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Abstract

STRATIGRAPHIC CONTRIBUTION: NORTHEASTERN BRITISH COLUMBIA AND NORTHWEST TERRITORIES

W. R. S. Henderson, British American Oil Co. Ltd.

This paper which is being submitted to the A. A. P. G. for publication was given as an abstract before the A. S. P. G., Calgary, on April 5th, 1954. The work is based on studies which were carried out in 1950 in Northeastern British Columbia on behalf of Hudson's Bay Oil and Gas Company Ltd., Union Oil Company of California, and The British American Oil Company Ltd., and in 1952 in the Northwest Territories on behalf of Hudson's Bay Oil and Gas Company Ltd., and The British American Oil Company Ltd.

The unpublished reports of the party leaders were freely drawn upon and acknowledgment was made of the cooperation and enthusiasm of the party leaders and their assistants which resulted in the acquisition of additional new information. In Northeastern British Columbia the party leaders were D. R. Clark, J. T. Cook, and D. E. Nisley; in the Northwest Territories, G. Dann, S. W. Paskevich, and L. J. Martin.

Acknowledgment was made of the benefit derived from discussions with Mr. R. W. Burns, Dr. F. G. Fox, and Mr. J. H. Manning of the above companies.

The speaker thanked Hudson's Bay Oil and Gas Company Ltd., Union Oil Company of California, and The British American Oil Company Ltd. for permission to publish the material, and Mr. E. D. Baldock, Chief Cartographer, Department of Mines and Technical Surveys, Ottawa, for permission to show infra-red photos. He also paid tribute to Mr. Harry J. Winny whose special skill as aircraft pilot for Hudson's Bay Oil and Gas Company assisted the project considerably.

The part of Northeastern British Columbia with which the writer dealt follows the Alaska Highway from the Interior Plains into the Rocky Mountains, and the portion of the Northwest Territories which was investigated lies in the valleys of the Liard and MacKenzie rivers.

The Cretaceous rocks which are exposed in Northeastern British Columbia were described by the speaker after making acknowledgment of the benefit derived from the publications of the previous workers. The more uniform character of the upper part of the arenaceous Dunvegan formation was contrasted with the transitional character of the lower part. Its total thickness at Steamboat Mountain, 50 miles west of Fort Nelson where the upper part is conglomeratic, is about 550 feet. On lithological grounds, the Dunvegan formation of Northeastern British Columbia is

correlated with the Dunvegan formation of the Western Peace River Plains as described by J. Gleddie (Bull. Amer. Assoc. Petrol. Geol., Vol. 33, No. 4, 1949) plus the underlying transition beds.

The Sikanni formation which underlies the Dunvegan formation and which had originally been described by C. O. Hage, (Geol. Surv. of Canada, Paper 44-30) was elaborated upon and measurements at new localities were given. One section which had been measured by Clark in the lower Sikanni Chief-Upper Fort Nelson River locality, was described as being approximately 1450 feet thick; 760 feet of this section lie above the base of the *Acanthoceras* zone and a further 500 feet lie below, completing the shale member to the top of the "Sandy" member.

The paper further described how, by use of aircraft and air photographs, the Dunvegan and Sikanni formations were followed northerly where they were found to be the equivalent of the Fort Nelson formation.

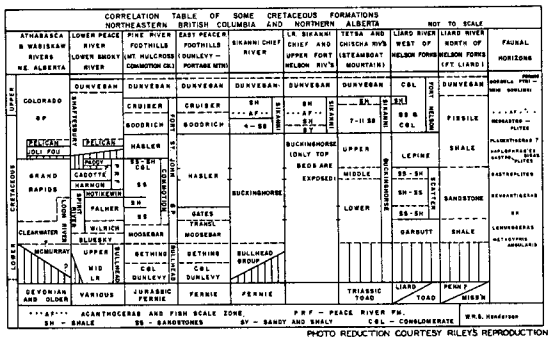
The Buckinghorse formation underlies the Sikanni formation and it also was originally described by Hage. Details were given of a section which had been examined by Cook in the lower Tetsa and Chischa rivers (near Steamboat Mountain). Here, a thick shale section overlies beds of Triassic age. In this locality an upper (shale) member about 1345 feet thick is underlain by a middle (sandstone, siltstone, and shale) member about 232 feet thick, and this overlies a lower (shale) member about 2040 feet thick. Some evidence was given which indicates that the beds overlying the Triassic are the equivalent of the lower part of the Buckinghorse formation of the type locality in the vicinity of Sikanni Chief river.

A Table of the Cretaceous beds was shown to indicate their correlations between a number of localities from Fort Liard in the north to Pine River foothills in the southwest and to the Athabaska and Wabiskaw rivers in Alberta in the southeast. The Fort Nelson formation was correlated with the Dunvegan and Sikanni formations. The Upper-Lower Cretaceous boundary was shown at the Fish Scales and *Acanthoceras* horizon, after Stelck. The Sikanni sandstones and Goodrich formation had earlier been correlated on the basis of their *Neogastrolites* faunas. The Paddy member and Pelican formation were placed in accordance with the publications of Wickenden and Badgley, Geol. Surv. Papers 51-16, and 52-11, respectively, and the Peace and Spirit River formations, after the A. S. P. G. Lower Cretaceous Study Group, 1951, "Lower Cretaceous of the Peace River Region." The Pelican formation was correlated with a part of the Shaftsbury formation which lies below the Goodrich formation and its approximate equivalent - the sandstone member of the Sikanni formation. The tops of the Grand Rapids, Peace River and Commotion formations were correlated with each other and approximately with an upper *Gastrolites* zone which had been reported from the Lepine formation and from the Hasler formation of East Peace River foothills. These correlations placed the Pelican and Joli Fou formations at

positions approximately equivalent to the Placenticerus liardense Whit zone in the Liard River west of the Nelson Forks locality, together with the underlying shale, and those correlations are therefore made. A lower Gastroplites horizon formed the basis for correlating the upper part of the Scatter formation, the Middle Buckingham member, a part of the Commotion formation and the Cadotte member. The Beudanticeras or Lemuroceras fauna occurs in the Notikewin member of the Peace River formation and in various other formations or members at horizons below the Gastroplites fauna. The lower part of the Scatter formation was correlated with the Gates formation and with a part of the Falher member on the basis of position and lithology.

Moving to the Northwest Territories, it was pointed out that Hage, (Geol. Surv. of Canada, Paper 45-22) had been unable to ascertain if Cretaceous shales lie directly on the 650 feet, or more, of sandstones, shales and chert which he had described at Pointed Mountain about 20 miles northwest of Fort Liard, and which he had referred to the Pennsylvanian and/or Mississippian. Paskevich had found a few hundred feet of similar beds which he believed to lie below Hage's section. The rocks are not well exposed.

At Twisted Mountain (about 15 miles above the mouth of the South Nahanni River) Dann measured nearly 950 feet of quartzitic sandstones (with the top concealed) which belong to the lower part of Hage's Pennsylvanian and/or Mississippian division. It appeared from air reconnaissance that at



least some part of the Pointed Mountain beds overlie the Twisted Mountain beds but the exact relationship between these two sections has not been determined.

Directly below an 88 foot covered interval at the same Twisted Mountain locality, Dann also measured over 1500 feet of beds with the base not exposed, consisting chiefly of limestones and which belong lithologically to the Mississippian section which Hage had described in the region. These two subdivisions of rocks were regarded arbitrarily as Pennsylvanian? and Mississippian?, respectively, on the basis of Hage's data and the marked lithological change.

Regarding the Upper Devonian, it was stated that the Simpson formation near Camsell Bend had been found to be about 3000 feet or even possibly 3500 feet thick.

The Middle Devonian to Middle Silurian rocks of the Canol, Camsell Bend and Nahanni Butte areas were reviewed (principally from the publications of Hage, Hume (Geol. Surv. Canada, Sum. Repts.), Hume and Link (Geol. Surv. Canada, Paper 45-16) and Williams (Geol. Surv. Canada, Sum. Repts.), and it was shown how information from B. A. - H. B. O. G., Lone Mountain well #2 and Trail Creek well #1 indicated that an upper part of the Lone Mountain formation varied from an evaporite section in the east to the dolomite section of Lone Mountain and Camsell Bend in the west. This evidence was regarded as supporting the correlation of the Bear Rock formation (with evaporites) of the Canol area with some upper part of the Lone Mountain formation - a correlation which had been made by Warren and Stelck (Succession of Devonian Faunas in Western

Canada; Trans. Roy. Soc. Canada, Vol. XLIV, Ser. III, Sec. IV, June, 1950).

The disconformities in the above succession were discussed and it is postulated that conditions of continuous deposition appear to have prevailed in the Camsell Bend area from Middle Silurian through Upper Silurian and Lower Devonian to Middle Devonian time with the possibility that a minor break may have occurred at the Lower-Middle Devonian contact in the Little Doctor Lake area (25 miles south of Camsell Bend). Here Dann had found possible evidence of a disconformity. No evidence had been found of the marked, erosional disconformity which separates the Bear Rock formation of possible Lower Devonian age from the Ronning (Silurian) group in the Canol area.

In the Rocky Mountain area adjacent to the Alaska Highway, the data of Williams (Geol. Surv. of Canada, Paper 44-28) and the considerable data of Laudon and Chronic (Bull. Amer. Assoc. Petrol. Geol., Vol. 33, No. 2, 1949) were reviewed - in so far as these referred to the Siluro-Devonian series.

Additional information was given on the above portion of the Paleozoic examined by Nisley where it occurs in the Stone Range, where Laudon and Chronic were handicapped by talus cover.

In the Rocky Mountains, Middle Devonian and Middle Silurian beds were recognized by Williams, but no diagnostic fossils have been reported from the intervening portion of the series. In these circumstances, classification of the rocks must perforce be tentative and such a re-classification is proposed.

In this re-classification, the Ronning formation was raised to group status, the name "Mount Kindle" was referred to the rocks carrying a Middle Silurian coralline fauna, and the Muncho and McConnell formations were placed in the Upper Silurian. The disconformity at the base of the "Ramparts" formation was regarded as marking the boundary between the Silurian and Devonian systems and the possibility was recognized that some part of the "Ramparts" formation might be Lower Devonian in age.

Although Laudon and Chronic found disconformities separating all the formations of their classification, it was postulated that the clastic beds in the lower part of the Ronning group and "Ramparts" formation indicated that the disconformities at the base of these divisions were the most important.

The Muncho and McConnell formations of the Rocky Mountains were tentatively correlated with an uncertain part of the Cathedral Mountain section of Kingston (Bull. Amer. Assoc. Petrol. Geol., (Vol. 35, No. 11, 1951) which lies below his Faunal zone No. 10 and above the beds carrying a Niagara fauna; they were also tentatively correlated with the lower part of the Lone Mountain formation of the Northwest Territories and, in the Canol region, with the marked disconformity at the base of the Bear Rock formation, together with any beds that occur in the (Silurian) Ronning group of that region above the equivalent of the Middle Silurian Mount Kindle formation.

The Bear Rock formation of the Canol region and the upper part of the Lone Mountain formation was correlated with an uncertain lower part of the "Ramparts" formation of the Rocky Mountains and with a part of the beds which include Faunal zone No. 10 in the Cathedral Mountain section. A personal communication from Kingston was quoted which intimated that he had carried out further work south of the Liard River and believed that the sandy beds in the lower part of the "Ramparts" formation of the Rocky Mountains may be provisionally correlated with the silty limestone which includes his Faunal zone No. 10 in the South Nahanni River valley.

In conclusion, the disconformities which occur in the

Siluro-Devonian series were referred to Umbgrove's diagrammatic synopsis of "the pulse of the earth" (The Pulse of the Earth, 1947, Table II) and it was pointed out that there is now evidence of Caledonian movements having taken place in the Rocky Mountains of Northern British Columbia, and in the MacKenzie and Franklin Mountains in the Northwest Territories. It was also pointed out that the evidence indicates that the Taconic, Ardennic, Erian, and Middle Devonian epochs of movement, as shown by Umbgrove, (particularly the Taconic and Erian), were all represented in the Rocky Mountain area, and it was suggested that the manner in which the disconformities could be referred to these epochs supported the writer's classification there.

Reported by T. P. Storey,
Western Leaseholds.
