TYPICAL SOUTHERN ALBERTA SECTION AS ENCOUNTERED IN INTERNATIONAL BLOOD NO. 1 WELL

L. E. Workman

The lithology of the International Blood No. 1 well (Lsd. 2-7-8-22 W4 M.) was described in detail. Many of these units were to be seen in whole or part on the field trip, thus tying both surface and subsurface sections. Some tentative correlations with Central Alberta were made for the Calmar, Cooking Lake, and Elk Point. Some probable Ordovician in the basal section of the well were also discussed.

Abstract by
G.B. Choquette, C.S.S.

SEISMIC TECHNIQUES IN THE ALBERTA FOOTHILLS

by

L. H. Reed

Seismic programs in the Alberta foothills area differ from those of a normal plains project in that structural features of a complex tectonic nature are the prime objective. The obstacles are twofold in nature: technical and operational. One of the most serious technical problems in some foothills areas is the difficulty experienced in acquiring usable reflection records, due to: disturbed conditions at reflection horizons depths, rough surface topography, and steeply dipping surface beds. Another serious problem is the influence of rapid lateral variations in vertical velocity caused by excessive thickness of a high or low velocity bed due to repetition by faulting. Wherever the velocity abnormality occurs in the section, all horizons below it will have the reflection time and apparent depth affected. From an operational view, continuous reflection shooting is restricted by limited accessibility can be minimized by the use of the refraction type of shooting. This method requires an essentially straight line which need be accessible at points 1 to 1-1/4 miles apart. The velocity of the Paleozoic limestones are markedly higher than the Mesozoic shales and sands. Therefore, a high speed marker bed exists, overlain by lower speed material. This situation is essential to successful refraction shooting. It is usually impossible to map a bed below the first high speed Paleozoic marker capable of transmitting refraction energy. The refraction method is usually used as a reconnaisance tool with detail being established by reflection shooting.

Abstract by R. R. Williams,
P & N G Conservation Board.

GEOLOGY OF THE PINCHER CREEK OIL FIELD

by

O. Erdman, R. E. Belot and W. Slemko

Pincher Creek is the largest wet condensate gas field in Alberta. It is located approximately 100 miles south of the International border, and 25 miles east of the B. C. border in the foothills. Much of the area is of low relief, covered with glacial till, with Bedrock of Cretaceous age outcropping along rivers and creeks. Due to thrust faults the Belly River formation, the Alberta group and the Blairmore formation have been repeated four times. The Kootenay (Lower Cretaceous) and Fernie (Jurassic) do not show repetition in wells drilled to date. The entire series from Belly River to Fernie is almost entirely composed of alternating beds of shales and sandstones.

The Rundle formation of Mississippian age comprises the main reservoir rock which is composed of competent limestone and dolomitic rocks, and is encountered at a depth of approximately 8,000 to 12,000 feet.

The major regional tectonic structures of the Pincher Creek area are the Lewis Overthrust, Front Range Thrust, Eastern Thrust and the Alberta Syncline.

The reservoir is approximately 18,900 acres with an average total thickness of 520'; average porosity ranges from 2.6 to 7.4 per cent; calculated reserve 3.1 trillion cubic feet (2.29 marketable gas). The field will produce dry gas, natural gasoline, ethane, propane, butane and sulphur. It is a potential source of ethylene oxide or ethyl-alcohol.

Abstract by E. Burton,
P & N G Conservation Board

CAMBRIAN AND ORDOVICIAN OF SOUTHWESTERN ALBERTA

by

F. K. North

Through a period from Precambrian to Upper Devonian times the great trough of the Rocky Mountains area was separated from the Great Basin area of Utah and Nevada by the positive area Montania. The Lower Cambrian coarse clastics of Lake Louise area disappears at Moose Mountain, and from the Crowsnest area southward the Lower Cambrian is certainly absent. The Middle Cambrian is the most extensive formation. Its basal member rests directly on the Precambrian at places as far apart as the Wind River Canyon of Wyoming, the Lewis and Clarke Range of Western Montana, Waterton Park, and the Elko area of South-eastern British Columbia. Upper Cambrian deposits are absent from a belt stretching from the Snake River area of Idaho, northwards almost to the Crowsnest and (apparently) Westward to the Pacific. They are absent under the southwestern Alberta plains and in the front ranges of the Rockies as far north as Clearwater River. The Ordovician is almost a replica of that of the Upper Cambrian, with the obvious proviso that the remaining Ordovician is less extensive. The lithology of the known Cambrian beds suggests deposition in quiet basins on the flanks of an emergent mass of low relief.

Abstract by M. Fuglem
P & N G Conservation Board

DEVONIAN STRATIGRAPHY IN THE ROCKY MOUNTAINS SOUTH OF BOW RIVER

by

R. de Wit

de Wit compares five Upper Devonian sections from Sulphur Mountain to Crowsnest Pass. He reports differences in facies, finding the Sulphur Mountain section and the Crowsnest Pass section similar, and different from the others. The change in character of these sections is thought to be due to a major overthrust. The Upper Devonian stratigraphy exposed at Crowsnest Pass is presented in detail.

Abstracted by R. F. Bailey
Socony Vacuum Co.

SUMMARY OF THE DEVONIAN STRATIGRAPHY OF THE ALBERTA ROCKY MOUNTAINS

D. J. McLaren

The lower part of the Upper Devonian of the Rocky Mountains is divided into a reef or carbonate sequence and an off-reef or clastic sequence. The latter is composed of the following succession: Lower Flume dark stromatoporoid and Amphipora beds; Upper Flume argillaceous limestone; dark Perdix shales and thin argillaceous limestone passing upward into argillaceous bedded limestone of the Mt. Hawk. These formations together are equivalent to the variable carbonate sequence of the Fairholme. The lower part of the Fairholme which consists predominantly of "black reef" is continuous with the Flume. Both the carbonate and clastic sequences are overlain by the dolomites and silts of the Alexo; these in turn are succeeded by the massive Palliser limestones.

Abstract by
H. Belyea, G.S.C.

TRIASSIC AND JURASSIC FORMATIONS OF SOUTHERN ALBERTA

By

M. B. Crockford and W. H. H. Clow

Messrs. M.B.B. Crockford and W.H.A. Clow presented a general outline of the geology of southern Alberta and showed a number of excellent slides illustrating the prominent and typical outcrops in the Crowsnest Pass area.

CARBONIFEROUS STRATIGRAPHY IN THE SOUTHERN FOOTHILLS OF ALBERTA

by

R. J. W. Douglas

Douglas recognizes some differences in the Rocky Mountain and especially the Rundle formation in the outcrops south of the Bow River with the type section at Banff, and he proposes a new nomenclature for these formation. The Rundle formation is given group status, and is divided into two formations and eight members. The divisions are made on the basis of composition and degree of crystalinity or granularity, characteristic bedding, fossil assemblages and insoluble residues.

Four outcropping stratigraphic sections and one Turner Valley subsurface section are given. Different lithofacies are related to the environment of deposition.

Abstract R. F. Bailey,
Socony Vacuum Co.

NOTES ON THE CRETACEOUS OF SOUTHWESTERN ALBERTA

by

R. L. Thompson and D. W. Axford

Nearing the area of early uplift to the Southwest, the Kootenay lies conformably on the Fernie in the Alberta syncline, and progressing east and northward, the Cretaceous lies in turn on the eroded Jurassic and Madison formations. The fresh to brackish water deposition of the Cretaceous ended approximately with the emission of the Crowsnest Volcanics, which is probably responsible for the Red Speckled Shale Zone of the Colorado group of the plains area. The Marine Colorado formation was deposited when the sea migrated westward and eventually covered the entire area. The Milk River formation marked the beginning of the retreat of the sea. This retreat was not complete until the end of Pakowki time, when a second major uplift and its erosion contributed rapidly to the Belly River group. The Bearpaw formation represented a final short invasion of the sea and the Blood Reserve formation represented the deltaic deposition of its retreat. A final fresh water type of deposition is represented by the St. Marys River and Willow Creek formations. The reddish coloration of the Willow Creek formation was probably a result of weathering conditions and is suggestive of a climatic change.

Abstract by M. Fuglem,
P & N G Conservation
Board.

SOME BEARPAW ZONES IN SOUTHWESTERN SASKATCHEWAN AND SOUTHERN ALBERTA

by

D. M. Loranger and J. Gleddie

On the basis of microfaunal data, the Bearpaw formation in Southwestern Saskatchewan, and in the Dunmore area, Alberta, was subdivided into six zones, listed in descending order:

Gyroidina sp. and Ostracod Zone, Glauconite Zone. *Ammodiscus* Zone, *Anomalina* Zone, *Plectina smithia* Zone and *Tritaxia crydermanensa* Zone (including the *Arctica* ovata zone). In the western plains area, three of these zones are present, but the forms are more brackish in habitat and facies variations exist between the western and eastern plains area. The Blood Reserve formation (Russell) is reduced to a member status of the Bearpaw formation and is correlated with the Oxarart member on the basis of stratigraphic position, lithologic characteristics and similar fossil content. A microfossil list and three plates of microfossils are appended.

Abstracted by R. L. Thompson,
Socony Vacuum Co.

SURFICIAL GEOLOGY OF SOUTHWESTERN ALBERTA

by

A. Mac. S. Stalker

In the southern foothills the contact of two major glaciations is located in the region where the Laurentide, or continental ice, from the north and east, met the streams of ice pouring down the valleys from the Cordilleran glaciers to the west. Generally where both are found, and can be distinguished, the Cordilleran drift underlies that of the Laurentide. The Cordilleran drift contains sedimentary stones whereas the Laurentide contains stones of igneous origin. The Laurentide ice was thin in this region and lacked the erosive power of the thick ice to the east and hence the existing topography controlled the movements of the ice. The Alpine glaciers, however, moved rapidly and had strong erosive power. There is evidence of two, and possibly three, major Laurentide glaciations. The direction of movement of the Cordilleran was downhill and is usually obvious. Its eastern movement is confirmed by drumlins, moraines and striae on the harder rocks. The best method of determining the Laurentide movement is through tracing erratics to their source rocks. The most western advance of Laurentide ice into the foothills is to be found, so far, some 20 miles north of the U. S. border at an elevation of 5,280 feet. One of the important aspects of the glaciation was the diversion of drainage and formation of glacial lakes.

Abstract by R. R. Williams,
P & N G Conservation Board.