ABSTRACTS

GLACIAL GEOLOGY OF THE MOOSE MOUNTAIN AREA, SASKATCHEWAN

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1956, M.Sc., University of Saskatchewan

The glacial drift in the Moose Mountain area exhibits most of the major glacial land forms. Linear elements such as crevasse fillings, fluting, and minor recessional ridges are present in the ground moraine. Knob and kettle topography and rimmed kettles are believed to have resulted from the melting of "dead ice," and consequently are designated "dead ice moraine."

The main direction of ice movement was from the northwest, although locally the direction of ice movement varied considerably. Preglaclial topography had a pronounced influence on the direction of ice movement. The Moose Mountain preglacial topographic high compelled the ice to flow around it forming the large Weyburn Lobe that occupied the Weyburn Lowland. Minor recessional ridges and the lobate ice marginal channels outline successive positions of the retreating ice front. The Missouri Coteau and the Moose Mountain preglacial topographic highs were the first areas to be deglaciated.

THE BLAIRMORE FORMATION OF SOUTHERN SASKATCHEWAN

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Rocks of the Lower Cretaceous Blairmore Formation extend over the whole of southern Saskatchewan. Along outcrop areas in western Manitoba, the Blairmore has undergone erosional truncation. Equivalent beds are found over almost the entire western interior plains of Canada and the United States.

In southern Saskatchewan and adjacent western Manitoba the formation consists principally of fine to coarse quartzose sandstone, shale, salt and pepper sandstone, lignite, clay ironstone, kaolinite shale, and various mixtures of shaly sandstone and sandy shale.

The Blairmore of the area is divided into five areal units and related to adjacent, more thoroughly studied areas. The divisions are; Mannville, Kootenai, Dakota, Swan River, and Ashville areas. The stratigraphy of each area is described and environment and source areas discussed.

Oil in commercial quantities has been found in the Blairmore Formation. The most likely areas for future exploration are suggested.

RELATION OF SOME BRITISH COLUMBIA INTRUSIVES TO THE ALBERTA SEDIMENTARY BASIN

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1956, M.Sc., University of Alberta

A comparison between the accessory minerals of some eastern British Columbia intrusive rocks and those of some Upper Cretaceous sandstones of the Alberta foothills region, shows some remarkable similarities in types.

Many unstable mineral constituents which occur in the sediments suggest relative proximity to the source of these minerals. They also suggest that chemical weathering was slight and that deposition and burial of the sediments were rapid.

The source of the Upper Cretaceous sediments appears to have been the area to the west of the Alberta foothills region. The rocks which supplied these sediments were mainly pre-existing sediments, metamorphic and igneous rocks, probably in this order of importance.

The absence of a substantial break in mineral type within the Upper Cretaceous sandstones, sugest that some of these British Columbia intrusives were unroofed prior to Upper Cretaceous time.

Age dating of zircon from the Nelson batholith of southeastern British Columbia indicates this pluton was intruded during late Paleozoic time.

AN UPPER ORDOVICIAN CORAL FAUNA FROM THE LOWER MACKENZIE RIVER AREA, NORTHWEST TERRITORIES

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1956, M.Sc., University of Alberta

An upper Ordovician coral fauna is described, for the first time, from the Lower Mackenzie River area. It consists of twenty-seven different species, twenty-six of which are described and figured.

Correlations with other faunas, particularly in Manitoba are given.

A summary of the "Silurian" faunas previously reported from various localities in the area is given, along with the Ordovician faunules found at the mentioned localities.

The genus *Manipora* and *Catenipora* are described at some length. It is concluded that they are both valid and useful genera.

CRETACEOUS MICROFAUNA FROM CAMERON HILLS, N.W.T.

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1956, M.Sc., University of Alberta

Forty-seven species of Foraminifera are described and figured and are included in thirteen genera (twelve arenaceous, one calcareaus): *Ammobaculites* (twelve species), *Ammodiscus* (one species), *Eggerella* (two species), *Haplophragmoides* (seven species), *Leptodermella* (one species), *Miliammina* (seven species), *Nodosinella* (one species), *Proteonina* (four species), *Quadrimorphina* (one species), *Textularia* (one species), *Tritaxia* (three species) and *Verneuilina* (four species). The Cameron Hills section may be correlated with a lower part of the Shaftesbury Formation of the Peace River area of Alberta and the upper portion of the Buckinghorse Formation of Northeastern British Columbia. The described fauna is of a brackish, shallow, lagoonal type environment.

ORDOVICIAN AND SILURIAN GRAPTOLITIC FAUNA OF THE SOUTHERN RICHARDSON MOUNTAINS AND ADJACENT AREAS, YUKON TERRITORY

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The Ordovician and Silurian rocks in the region of the southern Richardson Mountains and adjacent areas in northern Yukon Territory contain an abundant and varied graptolite assemblage. A complete section of rocks, ranging from lowermost Ordovician to uppermost Middle Silurian in age is apparently represented in the area. One hundred species, and one new genus, are described and figured from the two systems. These include two new variations and four new species from the Ordovician, and three new variations and one new species from the Silurian. The Lower Ordovician has by far the most abundant fauna.

Graptolite faunas are readily correlated with zones of the type sections of North America and Great Britain. Correlation and distribution of the graptolites are shown on accompanying tables.

LOWER CRETACEOUS MICROFAUNA FROM BEAR VILLA #1, ALBERTA

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Sixty-nine specimens of Lower Cretaceous Foraminifera from the Bear Villa #1 Well, located in North Central Alberta, are figured and described. Fifteen genera (8 arenaceous, 7 calcareous) are distinguished in the described microfauna. The arenaceous genera are *Ammobaculites, Ammodiscus, Glomospira, Haplophragmoides, Miliammina, Nodosinella, Proteonina,* and *Tritaxia.* The calcareous forms are included under the genera, *Discorbis, Globulina, Lenticulina, Marginulina, Marginulinopsis, Robulus,* and *Saracenaria.*

On the basis of microfaunal evidence the Clearwater and Joli Fou formations, as developed in Bear Villa #1, are correlated respectively with the Clearwater and Joli Fou Formations of the type section along Athabasca River. Correlations are indicated with the Cummings Member and basal Lloydminster Shale; with the upper part of the Loon River and basal part of the Peace River Formations and the Harmon Shale and Cadotte Members of the Peace River Formation.

The basal Clearwater fauna reflects open seaway shallow neritic facies, the middle and upper Clearwater fauna suggest shallow neritic to estuarine facies and the Joli Fou fauna suggests a shallow enclosed bay.

STRUCTURE OF THE BRULÉ-CROSSING CREEK AREA, BRITISH COLUMBIA

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1957, M.Sc., University of Saskatchewan

Rapid evaluation of areas containing possible oil and gas accumulations in the Rocky Mountains is necessary before detailed work should be considered. The use of vertical aerial photographs, low angle oblique photographs, and photogeology in combination with control traversing and reconnaissance flying provides a rapid method of geological evaluation. The validity of this method is shown by the results obtained in a survey of the Brulé-Crossing Creek Area, Britsh Columbia. The geology of this area consists in general of Paleozoic strata which are folded into asymmetrical and easterly overturned folds that in places are dissected by westward dipping thrust faults.

This thesis describes in some detail the methods used in conducting a rapid structural survey of the above area and also presents an account of the data obtained.

CADOTTE AND PADDY MEMBERS OF PEACE RIVER FORMATION

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The Lower Cretaceous Peace River Formation lies across the British Columbia and northwest Alberta boundaries. Its greatest extent lies in Alberta. The formation consists of three members: a basal marine shale (Harmon Member), a middle, marine sand unit (Cadotte Member), and an upper continental sand (Paddy Member).

The Cadotte Member is a well sorted, uniform, deltaic sandstone with a maximum thickness of over 200 feet. It has a lobate pattern typical of some deltas and it extends east to the middle of Lesser Slave Lake and north to Township 101. Its southern extensions are unknown.

The overlying Paddy Member is the continental phase of Peace River sedimentation and has a maximum thickness of over 120 feet. It too has the "bird's-foot" pattern of deltas built on a shallow shelf. This member extends to the western tip of Lesser Slave Lake, north to Township 91 and south to Township 66.

Both members had a complex western source which probably consisted of igneous, metamorphic and clastic rocks lying, for the most part, west of the present day Rocky Mountain Trench.

THE KNEEHILLS TUFF

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Petrographic and chemical studies were made of samples of Kneehills Tuff from various outcrop localities in Alberta, between Cypress Hills in the south and Whitecourt in the north. The length and breadth of zircon crystals in each sample were determined and size-frequency curves constructed. A comparative study was made of samples and separates from late Cretaceous or early Tertiary tuff beds exposed in the Foothills area and a sample of rhyolite associated with the Boulder batholith in Montana.

Results of the investigations showed the Kneehills Tuff to be uniform in texture, mineralogy and chemical composition over a wide area and almost identical to the upper tuff lenses above the Kneehills zone in the Drumheller area. It is suggested that the pyroclastic material for these tuff beds was derived from a late effusive phase of the Boulder batholith. Tuff beds of late Cretaceous or early Tertiary age exposed in the Foothills area were not the principal concern of this study, but in the few comparisons made, they do not appear to be directly related to the Kneehills type.

Radioactive dating of the zircon from the Kneehills Tuff by the lead-alpha method yielded an age of 53 million years. By the radiation damage method, the age is 110 $\pm$ 50 million years.

The potassium-argon age of feldspar from a bentonitic ash bed in the Ardley coal seam above the Kneehills Tuff is 52 million years, a figure in good agreement with lead-alpha, lead-isotope and potassium-argon ages for the Cretaceous-Tertiary boundary.

Individual tuff lenses in the Kneehills zone appear to be wind carried material from separate explosive outbursts at the source. The areal extent of each lens was controlled by late Cretaceous topography and meteorological conditions at the time of vulcanism. The original ash was apparently deposited in fresh water basins and altered diagenetically.

THE VIKING FORMATION, CENTRAL ALBERTA

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A study of the Viking Sandstone was made for the following four wells in Central Alberta: Imperial Norbuck 2-6, Imperial Joffre 2-21V, Imperial Armena 6-11V, and Superior Joseph Lake 11. Seven Foraminifera, one gastropod, four sporamorphs, thirty three thin section, and six suites of heavy minerals are described. The Viking, which shows no evidence of diachronism, was probably derived from pre-existing sediments to the west, and deposition may have taken place slowly in a shallow, marine, partially landlocked sea under slightly reducing conditions. Radioactive dating on glauconite and a bentonitic ash yielded dates of 63 and 45 million years respectively. These ages are thought to be low because of potassium adsorption and argon leakage.