

TECHNICAL SESSION

NEW YORK STATE GEOLOGICAL ASSOCIATION

Titles

Authors

Abstracts

Time of Presentation

Time: 2:00 P.M.

PETROLOGY AND STRUCTURE OF PRECAMBRIAN CRYSTALLINE ROCKS
RUSTIC QUADRANGLE, MUMMY RANGE, COLORADO

Paul W. Kirst
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ABSTRACT

A study of the Precambrian metamorphic rocks in the southern half of the Rustic Quadrangle of the Mummy Range, Colorado, indicates that the gneiss and schists are dominantly of sedimentary origin. During metamorphism, these rocks attained the rank of sillimanite-almandine-orthoclase subfacies of the almandine amphibolite facies. The biotite-sillimanite schist contains lenses of amphibolite gneiss and calc-silicate gneiss rich in diopside, pistacite and grossularite which reflect calcium concentrations in the original pelitic sediments. These metasediments may be correlative with the Idaho Springs formation.

In the southwestern half of the study area, the metamorphic rocks are engulfed and locally permeated by granite which may be correlative with the Silver Plume granite. In the northeast, the metamorphic rocks are interfingering with granite which is believed to be a variety of the Silver Plume granite known as the Log Cabin granite.

Rhyolite porphyry occurs in several lens-like bodies concordant with the regional structure and may be of late Precambrian age. Rhyodacite porphyry occurs as an irregularly shaped volcanic plug of probable Tertiary age.

Long narrow discordant bodies of anthophyllite-cordierite-almandine gneiss are the result of magnesian metasomatism of Precambrian silicic dikes in contact with the granitic magma.

An early deformation caused the development of regional foliation in the metamorphic rocks and the folding of a long narrow unit of hornblende gneiss. The axial planes of this folded unit are concordant with the regional foliation. This unit is cross-cut by granite which is believed to have been emplaced along weakness planes defined by planar anisotropy of the metamorphic rocks. A final deformation produced vertically plunging folds of larger amplitude throughout the area.

Time: 2:15 P.M.

THE PANAMA CONGLOMERATE OF CATTARAUGUS
AND CHAUTAUQUA COUNTIES, NEW YORK

William H. Miller
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ABSTRACT

A sedimentological study was made of the Panama conglomerate (Upper Devonian) in Cattaraugus and Chautauqua Counties, New York. Analysis of the data indicates the following preliminary conclusions:

Cross-bedding sets vary in thickness from six inches to three feet. Preliminary analysis of the vectorial properties indicates a direction of current flow from the south-east.

Average mean size of the Panama conglomerate is 0.11ϕ units, with a range of -1.22ϕ to 2.21ϕ units. Mean size decreases slightly from the base to the top. The average sorting coefficient is 1.38 (poorly sorted), with a range from 0.98 to 1.93. Sorting decreases from the base to the top due to a greater influx of the sand mode.

The Panama conglomerate in most cases exhibits positive skewness values, the average being 0.32 (very positively skewed). The range of skewness values is -0.54 to 0.59 . Positive skewness values indicate an excess of fine size material, represented as tails of a normal curve. Kurtosis values ranged from 0.89 to 1.40 with a mean of 1.24 (leptokurtic).

The Panama consists of predominantly disk and rod-shaped quartz pebbles that are very well rounded. Occasional jasper and quartzite pebbles are also present. The matrix of sand, notably in the -1.0ϕ to 1.0ϕ size, is predominantly sub-angular.

Heavy minerals consist of the following minerals in decreasing order of abundance: leucoxene, probable kyanite, tourmaline, magnetite-ilmenite, zircon, pyrite, hematite-limonite and accessory garnet, staurolite, epidote, sillmanite, rutile, hypersthene, kyanite, hornblende andalusite, and apatite. The dominant suite indicates a source from reworked sediments and/or metamorphics.

Time: 2:30 P.M.

DEPOSITIONAL ENVIRONMENT OF THE PARRISH LIMESTONE
(LATE DEVONIAN) NEW YORK

William T. Kirchgasser
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ABSTRACT

The Parrish limestone is a lentil 3-15 inches thick in the lower Cashaqua shale (Chagrin Phase; Frasnian) extending 25 miles southeast from Canandaigua Lake to Seneca Lake. Petrographic analysis reveals a burrowed heterogeneous matrix of sparse biomicrite, fossiliferous micrite and clay, with nodules of fossiliferous micrite. The matrix is commonly truncated or scoured near the top of the Parrish and overlain by thin current-reworked fossiliferous lenses of packed biomicrite and poorly washed biosparite. These lenses accumulated in relatively agitated water during times of low terrigenous deposition.

From its northwestern outcrops in the vicinity of Canandaigua Lake, the Parrish changes in facies southeastward from a dark red and green stylioline-cephalopod limestone to a thicker, light gray, more impure nodular stylioline-crinoidal limestone in the Keuka Lake area. Accompanying this change, the Cashaqua thins and the Parrish horizon, the top of the Rock Stream siltstone (underlying Cashaqua), and the base of the Rhinestreet shale (overlying Cashaqua) converge toward the central Keuka Lake area. Here the water was shallower and more agitated than in the surrounding areas; the rate of accumulation of the Cashaqua sediments was lower and the degree of current and infaunal reworking of the Parrish sediment was more intense.

The facies relations suggest that the Parrish limestone and Cashaqua shale accumulated over a broad submarine swell on the Rock Stream siltstone that crested in the central Keuka Lake area. The depositional environment is analogous to the deep Schwelle (swell) environment that produced Late Devonian cephalopod limestone similar to the Parrish (Kramenzelkaike) in the off-shore condensed successions of the Rhenish Mountains, Germany.

Time: 2:45 P.M.

AN ALTERNATIVE METHOD FOR THE COLLECTION OF
MATERIAL FOR HEAVY MINERAL STUDIES

Christopher B. Gunn
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London, Canada

ABSTRACT

In the course of prospecting for diamonds in West Africa the writer devised a simple method of collecting large amounts of heavy minerals in the field quickly, cheaply and easily, and has applied the system successfully to drift sampling in the United States. Field concentration has three main advantages over laboratory separation only. 1) It obviates the need to carry large amounts of material back to the laboratory; 2) it enables the geologist to gain a preliminary idea of his findings in the field so that he can use his time in the field more effectively; 3) it provides more heavy mineral concentrate for study which is more likely to be representative, since much larger samples can be taken in the field.

The method consists essentially of wet screening the sample in specially constructed sieve-boxes and collecting the minus 32 mesh material in a pan below water. This is then panned, observing a number of simple precautions, while the larger fractions are jigged in a way used by diamond washers to produce a heavy concentrate. The field product is a semi-concentrate which is then separated in the laboratory with heavy liquid in an open dish.

Time: 3:00 P.M.

PETROLOGY OF THE POUNDRIDGE LEPTITE

Peter Lessing
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Syracuse, New York

ABSTRACT

Detailed geological mapping and extensive chemical and petrographical analyses have been completed on the Poundridge leptite in Westchester County, New York. Structural data indicate that the leptite is concordant with the surrounding Fordham gneiss. Concordant and intercalated contacts support the idea that the Fordham gneiss and Poundridge leptite are integral stratigraphic sequences in the New York City group. The entire area is now in the sillimanite zone of regional metamorphism.

The leptite is a K-feldspar - plagioclase - quartz - biotite gneiss with perthite dominant in the medial zone and microcline dominant near the periphery. Except for the K-feldspar, no petrographic or chemical variation exists across the leptite. The leptite is also similar to granitic layers in the Fordham. The Poundridge leptite is interpreted to be the result of anatexis of pre-existing sedimentary units. However, petrological data would also support a varied choice of schemes for the enigmatic origin of granitic rock. The correlation of the Poundridge leptite with the Yonkers granite is doubtful, since they are distinctly different petrographically and are not correlated by field evidence.

Time: 3:15 P.M.

THE ORIGIN OF GLACIO-FLUVIAL AND ICE MARGINAL FEATURES
IN THE CLINTON-ORISKANY FALLS AREA, CENTRAL NEW YORK

Jay D. Murray and W. Scott Baldrige
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ABSTRACT

In the Oriskany and Stockbridge valleys and on adjacent highlands no evidence for extensive lakes has been found. Instead the character and abundance of meltwater channels along the northern scarp of the Appalachian Plateau indicates that during the latest retreat an integrated ice-marginal drainage system existed with only local ponding and attendant delta building.

The Valley Heads moraine in both the Stockbridge and Oriskany valleys is a complex of kames and outwash plains, with little or no till. Evidence strongly suggest that the greater part of the drift came not from the ice tongues occupying the valleys, but from outwash deposited against and over these stagnant and fractured tongues by meltwater from adjacent ice-covered highlands and valleys. Perhaps for this reason the Valley Heads moraine is invariably found in the valleys, for although ice covered the highlands, the bulk of the moraine formed in the lowlands where meltwater was funneled and deposited its load.

Drumlins and drumlinoid hills on the outwash plain north and north-east of Waterville suggest that at one time the Mohawk Lobe reached a position at least as far west as the eastern edge of the Oriskany valley. The presence of a Valley Heads-type kame and kettle moraine in the Saquoit valley several miles to the east, within the area once covered by the Mohawk ice, may indicate that the Mohawk Lobe was pre-Valley Heads time.

Time: 3:30 P.M.

RESTUDY OF CERTAIN RHYNCHONELLIDS OF THE
NEW YORK FRASNIAN: A PRELIMINARY REPORT

Jonathan W. Harrington
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Ithaca, New York

ABSTRACT

Study of collections from the Big Bend and Smethport depositional phases, as well as materials from the extensive collections at Cornell University, indicates the need for more precise generic definition of certain forms. The internal structure of several forms preserved in coquinite layers has been determined by serial sectioning.

A species occurring in a sandy coquinite stratum in the lower Ithaca formation near Scott, New York, shows affinities with two species from western Canada, Leiorhynchus castanea (Meek) of the Givetian and L. carya (Crickmay) of the Frasnian. L. mesacostale (Hall) from the Ithaca formation at Ithaca, New York, lacks dental plates, and the validity of the generic designation is questionable. Specimens from a coquinite layer in the Cayuta shale at Owego, New York, previously described as Camarotoechia congregata (Conrad), are, on the basis of internal structures and external features, considered to be of a distinct genus, probably intermediate between Cupularostrum Sartanaer of the Givetian and Ptychomaletochia Sartanaer of the Famennian.

Preliminary results of this study of the taxonomy, morphologic variation, and distribution of the Frasnian rhynchonellids in New York indicate that what have previously been considered as a number of species with variable external expression may be a group of genetically related species with well defined specific characteristics and limited stratigraphic ranges. Furthermore, elements of the rhynchonellid zonation in Western Canada as worked out by McLaren, Sartanaer, and others may be applicable to the Upper Devonian of New York.

Time: 3:45 P.M.

SHEAR STRENGTH EVALUATION OF SENSITIVE LAURENTIAL CLAY VIA
UNCONFINED COMPRESSION, FALL-CONE AND VANE SHEAR TESTS

Thomas Summerlee
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Potsdam, New York

ABSTRACT

Three types of laboratory tests utilized to determine the shear strength of cohesive soils are the unconfined compression, fall-cone and laboratory vane tests.

The testing apparatus and laboratory procedures associated with each of these three methods of shear strength evaluation have their own advantages and disadvantages.

A series of twenty-five shear strength evaluations each were conducted utilizing the unconfined compression, fall-cone and laboratory vane test procedures. These tests were performed on "undisturbed" 3-inch tube samples of sensitive Massena (Leda) Clay obtained from the north bank of the St. Lawrence Seaway Canal, downstream from Snell Lock. Massena clay is a sensitive, slightly preloaded marine silty-clay commonly found in and adjacent to the St. Lawrence River Valley.

Statistical methods were used to analyze and compare the results of the shear tests evaluated by the three methods. Correlations were made between the shear strength and the natural water content, liquid limit, plastic limit and the non-homogeneous peculiarities of the various clay samples tested.

Time: 4:00 P.M.

X-RAY STUDY OF SEDIMENTARY PYRITE OF WESTERN NEW YORK

John E. Izard
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ABSTRACT

X-ray examination of a large number of iron sulfide samples collected from the sedimentary rocks of western New York showed the presence of only pyrite although some of this material has long been referred to in the literature as marcasite. Grinding experiments attempting to cause an inversion of marcasite to pyrite in the manner described by Anderson and Chesley (1933) were unsuccessful and it is believed that no such inversion by grinding occurs for these polymorphs. A few experiments in the synthesis of pyrite under sedimentary conditions are described and the possible role of organic decay products such as the amino acid cystine is discussed.

Time: 4:15 P.M.

A GROUND MAGNETIC STUDY OF THE PLATTSBURGH,
NEW YORK GRAVITY ANOMALY

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ABSTRACT

The Plattsburgh gravity anomaly, one of four along a NW line (Simmons, 1964) was studied by ground magnetics. Data from 234 stations revealed a 3000 γ anomaly. The anomaly was reproduced from a model of vertical cylinders at depths of 0.45 to 1.9 miles. The source is presumably a vertical plug of irregular plan with susceptibility contrast of about 2.5×10^{-2} c.g.s. Shape, possible rock type, and distribution of the line of anomalies are roughly comparable with the Monteregian Hills, but the depth is greater. Irregularities in the basement surface account for part of the anomaly, but the major body does not reach this level.

References:

- Diment, W. H. (1966, Pers. Comm.) Dr. Diment originally suggested the similarity of the anomalies to the Monteregian Hills.
- Simmons, G. (1964) Gravity survey and geological interpretation, Northern New York. G.S.A. Bull. v. 75, pp. 81-98.

Time: 4:30 P.M.

SEISMIC REFLECTION PROFILING AT SEA

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ABSTRACT

Seismic reflection profiling is one of the newest and most practical methods available to the oceanographer that permits study of the bottom and sub-bottom to as much as 4,000 fathoms. The methods and interpretation are described.