk of the mountain.

The thrust plane dips 9-12 degrees to the southeast and trends N50E. Middle Ordovician (Martinsberg? - Mohawkian?), Upper Silurian (High Falls, Binnewater, and Rondout - Cayugan), and Lower Devonian (Manlius and Coeymans - Helderbergian) formations are thrust upon overturned Lower Devonian (Port Ewen, Connelly, Glenerie, and Esopus - Helderbergian and Ulsterian) formations. A minimum lateral displacement of 1400 feet is estimated. It also appears that the southern end of the mountain has been rotated 20-25 degrees to the northwest, around a hinge near Kingston.

The structure of the southern end of Fly Mountain is noteworthy because of the magnitude of both the overturning and the thrust, each seemingly unparalleled in the Kingston-Rosendale area.

COMPOSITION AND FABRIC OF OLIVINES FROM SELECTED ADIRONDACK METAGABBROS

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ABSTRACT

X-ray determinations of the d (130) spacings in olivines from three layered metagabbros (Jay Mountain, Tahawus Club, and Texas Ridge) in the eastern Adirondacks show compositions in the range Fo_{65} - Fo_{79}. In two of the bodies compositions are uniform but exhibit significant variation in the third, suggesting the possibility of crytic layering. Metamorphic reactions between plagioclase and olivine have produced 3-ply coronas and may have affected olivine compositions.

Petrofabric analysis of olivines from an olivine-rich layer revealed that concentrations of α poles are normal to the plane of the megascopic foliation, and $\beta\gamma$ girdles in this plane are complicated by γ substitution for α poles. These patterns are attributed to laminar flow during intrusion.

NEW EVIDENCE CONCERNING THE VALLEY HEADS PROBLEM

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ABSTRACT

In studying the location of moraines in Central New York and their relation to recessional or terminal ice positions of Wisconsin time, it was resolved that there is no continuous belt of moraines constituting a time boundary. Noting that maps by previous authors locating the "Valley Heads Moraine" differed greatly when reduced to the same scale, led the author to investigate the distribution of glacial drift and the location of morainal belts in the Groton, Cortland, Dryden, and Harford topographic quadrangles. A map of the surficial geology was constructed using a catena diagram which relates soil series to parent material. Soil information was taken from the soil surveys of Cortland and Tompkins Counties. The vast majority of the drift is acid till covering the uplands and glacial outwash fills the valley. Both till and outwash decrease in lime content to the south. Lacustrine sediments and deltaic material suggest the presence of pro-glacial lakes especially in the valleys radiating from Dryden. Colluvial material and alluvium also can be located. Field work failed to locate drift of different ages. Conclusions based on the surficial map, constructional topography and field work are (1) the name Valley Heads should be dropped since there is no continuous moraine located in the area; (2) the several moraines occurring in the valleys of the region be renamed according to their geographical location, that is, the Tully Moraine, the Scott Moraine, etc. - such nomenclature indicates the independent status of the ice lobes in each valley; (3) deglaciation in the region of Central New York occurred as vertical ablation rather than lateral retreat.