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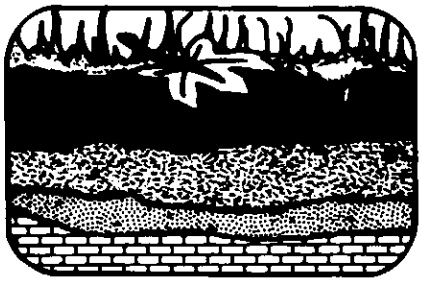
Conference Reports



Fourth Annual Central Canada Region CSRG Meeting

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The 1990 Central Canada Region Meeting of the Canadian Sedimentological Research Group (CSRG), organized by Rick Cheel at Brock University, was attended by about 40 people, and was highlighted by 17 oral and 9 poster presentations. It is difficult to imagine that one would derive much more out of a so-called "major" meeting. The green of Brock's campus was delightful and the architecture (non-alluvial) showed itself to be intricately arranged (*i.e.*, labyrinthine) and well landscaped (especially Alphie's Trough, the tavern in a ravine and site of the barbecue).

And so to science. If a prevailing theme were to be identified, it would have to be sequence stratigraphy, toward which many of the presentations were directed indirectly or blatantly. Guy Plint and co-workers (Bruce Hart and Steve Donaldson) of the University of Western Ontario gave several interesting talks on the Cretaceous of Alberta, with possible Milankovitch periodicity and (could it be?) Cretaceous glaciation. Despite the reservations of many about some aspects of sequence stratigraphy, it was instructive to see controversial concepts being evaluated *in the field*. (Similar tests will likely be a major direction in sedimentology for the next decade, contributing eventually to a revision of SEPM volume No. 42.) At least, stratigraphy is regaining its rightful place of honour. Gerry Middleton's perceptive presentation on tilting of foreland basins gave a different perspective on allocyclic controls: an antidote, he commented, to those who may be tempted to "worship at the shrine of Exxon".

Gary Yeo and Jon Devaney presented results of studies of fluvial successions from the Canadian Appalachians and Arctic, respectively. Moving south, Carlos Bruhn showed us that we have much to learn about submarine fans, with spectacular examples from Brazil. Simon Haynes took us away from clastic depositional environments by describing his work on the geology of gypsum mines in southern Ontario. Hans Meyn illustrated the complexity of sedimentary rocks of the Grenville Province.

Problems in flow dynamics received good treatment from Bill Duke and Tony Prave, the vocal and provocative US contingent. Bill suggested a solution to the "shelf turbidite" problem based on a hydrodynamic analysis: many of the so-called shelf turbidites could in fact have been produced by storm-induced oscillatory flow. Tony described antidune deposits in turbidites, in accord with the recently growing interest in antidune bedding. Indranil Banerjee raised the question of whether wave ripples formed a continuous spectrum with HCS. Bob Dalrymple discussed patterns of tidal sedimentation and bar growth in the Bay of Fundy, giving a broader view of one modern setting.

Chemical sedimentology was also well represented, beginning with Uwe Brand who illustrated in a spectacular manner some of the wizardry of geochemistry. Jennifer McKay demonstrated how depositional environment may play a role in controlling diagenesis, with an example from the Cretaceous of Alberta, and Joan Morrison presented paleo-oceanographic reconstructions based on fossil geochemistry.

Poster sessions at the meeting covered a wide range of topics. Derek Armstrong presented his summary of the Paleozoic geology and bedrock resources of the Bruce Peninsula; Indranil Banerjee illustrated a multidisciplinary study of the Cretaceous Joli Fou transgression of Alberta; Nick Bates and Uwe Brand reported a study of the biogeochemistry of Lower Paleozoic brachiopods; Rick Cheel and Gerry Middleton described an unusual transgressive surface in the Silurian Whirlpool Formation of southern Ontario; Bob Dalrymple continued his discussion of 3-D facies evolution in the macrotidal environment of the Bay of Fundy; Bill Duke and Peter Fawcett shed further light on the sequence stratigraphy of the Lower Silurian Medina Group of New York and Ontario; Mike Easton and Terry Carter presented a summary of the geology of the Grenville basement of southern Ontario; Simon Haynes described evaporites exposed in gypsum mines; and Jerry Hibbert presented results of his application of Geographical Information Systems to the Halton Till of southern Ontario.

In addition to two days of presentations, the meeting was preceded by two concurrent, one-day field trips along the Niagara Escarpment.

Bill Duke (Pennsylvania State U) led a field trip to various outcrops of the Medina Group along the Escarpment. The first part of the trip included impressive overviews of the Medina Group in the Niagara Gorge at the Robert Moses and Adam Beck Power stations and at the Lewiston Artpark, and close-up looks at lateral accretion bedding and local basal scour in the Thorold Sandstone and tidal channels in the upper part of the Grimsby Formation. Since no-one's life is complete without a visit to Niagara Falls, the trip began with a short detour to the mecca of kitsch. This also gave us a chance to rapidly acquire confidence in our driver's skill at stopping and making sharp turns on short notice.

The second part of the trip included a series of stops at exposures east of the Niagara Gorge. Features observed near the Artpark included channel fills and phosphatic lag deposits capping parasequences within the Grimsby Formation. Suncracks in

the lower part of the Whirlpool Sandstone and syneresis cracks and wave ripples in the upper part are evidence of a transition from fluvial to marine conditions in early Medina time. Hematitic ooids in the lower Grimsby Formation near Lockport provided a small thrill for the ironstone aficionados. The problem of confusion between the upward coarsening and thickening, red shale to sandstone, Town Line Road-Kodak and Grimsby-Thorold transitions, was also made apparent. A sign of our times was a chat with the US border guard who had been a geophysicist until "the oil industry went down the toilet".

The final part of the trip included two stops on the Niagara Escarpment west of the Gorge. Animated discussion, which Bill Duke had tried to provoke all day, finally erupted at Balls Falls. The argument concerned whether or not the channel fills, beautifully exposed here in the upper Grimsby Formation, were tidal. The controversy may have been fueled by the novelty of crossing the Twenty Mile Creek above the falls on sheets of plywood laid over the framework of a bridge undergoing repairs. At the Jolly Cut in Hamilton, we saw textbook ball-and-pillow structure in the Thorold Sandstone and the basinward transition from the lower Grimsby and Neahga shales to carbonates of the Manitoulin and Reynales formations. As the light filtering through the urban haze of the Golden Horseshoe was getting too weak to properly appreciate the red-green colour transitions in the Medina anymore, we headed back to St. Catharines. Although we were not unanimously persuaded by all of Bill's interpretations, we were convinced that the Medina is anything but a monotonous succession of shales and sandstones.

Carl Brett (U of Rochester) and his students, William Goodman and Steven LoDuca, led the second field trip, which examined the Silurian strata of the Niagara Peninsula. The theme of the trip was the application of sequence stratigraphy principles to this classic succession. Through detailed examination of outcrop and drillcore in the region, they have identified a number of unconformity bounded sequences. Their work is leading to a better understanding of the effect of relative sea level fluctuations and tectonic movements (*e.g.*, the Algonquin Arch) on sedimentation during the Silurian. They have also proposed revisions to the local stratigraphic nomenclature, which were presented to Silurian aficionados among the field trip participants. The 15+ field trip participants set off with box lunches and an ambitious eight-stop itinerary in hand. After a lengthy delay at the US–Canada border on the way to our first stop, we realized there would have to be some trimming of the itinerary to make it back to Brock for our pre-arranged (and pre-paid!) barbecue dinner.

At the first stop, the Robert Moses Power Plant at Lewiston, New York, Carl led us up from the red shales of the Upper Ordovician Queenston Formation, through the Silurian succession of siliciclastic Medina (or Cataract) Group, the mixed siliciclastic-carbonate Clinton Group, and the escarpment-capping Lockport Group carbonates. Carl recognizes four third-order sequences within this succession. He gave us an overview of the stratigraphy and some of the smaller order parasequences within the Medina group (Sequence I). Whirlpool Formation experts Gerry Middleton and Marg Rutka, along on the trip, helped Carl identify the non-marine to marine transition in this unit.

Highlights of the units at this first stop included: storm beds in the mudstones of the Rochester Formation; the possibly seismic-induced soft sediment deformation in the Decew Formation; cross-stratified crinoidal grainstones of the lower Gasport Member (or Formation according to Brett) of the Lockport Formation (or Group as per Brett); and 2-metre-wide stromatolitic domes in the lower Guelph Formation. Although this first stop took up the better part of the morning, it provided the participants with an excellent reference exposure (easily accessible except where fenced off around toxic seeps!) of almost the entire Niagaran succession.

Our second stop was across the Niagara River and border at the Adam Beck Hydroelectric Plant. We stopped only briefly here to see a small bryozoan bioherm at the top of the Irondequoit Formation, and the reworked top of a bioherm at the top of the Gasport Member in the Lockport Formation. Although the section here is easier to hack away at, it is not as cleanly exposed as at Stop 1 on the American side. After this stop, we ravenously consumed our box lunches at Wintergreen Flats, a scenic lookout over the Niagara Gorge.

The third stop of the trip, a railway cut just west of the Welland Canal near Thorold, illustrated the stratigraphic relationships of Brett's Sequences I-III. This section exposed the Thorold Sandstone, Neahga Shale, Merritton Limestone, and the Rockway Dolostone (the last comprising the Canadian "Reynales"). This again was a stop for Silurian stratigraphy aficionados, as Carl demonstrated that the "true" *Reynales* was missing from the section here.

For the fourth stop of the day, we crossed back over the Welland Canal and climbed up a section to an old quarry (now filled-in) where bioherms in the Lockport are well exposed in the quarry/escarpment wall. These bioherms developed on cross-stratified crinoidal grainstones in the Gasport and clearly exhibit a faunal succession from bound argillaceous micrite containing abundant thickets of bryozoans, cladoporid corals, and pelmatozoan holdfasts through to stromatoporoid and favositid coral dominated tops.

We raced the setting sun to Stop 5, the Highway 20 roadcut. The highlight at this brief stop was the inverse thickness relationship of the crinoidal grainstone unit of the Goat Island and overlying chert-rich Ancaster Beds. These units are respectively thinner and thicker here than at Stop 1. Thus, as Carl pointed out, these two units and the occurrence of the overlying Vinemount Shale in this area indicate local relative deepening during deposition of the Lockport Formation, whereas the thinning of the underlying Rochester Formation shales here indicates earlier shallowing. This illustrates another of Carl's themes, the lateral movement of depocenters during deposition of this succession.

Having made it to five of the planned eight stops, we returned to Brock University for post-trip and pre-dinner refreshments at Alphie's Trough and Carl seemed somewhat crestfallen when we found that Bill Duke's clastic field trip was still out. Simon Haynes saved the day when he pointed out to Carl that the shaley upper Decew unit which we had missed at one of the cancelled stops was exposed in the escarpment directly beneath this very watering hole. After examining the section, Carl and Simon discussed (over refreshments) tentatively calling the beds the Alphie's Trough Member of the Decew Formation.

Carl Brett's field trip was a good introduction for novices to the Niagara Peninsula, showed us a good deal of sedimentology, and provided aficionados of local Silurian stratigraphy with exciting new interpretations of the depositional history of this classic succession. All-in-all a great "two-day" field trip.

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