may be correlative with the Watrous, Sawtooth, Gravelbourg, and Shaunavon formations of the Plains. Higher parts of the Peace River subsurface Fernie may be correlated with the Rierdon, Swift, and Vanguard formations.

P. HARKER, Geological Survey of Canada, Ottawa, Ontario
Carboniferous of Western Canada, Extent and Salient Problems*

The outcrop of Carboniferous rocks in western Canada forms an almost continuous belt extending from the International Boundary to the Peace River and beyond. In the Rocky Mountains of Alberta, Carboniferous strata form the highest points of many of the mountains lying within the tectonic province of the eastern ranges. To the west they are overridden by Cambrian and other sediments; eastward, they disappear beneath the Mesozoic deposits in the complex structures of the Foothills; and are present in the subsurface of much of Southern Alberta.

Two of the major valleys which cut across the strike of the eastern ranges, the Bow and the Athabasca, gave early access to the pioneer geologists. G. M. Dawson first recognized the existence of Carboniferous strata in 1886 and a year later, McConnell published a stratigraphic subdivision of the great succession of Devonian and Carboniferous rocks in the Bow Valley. In later years McConnell's Lower Banff shales became the Banff formation and his Upper Banff limestone was renamed the Rundle formation by Kindle. From these early beginnings the Carboniferous succession in Alberta came to be subdivided into three somewhat loosely defined units, the Banff, Rundle, and Rocky Mountain formations. Paleontological studies have shown that strata representing the whole span of Mississippian time are present but there may be some gaps. Whether or not the Pennsylvanian is present is still an open question. Although the succession is not abundantly fossiliferous, the faunas offer some means of broad regional control. The Carboniferous seas were relatively shallow and of considerable extent, and correlation of lithological units deposited under these conditions could be expected to present many problems.

P. F. MOORE, Shell Oil Company, Calgary, Alberta
Historical Review of Alberta Carboniferous Nomenclature

The early history of nomenclature has been adequately described by F. W. Beales (GSC, 1950).

P. E. Raymond working with the Harvard School in the Jasper area (Am. J. Sci., 1930) proposed the name Coronach for beds which he thought were in the Devonian but which were actually infaulted Carboniferous Banff equivalents. He proposed the name Bedson for rocks which he thought were at the base of the Carboniferous but which are actually Palliser (Upper Devonian). In another outcrop, the Banff and Rundle were recognized as separate units of Carboniferous age and grouped as the Moosehorn formation. None of these names has been used since.

Recent history has been plagued by names proposed informally, adopted with differing interpretations by numerous workers, and yet never given official status by publication and citation of a type locality. H. H. Beach (unpub., 1947) informally proposed the names Tunnel Mountain, Shunda, and Shunda and Dyson Creek as formations within the Rundle group. Later that year P. S. Warren divided the Rocky Mountain formation into Tunnel Mountain and Norquay members (unpub., 1947). L. M. Clark (AAPG, 1949) cited Beach's formations though he did not use them as his mapping units; W. B. Gallup (AAPG, 1951) used Beach's names in his paper on the Turner Valley field.

Beach intended his names to apply to rock units both in the Rocky Mountains and Foothills. But the beds to which he gave the same names in the two belts are not correlatable in the way he supposed. There is, therefore, a "mountain Tunnel Mountain," a "foothills Tunnel Mountain," and in this case also a "Warren's Tunnel Mountain"; a "mountain Shunda," and a "foothills Shunda," etc. Clark used the names in the "mountain" sense, Gallup in the "foothills" sense.

The Middle Banff (Warren, GSC, 1927) has been called "Clark's member" at the Gap in Bow Valley and this term has received wide currency on Canadian Stratigraphic Service logs for a rock unit beneath the Plains which is probably not correlatable with the Middle Banff in Bow Valley.

L. R. Laudon et al. (AAPG, 1949), working in NE. British Columbia, limited the name Rundle to the upper Rundle only; the lower Rundle he named Dessa Dawn formation, a term which was brought into Alberta by A. C. Spreng (AAPG, 1953).

R. A. C. Brown named the Greenock formation in the Jasper area (GSC, 1952) for beds which included equivalents of both the Upper Rundle and Rocky Mountain formations.

R. J. W. Douglas (ASPG, 1953) published a preliminary account of investigations in parts of the southern Foothills. He proposed the new formation names, Mount Head and Livingstone, each divided into a number of members, and named the Etherington member of the Rocky Mountain formation.

G. O. Raasch (privately circulated, 1954) introduced the name Storm Creek formation for the

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higher sandstones of the Rocky Mountain formation and suggested a redefinition of the Tunnel Mountain formation.

Douglas and Raasch presented their final conclusions at this meeting.

R. J. W. DOUGLAS and P. HARKER, Geological Survey of Canada, Ottawa, Ontario
Mississippian Succession in Mount Head Area, Alberta*

The Mississippian rocks of Mount Head area in the Southern Foothills of Alberta are included in the standard formations of the Alberta Rocky Mountains, the Banff, Rundle, and Rocky Mountain formations. The succession differs in several respects from that of the type region at Banff, these variations being, in part, of economic interest.

The Banff formation is Kinderhookian in age. The Rundle formation is raised to group status to include two formations, the Livingstone and Mount Head. The Livingstone formation, of Osagian age, is divided into two members, Pekisko and Turner Valley, and the latter member into the following groups of beds: Banner, Dark Lime, Lower Porous, Middle Hard, and Upper Porous beds. The Mount Head formation of Meramecian age contains the following members: Wileman, Baril, Salter, Loomis, Marston, and Carnarvon. The Rocky Mountain formation is divided into a lower or Etherington member, Chesterian in age, and an Upper member of Pennsylvanian or Permian age.

The Mississippian succession throughout the Southern Foothills of Alberta resembles that of the Mount Head area. Its division into several formations and members permits detailed correlation and study of the lateral variations of the beds.

G. O. RAASCH, Canadian Stratigraphic Service, Calgary, Alberta
Carboniferous Section at Highwood Pass, Alberta

The upper 605 feet is assigned to the Rocky Mountain formation, which is here amended to comprise strata of Permian age. The formation is divided into an upper quartzitic sandstone member, 503 feet thick, for which the term Storm Creek is proposed. The lower member is believed to be the equivalent of Warren's (unpublished) Norquay member of the Banff region, on both faunal and lithologic grounds.

The name Tunnel Mountain is redefined to cover the underlying 602 feet of resistant dolomite and limestone with interbedded gray and green shale, of Chester age. Below this, a topographically weak unit comprises 557 feet of Meramecian strata and is correlative with Douglas' (1953) Mt. Head formation. Its upper 188 feet is interbedded black bituminous shale and black bituminous dense limestone, while *Lithostrotion*-bearing biostromes are intercalated in the lower portion. Finally some 300 feet of resistant Livingstone (Osage) strata intervene between the base of the Mt. Head and the thrust which terminates the section below.

Two major faunal zones have been discriminated in the Tunnel Mountain and three in the Mt. Head. Indicated affinities of these are with the late Chester, Ste. Genevieve, St. Louis, and Salem units of the standard Mississippi Valley section. Corals in the Mt. Head also permit correlations with the Brazer limestone of Utah. More locally, lithologic and faunal evidence indicates a close correlation with type sections at Mt. Head and Banff.

P. HARKER and D. J. MCLAREN, Geological Survey of Canada, Ottawa, Ontario
Devonian-Mississippian Boundary in Canadian Rocky Mountains*

Over most of the Alberta Rocky Mountain region, the Palliser formation, containing an Upper Devonian fauna, is overlain with disconformity by the Exshaw formation. The Exshaw, consisting of a lower black shale and an upper calcareous siltstone, has been considered to be Devonian but the faunal evidence of Devonian age is inconclusive. The Exshaw, though widespread, is not present throughout the region and in some sections the Mississippian Banff formation rests disconformably on the Palliser. The Exshaw occupies the same stratigraphic position and is lithologically similar to the Bakken of Saskatchewan. The Sappington of Montana which is reported to contain an early Mississippian fauna bears some lithological resemblance to the siltstone member of the Exshaw. It is suggested that the Devonian-Mississippian boundary be placed at the base of the Exshaw formation in the Alberta Rocky Mountains.

W. H. H. PATTON, Canadian Gulf Oil Company, Calgary, Alberta
Mississippian Succession in South Nahanni River Area, Northwest Territories

A thick section of Mississippian rocks is exposed west of Jackfish River in the LaBiche Range of the MacKenzie Mountains near South Nahanni River, Northwest Territories.

From fossil evidence rocks of Kinderhook, Osage, Meramec, and Chester ages are known to be present.

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