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PALEOCURRENTS IN THE TRIASSIC OF NORTHEASTERN BRITISH COLUMBIA, CANADA

Triassic strata of the Rocky Mountain Foothills in northeastern British Columbia consist predominately of fine-grained clastics in the lower part, medium- to coarse-grained in the middle and lower upper parts, and fine-grained in the uppermost part. Some bioclastic carbonates and evaporites also occur in the middle and upper parts. Triassic rocks rest disconformably upon upper Paleozoic chert, and are overlain disconformably by Jurassic shales in the southern part of the area and lower Cretaceous shales in the north. This, together with an unconformity, bevelling progressively older beds northeasterly indicates uplift in the northeast. Seventy sections were measured to establish the stratigraphic facies relations and history of sedimentation. This work was augmented by textural studies on hand specimens from certain sections and by observations on bedding thicknesses. Generally, lower Triassic beds are thinner and finer-grained than middle and upper parts except for the youngest beds. Also, as sediments are coarser in the east than west, the following history of easterly transgression, followed by westerly regression and again followed by easterly transgression, was established.

Paleocurrents based on the observations on 2,500 current structures such as planar cross-bedding, festoon bedding, current and wave ripple marks, and flow markings indicated that the probable direction of sedimentary transport was toward the west and southwest. Triassic sediments deposited during a regressive phase underwent textural changes expressed as decrease in grain size and gross lithological aspect from coarse in the east to fine in the west; at a given section younger beds are generally coarser than older beds, and axes of maximum thickness for successively younger formations occur successively westerly from those of older formations. These observations implied an apparent migration of depositional sites in the direction of sedimentary transport during the regressive phase of sedimentation. Such apparent migratory behavior of depositional sites in a direction away from the source area, and coinciding with the direction of sedimentary transport, was a response to increased erosion and consequent sedimentation arising from uplift in the northeast. It appears that paleoslope attitude was the dominant regional control of the resulting sedimentary trends.

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CARBONATE PETROGRAPHY OF BLAINE FORMATION (PERMIAN), NORTH CENTRAL TEXAS

The Blaine formation is a part of the Pease River group (Upper Guadalupian) and consists of alternating gypsum and anhydrite, carbonate, and fine clastic beds. Carbonates occurring within the Blaine are relatively pure dolomites, closely associated with evaporite deposits.

Petrography, staining methods, chemical analysis, Ca/Mg ratios, X-ray, differential thermal analysis, and stratigraphy were used to interpret the mode of formation and deposition, the sedimentary environments, and the secondary alteration of the Blaine carbonates. The dolomites are predomintly very finely crystalline and are associated with various allochemical elements typical of what has been termed "evaporitic dolomite."

Origin of the carbonate is interpreted to be dolomitization (penecontemporaneous?) of aragonite or calcite allochemical and orthochemical sediments. The homogeneous character, lateral persistency, uniform thickness, and paleogeography suggest deposition in a large lagoon which was probably hypersaline and surrounded by low, arid to semi-arid landmasses. Deposition of carbonate and evaporite sediments occurred similar to configurations noted by Scruton (1953) and Briggs (1958): carbonates and sulphates around the margin and chlorides and sulphates in the center of the basin.

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PYROCHLORE FROM OKA, PROVINCE OF QUEBEC, CANADA

Five varieties of pyrochlore have been identified at Oka.

1. A metamict variety containing uranium and thorium; bright red color, fine-grained, associated with ijolitic rocks. $a_0 = 10.43 \pm 0.05$ Å.
2. A cerian variety; chocolate-brown, coarse-grained, euhedral (octahedra and dodecahedra), associated soda pyroxene marble. $G = 4.38$, $a_0 = 10.393 \pm .001$ Å.
3. A thorian variety; brownish red, in calcite-forsterite rock. $a_0 = 10.428 \pm .005$ Å.
4. A zirconian variety; reddish brown to black, occurrence in carbonatite. $a_0 = 10.395 \pm .001$ Å.
5. A fifth variety is known to be high in Nb_2O_5; the complete chemical composition is not available but the Nb_2O_5 content is greater than 60%.

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MINERALOGY OF THE MOUNT PLEASANT TIN DEPOSIT IN NEW BRUNSWICK

The Mount Pleasant tin deposit in New Brunswick is mineralogically complex and contains a wide variety of minerals. The tin-bearing minerals are cassiterite and stannite. Cassiterite is the chief tin mineral, and it occurs in sulphide veins, wall-rock and in a kaolin body containing fluorite. The cassiterite in the sulphide veins and wall-rock is present as small grains, whereas that in the fluorite-bearing kaolin body is present as relatively large grains in massive fluorite. Stannite has been found only in sulphide veins where it occurs as grains, veinlets and minute inclusions in sphalerite, and occasionally as borders around cassiterite.

Sphalerite is the most abundant ore mineral. It is black and contains minute exsolution bodies of chalcopyrite and stannite. Analyses of sphalerite concentrates give Fe 8.2–14.3%, Cu 1.3–5.5%, Sn 0.15–0.40%, In 0.03–0.30%, Cd 0.12–0.19%, and Mn 0.06–0.08%.

Sphalerite geothermometry indicates that the depositional temperatures of the sphalerite fall between 335° C. and 700° C., and arsenopyrite geothermometry gives depositional temperature up to 500° C.

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SILURIAN STRATIGRAPHIC AND STRUCTURAL HISTORY IN INDIANA FROM THE CINCINNATI ARCH TO THE MICHIGAN BASIN*

Silurian rocks in northern Indiana early inspired

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