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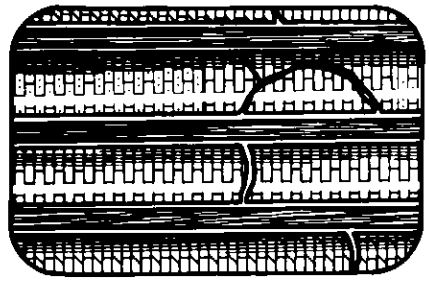
Andy Okulitch and Ulrich Mayr (GSC) illustrated the complex tectonics in the vicinity of major transform faults on Ellesmere Island. Rein Tirrul (GSC) presented his recent work establishing the existence of nappes in the Kilohigok Basin near Bathurst Inlet. Jean van Berkel gave a presentation on the deformation of tin anorthositic layers and contemporaneous feldspar blastesis. B. Wiseman (Toronto) and Jean van Berkel presented a computer simulation of diapiric ridge development.

The Sunday field trip (led by Simon Hanmer) gave us an opportunity to examine examples of rectilinear "straight" gneisses, porphyroclastic granoblastic gneisses and tectonic marble melange in the vicinity of the western boundary zone of the Central Metasedimentary Belt in Quebec. The outcrops were chosen to illustrate the interpretation of these rocks as high strain tectonites akin to those described in the Ontario Grenville and shown there to mark zones of intense NW-directed overthrusting. The outcrops provoked lively interest and discussion, and were only rivalled by the sun breaking through just in time for an excellent home-made lunch prepared by "Caterers Anonymous".

After four successful and fruitful meetings, the Canadian Tectonics Group is now an established entity and shows every sign of continuing vigour. Our next meeting (October, 1985) will be held in Newfoundland. Interested geologists who may not yet be on the mailing list for First Circulars might wish to contact Tom Calon at Memorial University, St. John's, Newfoundland, A1C 5S7 (Telephone 709-737-8398).



Carbonates in Subsurface and Outcrop CSPG Core Conference – October 18-19, 1984

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This conference was organized by the Sedimentology Division of the Canadian Society of Petroleum Geologists. The core committee consisted of Gillian Harrison, John Kaldi, Nick Meijer-Drees, William Styan, Christian Viau, Nigel Watts and Leslie Eliuk (Chairman). The original objective of the meeting was to allow the comparison of carbonate facies in the subsurface with similar rocks in outcrop. Over half the displays did, in fact, make this comparison, thereby enlarging our understanding of both environments. Though not planned that way, the conference was essentially one of Devonian examples from Alberta, British Columbia, the Yukon, the Northwest Territories and Alaska, with Cambrian and Pleistocene "bookends" to complete the display. Some contributions put more emphasis on diagenesis and geochemistry, reflecting the increasing importance of these aspects of sedimentary and petroleum geology. The lengths of the write-ups span a wide range, but the efforts of all the contributors were greatly appreciated and resulted in a 306-page guidebook.

This conference was notable as the first to be held in the new, expanded core facilities of the Energy Resources Conservation Board. A brief review, included in the guidebook, surveys the 22-year history of rock data storage and study at this site (Shima and Pow, ERCB). A glance at the bibliography of core conferences held in Calgary (Eliuk and Harrison, Shell) indicates that it was 15 years ago that the ERCB and its staff first provided the free use of their facilities for a core conference for the membership of the CSPG. This, and the excellent service over the years, is much appreciated by sedimentary geologists and other friends of carbonate rocks who have spent time at the Core Research Centre.

The Core Research Centre is located in northwest Calgary in the Research Park adjacent to the University of Calgary. Over 900 visitors braved near-blizzard conditions to look at 14 exhibits and tour the spacious facility. Up to six long core tables were used to display a single exhibit, allowing over 200 metres of core to be shown; most contributors used one to three tables. As well, some contributors made use of separate rooms to show slides, while a few used personal computer terminals or video equipment as part of their displays.

In the following brief review of the displays, the affiliation of the authors and the page length of their articles in the guidebook are bracketed behind their names.

Shima and Pow (ERCB, 9) reviewed the history of Alberta core and sample storage by the Energy Resources Conservation Board. They brought us up to 1983, when 1,020,000 metres of core and cuttings representing 20,000 kilometres of drilled section were stored at the Core Research Centre, where they are available for study. Eliuk and Harrison's (Shell, 21) annotated bibliography of all Calgary area core conferences starts in 1969 and lists ten conferences. Of the total 138 displays, it is interesting to note that nearly two-thirds were on siliciclastics. The 1984 conference to a good extent corrected that imbalance.

The non-Devonian "bookends" were Aitken and Pugh's (GSC, 20) display of Middle Cambrian recurrent lithofacies from two different wells based on studies that were published previously by the Geological Survey of Canada (GSC). The other "bookend" was Harrison, Cooper and Coniglio's (Alberta Geological Survey, Shell and Memorial University, 16) review of the youngest units of the Florida Keys Pleistocene. Some of the data shown had been published earlier in the *Bulletin of Canadian Petroleum Geology* (1983, v. 31, p. 135-147), but much of the material on this widely known analogue for ancient carbonate ooid and reefal deposits remains to be published.

Three contributions examined formations of Early and Middle Devonian age outside of Alberta. Although Morrow's contribution (GSC, 2) consisted only of a figure and abstract, it presages a forthcoming paper that develops further his model of Middle Devonian (Watt Mountain) regional exposure with support from stable isotope studies. During that time, a major Florida-like groundwater system and consequent karst diagenesis of older carbonate bodies is interpreted for northeast British Columbia and adjacent areas. Clough and Blodgett (Alaska State Survey and Oregon University, 25) described a basin-to-carbonate-shelf transition from outcrops in the western Ogilvie Mountains of Alaska and the Yukon. Based on their Masters of Science theses

and considerable subsequent fieldwork, this study presented a basin model with seven major environments of deposition which is currently being evaluated for petroleum potential. An outcrop *versus* subsurface oil pool comparison was presented by Muir, Wong and Wendte (University of Ottawa and Esso, 20) for the Hare Indian-Ramparts (Kee Scarp) of the MacKenzie Mountains and subsurface Norman Wells of the Northwest Territories. Models were presented for the basin-filling sequence and reef sedimentation based on upward-shoaling that localized the position of the reefs, then affected sedimentation of the reefs on smaller second-order cycles and on a yet smaller third-order in the reef interiors. Because of the widespread nature of these cycles, eustatic control was proposed and an eight-stage growth history presented for these sediments. Another possible, controversial conclusion was that the upper Ramparts and lower Canol Formation interfinger and must be time equivalent. Double-page foldouts were used to show facies-stratigraphic sections of the reefs.

Viau, with Oldershaw's supervision, (University of Calgary, 29) presented ongoing research into the deposition and, particularly, diagenesis in the Devonian Swan Hills Formation in the field of the same name in north-central Alberta. By using cement stratigraphy, Viau argued for very early cementation resulting from the first of two pulses of upward-moving fluids. Using computer-generated maps and sections, Viau and Oldershaw put forward the idea that distribution of both pulses of cementation and morphology of the reef itself can be best explained by early (and continuing) tectonic control. Stoakes and Creaney (Esso, 16) showed the central importance of the Duvernay Formation as source of the majority of Upper Devonian Hydrocarbons in east-central Alberta. They considered the maturation of, and subsequent migration from, this widespread, organic-rich basinal carbonate unit while distinguishing two significant subfacies in core. Bloy, Hunter and Leggett (Thomson-Jensen, Westcoast, and Home, 4) presented further ongoing, (but in the proper sense) "amateur" research results in an extended abstract, with two intriguing outcrop photos of the Cairn (lower Leduc) Formation. They have been studying this biostromal/biohermal unit in easily accessible exposures above Canmore. As a result of joint fieldwork related to their separate Master of Science theses on the Leduc-age Grosmont Formation, Theriault and Cutler (formerly University of Calgary, Shell Canada and Union Oil of California, respectively, 19) compared surface and subsurface lithostratigraphy of this widespread platform unit. They showed not only that correlation between sections 115 km apart was possible but that many of the seven major facies occur in comparable positions at both localities.

Krause (Petroleum Recovery Institute, 19) provided additional insight into the subsurface Nisku "reefs" of West Pembina fame by comparing similar age deposits exposed in the Rocky Mountain Front Ranges with the subsurface. His primary conclusion was that the Nisku reefs were submarine-cemented, deeper-water lithoherms growing on the toes and lower slopes of several carbonate ramps that progressively infilled the Winterburn basin. Machel (McGill University, 34) gave more information from his ongoing thesis work to support the Nisku diagenetic model that he had presented in recent talks to the CSPG. After discussing aspects of depositional facies, diagenetic features important to understanding dolomitization, and hence reservoir characteristics, were considered. Although he listed at least four dolomite types, the most important is matrix dolomite, which was interpreted to be selective for lime mud, and leaves little intercrystalline porosity if dolomitization is complete. Observed porosity must therefore result from removal of remnant calcite. The matrix dolomite increased down dip to the southwest, and formed at intermediate burial depths from upward moving fluids of presently unknown source and nature.

Geldsetzer and Meijer-Drees (GSC, 20) provided more information on their surface and subsurface studies of the whole Devonian section on or adjacent to the western Peace River High. Although biostratigraphic work yet to be completed may result in some revision, they did present a correlation and terminology comparing the outcrop and wells, and listed many examples of cored intervals for comparison. Eliuk (Shell, 45, the longest paper, due mainly to close-up core photos, thus showing the advantages of also being the editor!), put down on paper an example of a hypothesis applied around 1977 and discussed before the CSPG Sedimentology Division in early 1981 and which seems to be becoming more and more popular – namely, that H_2S comes from the thermochemical reduction of anhydrite present within the reservoir carbonate in the deep subsurface. An interesting corollary of that hypothesis is that as the reservoir gases become more "acid" or "sour", the reservoir itself ought to become more porous as a function of total porosity-thickness. Amazingly, Eliuk had a graph which actually showed this correlation. Given the undoubtedly complicated history and processes that any reservoir-hydrocarbon couple must go through, he feels this correlation is either a fluke or a tribute to the relatively uniform deposition and diagenetic history of the Crossfield zone of the Wabamun/Palliser of the Plains/Foothills, enclosed as it is between underlying and overlying anhydrite beds.

The final Devonian display, by Alan Pedder (GSC), was the only one not to have an accompanying write-up in the guidebook. Pedder showed Devonian fossils of various ages and types, but particularly his speciality – corals – to enlighten visitors on what the creatures actually are which observers are seeing in cores.

Though the conference itself is now of only historical interest, as the first one in the ERCB's new Core Research Centre, the guidebook of 306 pages is still available for $20.00 plus $1.00 (Canada) or $2.00 (international) postage and handling if not picked up from CSPG Office at 505, 206 – 7 Avenue S.W., Calgary, Alberta, T2P 0W7, Canada. Nearly all of the articles represent new data not available elsewhere. The annotated bibliography makes the guidebook even more useful, as it lists previous displays and studies, many of which are available nowhere else.