ALBERTA PALAEONTOLOGICAL SOCIETY

BULLETIN

VOLUME 2, NUMBER 1

MARCH 1987

ALBERTA PALAEONTOLOGICAL SOCIETY

The Society was incorporated in 1986, a non-profit organization formed to:

A. Promote the science of palaeontology through study and education.

B. Make contributions to the science by:

1) Discovery
2) Collection
3) Description, curation, and display
4) Education of the general public
5) Preserve material for study and the future

C. Provide information and expertise to other collectors.

D. Work with professionals at museums and universities to add to the palaeontological collections of the Province (preserve Alberta's heritage).

MEMBERSHIP: Any person with a sincere interest in palaeontology is eligible to present their application for membership in the Society.

Single Membership	$10.00 annually
Family or Institution	$15.00 annually

OUR BULLETIN WILL BE PUBLISHED QUARTERLY: March 1, June 1, September 1, and December 1 annually

DEADLINE FOR SUBMITTING MATERIAL FOR PUBLICATION IS THE 15TH OF THE MONTH PRIOR TO PUBLICATION.

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Meeting Room: Room 1032 (Rock Lab) Mount Royal College
4825 Richard Road S. W.
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PRESIDENT'S VIEWPOINT — CHALLENGES FOR '87 — Wayne Braunberger

1987 may prove to be an interesting year in the Province of Alberta. With the recent budget cutbacks, one may question the future of palaeontology and geology in Alberta. Within private industry, demand for geologists is at a low point and palaeontology departments have gone the way of the dinosaur. The new Tyrrell Museum has been in operation for over a year now. Will it continue to be a centre for palaeontological research or become a glorified museum with no real work done due to lack of funds? Or what about our universities, with the reduction in funding and the lack of demand for geologists--will the geology departments continue to function? Is there a future in geology/palaeontology? Only time will tell, but I believe there is. The quest for knowledge will continue, albeit at a slower pace.

What can you, the amateur palaeontologist, do? Let your views be known to government. Participate in the volunteer program of the Tyrrell Museum. Encourage young people with an interest in palaeontology/geology not to become disillusioned. Yes, the coming years prove to be interesting, not only from an economic viewpoint, but also from a scientific viewpoint. The Canada/China dinosaur project continues, new areas are under investigation for fossil resources, and new ideas and theories continue to come forward.

The coming year promises to be very exciting for the Society. As a result of discussions with members of the Tyrrell Museum, several projects are in the planning stage which should be of great interest to everyone. The Tyrrell Museum wishes to work with the Society in practical and meaningful ways. This, I feel, is a large step forward in our goal of working together with the professional palaeontologists In my own contact with the staff at the Museum I have found them to be friendly, helpful, and supportive of the Society and its endeavors.

A new Executive and Board of Directors were elected in January. Ideas and plans are being formulated for upcoming programs, field trips, and other educational aspects. Don Sabo is working hard to develop programs and educational classes. Harvey Negrich is busy putting together the field trips for the summer. As well, Harvey and a group of volunteers have been busy cataloguing the Society's fossil collection.

The Society's library is presently at the home of our librarian, Karen Weinhold, but we have recently acquired storage space at Mount Royal College to provide easy access for all members. The fossil collection will also be kept at Mount Royal once cataloguing is complete.

Spring is almost upon us and thoughts once again turn to the great outdoors. Soon the fossil collecting fraternity will be out in full force. I ask you to use caution when out on your trips as many of the areas are dangerous. I would urge all collectors to document their finds so they may retain their scientific value. If you haven't already done so, I recommend that you obtain a copy of the Alberta Historical Resources Act and be familiar with the regulations concerning fossils.

Best of luck for the upcoming season, and good hunting!

PROGRAMS Don Sabo

Since the last issue of the "Bulletin" we have had a variety of interesting and well attended programs. For the months of March, April and May three very interesting guest speakers are lined up, covering a wide range of topics. This will be followed by the summer break; no regular meetings are scheduled for June, July and August.

The December meeting, a social evening with no planned program, was spent discussing topics of interest among members and enjoying the refreshments provided.

For the January meeting we were entertained by two films loaned to us by the Tyrrell Museum, "Fossils: Clues to the Past" and "Charlie".

For the month of February we were very fortunate in having Dr. Philip Currie, Assistant Director in charge of Research & Collections, Tyrrell Museum, present an enlightening program on the current activities and future plans of the Tyrrell Museum of Palaeontology

I wish to thank Dr. Currie once again for taking time out from his busy schedule to speak to us and for his assurance that he would return at a future date.

Forthcoming programs:

March 20: Dr. Paul Johnston, Curator of Invertebrate Palaeontology for the Tyrrell Museum will be speaking on Invertebrate Fossils of Australia.

April 24: Andy Neuman, Collections Manager for the Tyrrell Museum will be presenting a program on the Fossil Fish of Wapiti Lake, N. E. British Columbia.

May 22: Wayne Haglund, Chairman of the Department of Geology and Petroleum Sciences for Mount Royal College will present a program on an invertebrate fossil group.

At this time I would ask that any member who would be willing to present a program, or has any ideas concerning future programs, please contact me at 238-1190.

EDUCATION:

The Society has obtained the use of the Rock Lab, Mount Royal College under the Continuing Education Program, for the first Friday of the months of March, April, May, October, November and December, hours 7.00 p.m. to 10.00 p.m. Jonathon Greggs, Assistant Instructor for the Geology Department at Mount Royal College will be on hand to show members what equipment is available and offer operating instructions. He will also offer guidance on fossil identification and preparation techniques.

This is our first attempt at setting up an educational program so any comments or suggestions would be greatly appreciated.

The cost of these monthly workshops is $20.00 for six evenings, or $5.00 per evening. Cost includes instruction and the use of all equipment (see following list).

Please help to make these evenings a success by participating in the program and making use of equipment that you would not otherwise have the opportunity to use.

* * * * * * *

THE FOLLOWING EQUIPMENT IS AVAILABLE FOR MEMBERS OF THE ALBERTA PALAEONTOLOGICAL SOCIETY, DURING THEIR REGULAR LABORATORY EVENINGS:

Rock saws, with diamond blades, 2
Trim saws, with diamond blades, 2
Lap wheels, 220 and 600 grit
Crusher
Foredom drills, with nonpercussion hand pieces, 5
Microscopes:
- 12 Fisher Stereomasters, 10x and 30x
- 20 Zeiss Binoculars, 10x to 100x
- 5 Zeiss/Kyowa petrographic microscopes, to 400x (thin sections only)

Camera, 35mm SLR, with 50mm and 80mm macro lenses, and microscope (binocular and petrographic) accessories.
Photographic lights, 150 watt photoflood, 2
Ultrasonic cleaner
Ultraviolet lamp
Sieve sets, and sieve shakers
Manual rock splitting equipment
Electronic balance
Hot plates
Assorted glassware
Table top furnace (to 100°C)
Overhead projector

By prior arrangement, during business hours:

35mm slide projector
16mm film projector
VHS, Beta, or 3/4" VCR and monitor
Video camera and monitor
Video camera and monitor for microscopes

Please note: ALL consumable supplies including, but not limited to:

- Drill and grinder bits
- Grinding/lap powders
- All chemicals, solid or liquid
- Photographic (and other) film
- Glass slides and coverslips
- Photocopies
- Storage trays

must be supplied by the individual, or the Society

THE STUDY OF MICROVERTEBRATES IN DINOSAUR PROVINCIAL PARK PROGRESS AND PROSPECTS

By: DR. DON BRINKMAN

Microvertebrate sites are localities in which small fossil bones and teeth have become concentrated. They have played an enormous part in developing our understanding of life in the Upper Cretaceous, because thev predictably include the remains of small, rare animals that are otherwise unknown. Recently it has been found that they are an important source of paleoecological information. In this report, I will describe some of the work that has been done on microvertebrate sites in Dinosaur Provincial Park and some of the work currently underway at the Tyrrell Museum of Palaeontology.

The importance of microvertebrate sites in Dinosaur Provincial Park was first recognized in 1966 when Jane Colwell (Danis), working for Richard Fox of the University of Alberta, began prospecting for mammal localities. Fox had started working at the University of Alberta in 1965. One of the first things he did was go through the collections that were already there. In a tray of fossil bones from the Dinosaur Park simply labeled "Railway Grade", he found two mammal jaws. This was pretty exciting stuff at that time. Mammal specimens were rare, and only eleven specimens were known from Dinosaur Park prior to that time. Due to previous commitments, he was unable to follow up on this discovery, but Colwell had the opportunity to spend time in the field. Going only on the label and a map of the park, she found one of the richest microsites yet located in Dinosaur Park. She spent the following three summers surface collecting from this locality and prospecting other areas in the park with notable success. By the time she had finished, the number of mammal specimens known from the area of the park was increased by an order of magnitude. This material, along with specimens collected by Fox in other localities, was published on by Fox in 1978 and 1980.

Researchers working elsewhere about this time had developed a new method for collecting from microsites involving underwater screenwashing. Bags of rock are dug out of a microvertebrate site, put in wooden boxes with screens on the bottom, and left to soak in the river for a few days. In most localities, the rock will break down and wash away, leaving the fossils and other solid particles such as ironstone pebbles in a highly concentrated matrix. The fossils are then picked out under a microscope. A large volume of material can be processed relatively easily this way, and large collections made. Fox tried screenwashing the Railway Grade locality, but results were disappointing. The discovery of richer localities near Medicine Hat and localities from a lower formation resulted in his attention being directed elsewhere.

Work on microvertebrate sites in Dinosaur Provincial Park did not stop however. Peter Dodson, a student studying under Fox, continued to work there. Dodson wasn't trying to find out what animals were there, but how they came to be preserved. the study known as taphonomy. He noted that microsites generally contained the hardest, most resistant parts of skeletons such as teeth and scales, and were generally preserved at the base of sandstones along with clay pebbles. This is the kind of rock that would have been laid down in rivers, so Dodson interpreted microvertebrate sites as lag deposits at the base of rivers.

Dodson published his results in 1971. Work on microsites in Dinosaur Provincial Park was restricted to limited surface collections until 1979, when Phil Currie, then curator of vertebrate palaeontology at the Provincial Museum of Alberta, started to work in Dinosaur Park. One of the first studies that he initiated was a survey of the resources of the park, and as part of this survey, he started recording the occurrences of all kinds of fossil bones. He noted that isolated bones are far more abundant than articulated dinosaur specimens, and that the isolated bones often occur in bonebeds. Thus the resources of the park could be, to a large extent, documented by mapping the bonebeds and noting what kinds of fossils they contain. Microsites were considered a particular kind of bonebed and they were mapped as well. In the first year of study, over 20 microvertebrate sites were mapped.

Currie was primarily interested in how animals lived. He recognized that a great deal of paleoecological information could be obtained from the study of bonebeds. One study he initiated has led to the recognition that some kinds of dinosaurs were probably herding animals. He soon started to wonder what kind of paleoecological information could be obtained from a study of microsites. Dodson, now a professor at the University of Pennsylvania, started working on this question.

Dodson's approach was to collect from as many sites as possible, count the remains of the different kinds of animals represented in the collections, and compare the counts from the localities to see if there were differences in the kinds or relative abundance of animals. The first year he collected from five localities, and in following years he increased the sample size to 24 localities. He grouped animals into general categories, such as fish, crocodiles, turtles, and so on, and compared the abundance of each group from the different localities. He found that there was a strong consistency in the relative abundance of different kinds of animals. A few sites were anomalous in one feature or another, but overall, a single pattern emerged. Dodson was particularly interested in the dinosaur communities, and wanted to know how abundant the different kinds of dinosaurs were at the time the beds were being laid down. Counts of articulated specimens had already been made, so he compared the relative abundances as indicated by remains in microsites, to the relative abundance as indicated by articulated remains. He found a strong correlation. One exception was noted: pachycephalosaurs, the dome headed dinosaurs, were more abundantly represented by articulated specimens than by remains in microsites. The abundance of pachycephalosaurs as articulated specimens is largely a result of the very tight suturing of the bones of the skull roof. Excluding this animal from the analysis, the relationship between the proportions of articulated dinosaur remains and isolated remains in microsites is particularly close.

In 1985, Staff of the Tyrrell Museum started a programme of study of microvertebrate sites in Dinosaur Park based on screenwashing. This study had a number of objectives: to document the diversity of fish in the formation, to collect isolated examples of small reptile skull bones that could be used for anatomical studies, and to extend Dodson's study of the paleoecology of the park by focusing particularly on aquatic communities.

Some surprising results concerning the diversity of fishes in the park were soon realized. Scales of a primitive fish not previously described were found to be one of the most abundant kinds of fish represented (Fig. 1). Fortuitously, a partial skeleton was found about this time by Maurice Stefanuk in younger beds in the Drumheller area, so it was possible to associate isolated skull bones with these scales, and to begin to get an idea of what the fish looked like. It is still largely unknown, but fish described from Western China (Fig. 2) are probably related. This represents an interesting connection between Alberta and China fossil assemblages that may be part of a larger pattern of similarity in the kinds of animals found in rocks of similar age in these two places. Other kinds of previously unknown fish are also being identified. A number of distinctive types of jaws of unknown kinds of fish are also encountered (Fig. 3). Recently a skeleton of a fish collected in Dinosaur Park was located in collections of the Royal Ontario Museum, and this indicates the presence of an additional kind of fish related to the living Goldeye.

A few examples of isolated turtle skull bones were located during the screenwashing, but in general they are rare. Isolated pieces of shell can be common, however, and through study of articulated specimens, different kinds can be recognized and used in the faunal comparisons.

The paleoecological study follows that of Dodson's in that it is based on counts of different kinds of elements from as many localities as possible. The sedimentology of each locality is being studied by Dave Eberth of the Tyrrell Museum. So far, eighteen localities have been sampled, and 20,935 elements counted and identified.

Although the results are preliminary, an interesting pattern is emerging. It is found that microvertebrate localities occur in a number of environments of deposition, not just at the base of large sandstones. Stratigraphic trends in the abundance of animals have been recognized. In particular, in comparison to salamanders, teleost fish are decreasing in abundance (Fig. 4) and the ray, *Myledaphus*, is increasing (Fig. 5). It is suspected that these changes may reflect an increase in the tidal influence towards the top of the Judith River Formation. Emlyn Koster, Director of the Tyrrell Museum, looking at the general sedimentology of the beds exposed in the park, has identified this as an overall stratigraphic trend. Also, significant associations in the relative abundance of different kinds of animals have been identified. The degree to which different animals, or groups of animals tend to be associated in their abundance is shown in a branching diagram (Fig. 6). Two major groups of animals are present. *Myledaphus* and crocodile remains are particularly strongly correlated in their abundance; where one is abundant the other is also abundant, and where one is rare the other is also rare. It is suspected that these groups of animals represent animals that lived in similar environments and that their abundance reflects the proximity of that environment to the site of deposition of the microsite.

It will take at least two more field seasons before these patterns are fully understood. Once this is done, it will be possible to consider broader issues such as the geographic distribution of animals in the Upper Cretaceous, change in diversity through the Upper Cretaceous and into the Tertiary, and the evolution of particular animals, from an ecological perspective. Ultimately, it is hoped that this will provide a better understanding of the processes that lead to change in organisms through time.

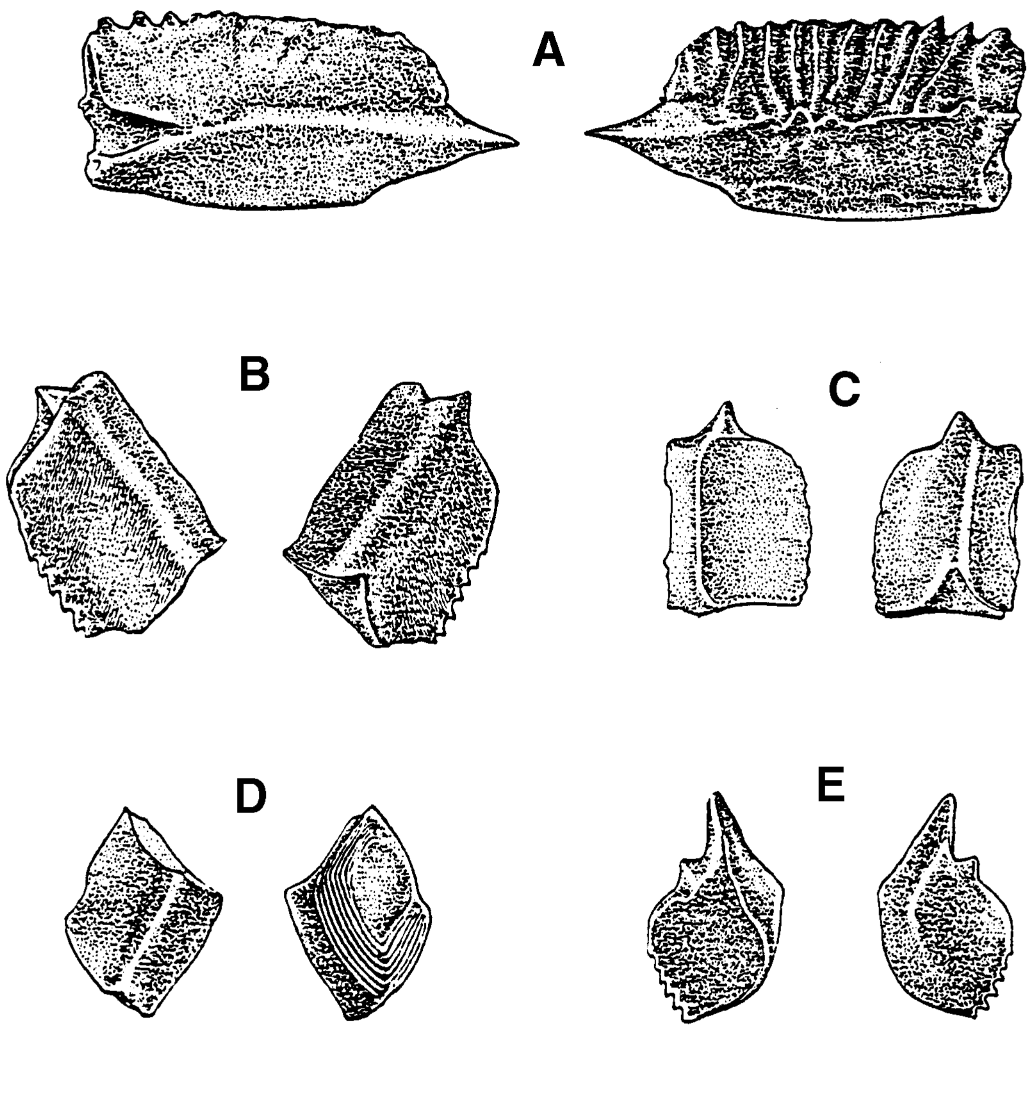

Fig. 1 Fish scales from microsites in Dinosaur Provincial Park.

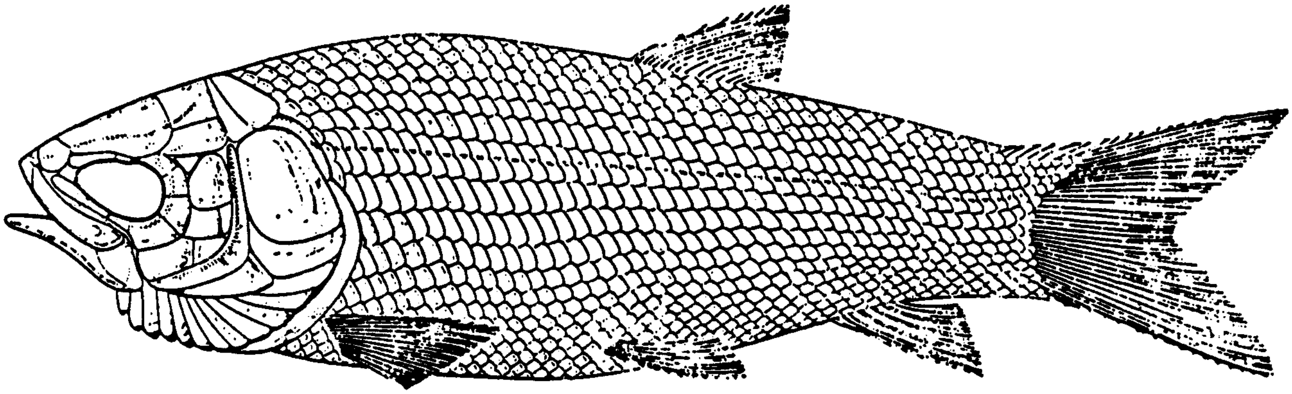

Fig. 2 Siyuichthys ornatus, a fish from Western China possibly related to fish from Alberta with scales shown in figure 1.

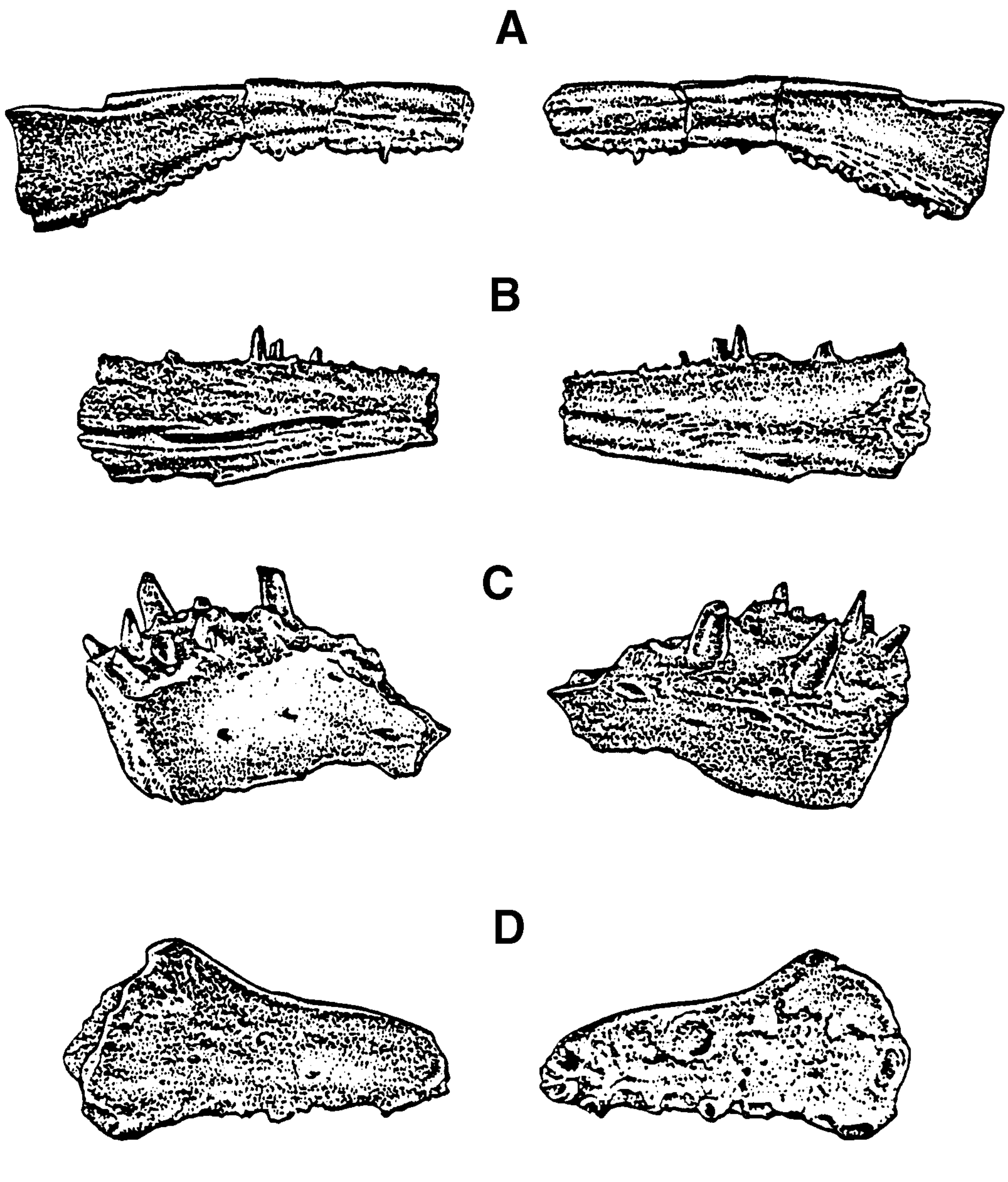

Fig. 3 Fish jaws from microvertebrate sites in Dinosaur Provincial Park.

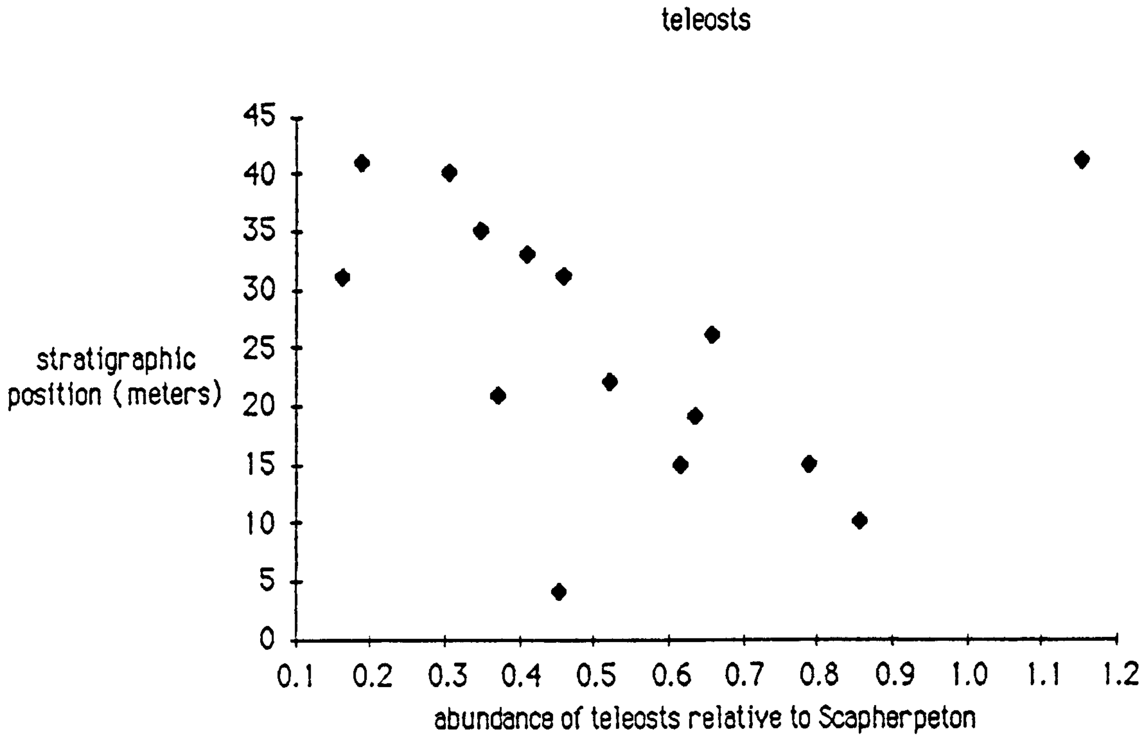

Fig. 4 Graph showing the change in abundance of teleost fish relative to the salamander _Scapherpeton_ thoughout the stratigraphic section exposed in Dinosaur Provincial Park.

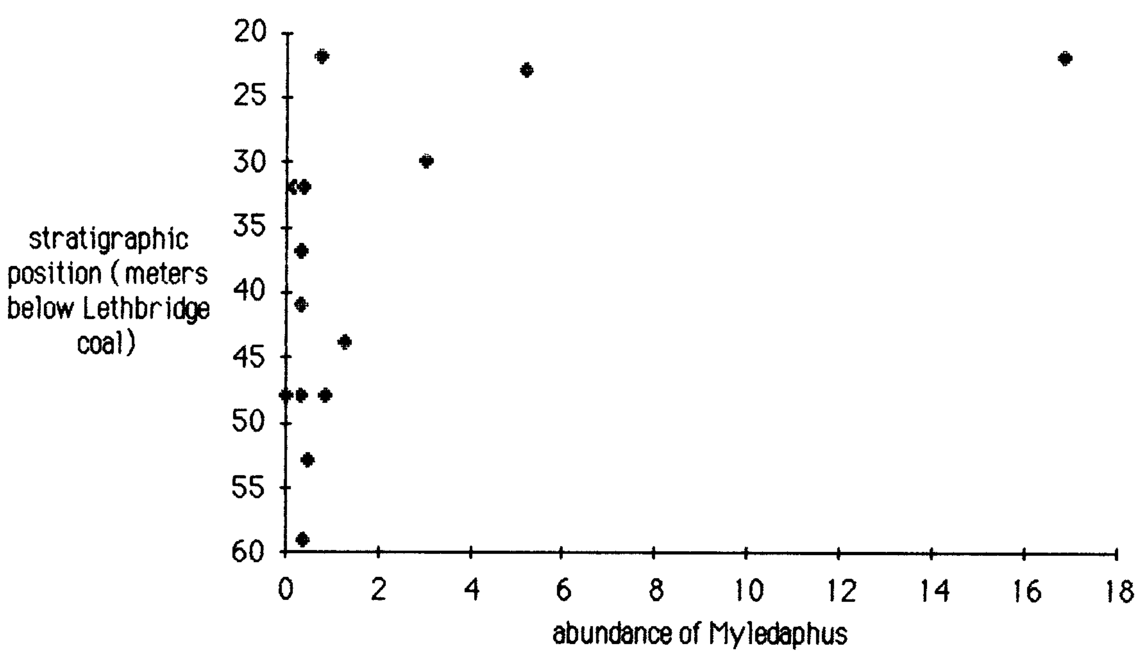

Fig. 5 Graph showing the abundance of _Myledaphus_ relative to the salamander _Scapherpeton_ throughout the stratigraphic section exposed in Dinosaur Provincial Park.

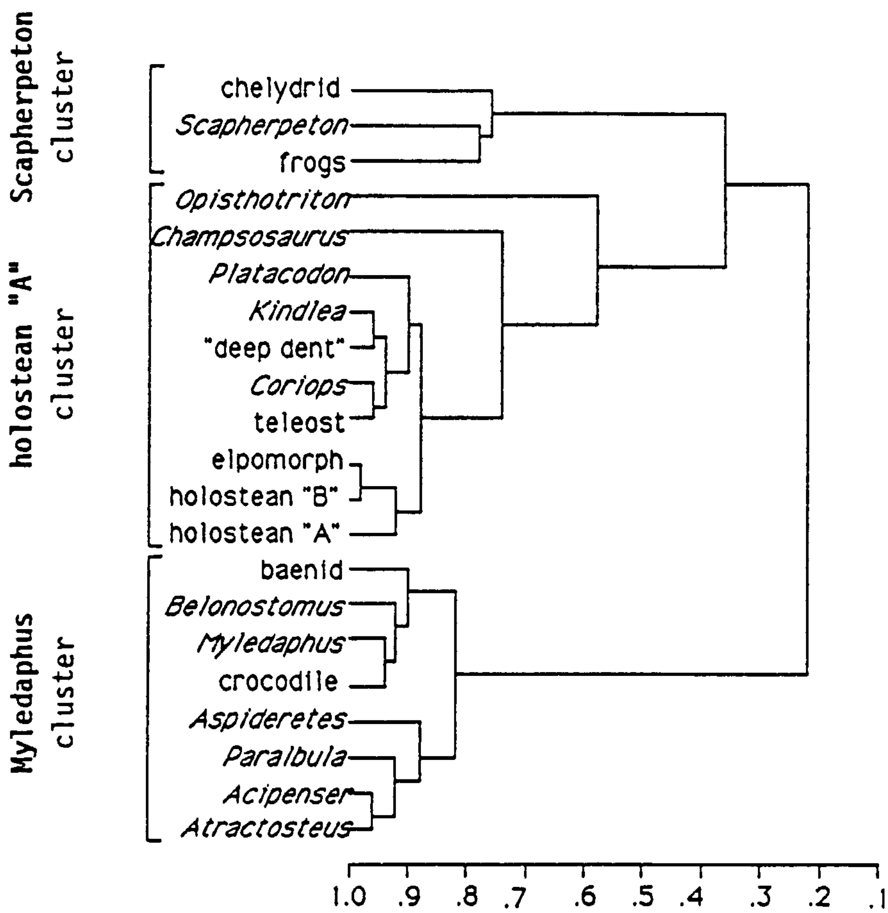

Fig. 6 Cluster analysis of aquatic animals from microvertebrate localities in Dinosaur Park, showing groups of animals that tend to occur together. The scale is the correlation coefficient, and indicates the level of correlation of each group.

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BONEBED EXCAVATION - MIDLAND PROVINCIAL PARK

The Society has been offered the opportunity of providing the manpower for excavating the bonebed that is located behind the Tyrrell Museum within the network of walking trails. This activity would be over the summer months and primarily on the weekends. This project presents an excellent learning opportunity. You will be able to learn field collection methods, preservation techniques, and specimen documentation. Training will be provided by the Tyrrell Museum. Anyone who is interested should contact Wayne Braunberger in Calgary at (403)278-5154.

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TRILOBITES Courtesy of Western Interior Paleontological Society

Trilobita, a highly significant Class member of the Phylum Arthropoda, somewhat resembling the modern horseshoe crab Limulus, are, or were, a strictly Palaeozoic group of marine arthropods They are ancient relatives of modern insects and probably descendants of very ancient annelid worms. Trilobites were a dominant form of invertebrate life in the early part of the palaeontological record. Their remains are often abundant and widely distributed in shallow sea deposits of Cambrian and Ordovician times, less numerous in formations of Silurian and succeeding Palaeozoic periods. A few genera persisted into Permian time. By the end of the Palaeozoic Era they were extinct.

Their beginning? The variety and complexity of trilobites found in the early Cambrian rocks surely indicate a very long antecedent existence, probably as much as 100 million years during which the first arthropods became differentiated to have the forms found so abundantly in the Cambrian.

Trilobites (Greek treis (tri), three, lobos (lobe) have three longitudinal divisions that they owe their name to: a central axial lobe and two lateral or pleural lobes, (Greek pleuron, rib). They also have three distinctive transverse divisions: cephalon (head), thorax, and pygidium (tail), but the name comes from the longitudinal lobes. Trilobites are very diverse and more than 10,000 species have been described. They range in size from a few millimeters (0.25") to nearly 75 mm. (30"). Most are 2 - 7 cm. (.8" to 2.7") in length.

The hard parts of a trilobite, which generally are the parts preserved as fossils, consist of mineral-impregnated portions of its chitinous covering. These cover the back (top) or dorsal side and marginal parts of the lower or ventral side. This exoskeleton is composed of calcium carbonate and calcium phosphate in varying proportions.

Most fossil remains of trilobites are shed exoskeletons (exuvia), for by having a hard unyielding external covering they could only grow by molting. At each time of molting the hard exoskeleton splits open (a process called ecdysis), so as to release the imprisoned animal, allowing an increase in growth. With the trilobites this splitting occurs at the cephalon along weak lines called sutures. The animal then crawls forward shedding the carapace or shield. Each individual trilobite molts its exoskeleton and secretes a new and larger one periodically during growth, thus one animal might leave several fossils.

Preservation. Trilobites are found either with their mineralized exoskeleton preserved, or as external or internal molds. Fossils consisting of preserved hard parts may show little or no change in composition of the original exoskeleton, or alternatively, the substance of the exoskeleton may be replaced partly or wholly by silica, pyrite or other mineral substances. Complete specimens of trilobites are found frequently, either outstretched or enrolled, but commonly the remains consist of detached portions of the cephalon, free cheeks, appendages, pygidium, etc. Exceptionally well-preserved specimens with their fragile ventral appendages preserved, however, have been found in black shales and in extremely fine-grained limestones. Two famous black shale localities are the Budenbach shale (Devonian) in Germany where soft portions are preserved by pyrite replacement and the Burgess shale (Middle Cambrian) in British Columbia where the fossils are impressions and films of carbon that show both outer shapes and internal structures in amazing detail. Silicified specimens found in limestone can be completely separated from the matrix by dissolving away the limestone with acids. Trilobites that could enroll themselves did so to protect their soft underparts much like modern "sow" bugs. Enrolled specimens are believed to be trilobites that were buried whole.

Classification of trilobites historically has been related to morphological features of the hard parts such as the cephalon facial sutures, possession and structure of eyes, characters of the pleurae, number of thoracic segments, size of the pygidium, others. Their eyes could be simple, or absent altogether, or compound. Some with the many-faceted eyes contained up to 15,000 perfect lenses. This enabled the animal to see in all horizontal directions at one time.

Trilobites were part swimmers, part crawlers and part burrowers; occupying a strictly marine habitat. In crawling the jointed appendages dug into the sand or mud and spines cut sharp furrows, leaving well defined traces.

Trilobites can be found in Colorado, particularly where outcrops of the Manitou, Minturn and Peerless formations occur. But these are difficult hunting and one must know his stratigraphy. A few localities are: Front Range west of the Air Academy; Molas Pass near Durango; Williams Canyon by Cave of the Winds. More prolific areas for collecting are in the Midwest States.

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A recent publication dealing specifically with Cambrian trilobites of Alberta is now available. This publication is No. 3 in the series PALAEONTOGRAPHICA CANADIANA

Trilobites of the Upper Cambrian Sunwaptan Stage, southern Canadian Rocky Mountains, Alberta
by Stephen R. Westrop

Highly technical but an excellent reference source for the more advanced student.

Available from:

Canadian Society of Petroleum Geologists
#505, 206 - 7th Avenue S. W.
Calgary, Alberta
T2P 0W7

Price: $25.00 (soft cover)

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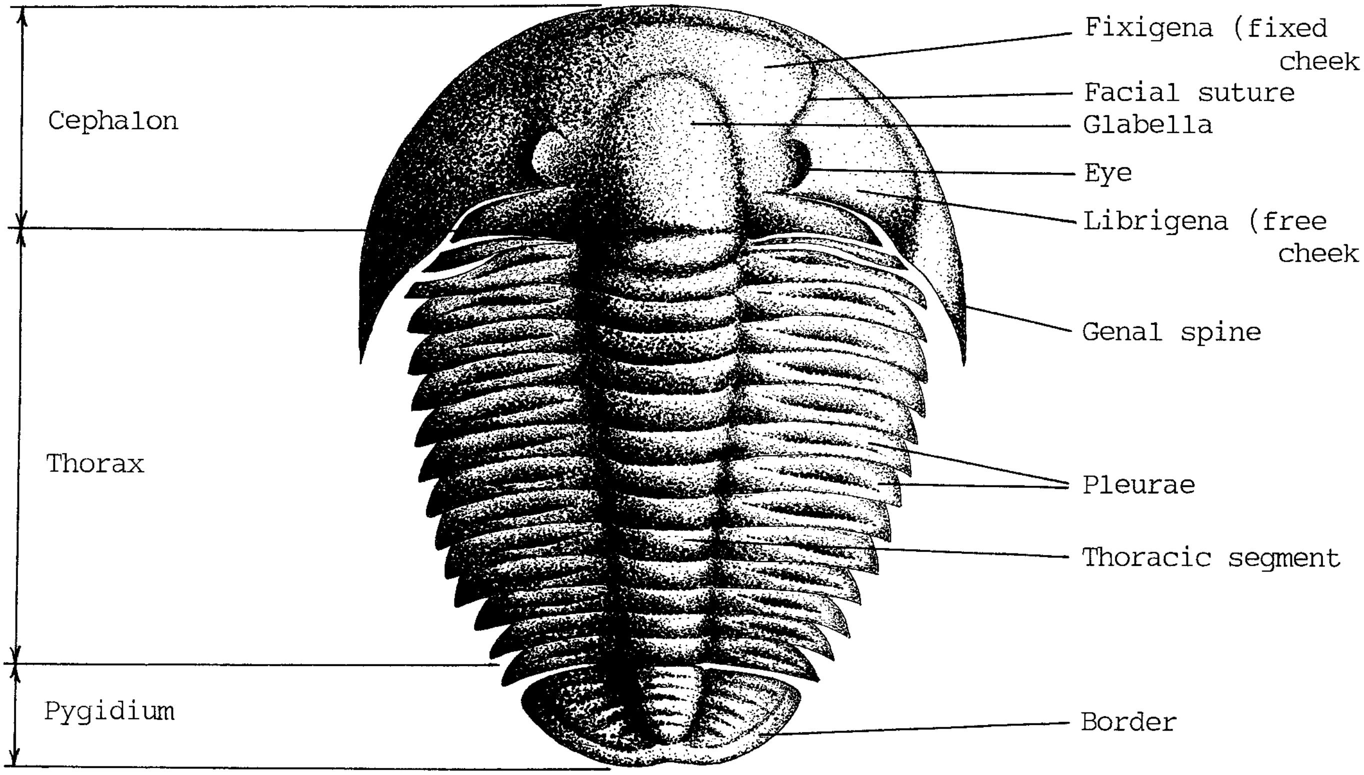


Elrathia (x2)

ANTELOPE SPRINGS, UTAH

By Geoff Barrett

Several miles to the west of the small town of Delta, situated in Millard County, Utah, lies one of the richest trilobite localities in the world. This area, which constitutes part of the arid mountainous region known as the House Range, contains several outstanding fossiliferous horizons of Middle Cambrian age, the most widely known of these being the Wheeler Shale.

The type locality of the Wheeler Shale occurs in the broad, natural amphitheatre known, not unreasonably, as the Wheeler Amphitheatre, encompassing an area whose name is synonymous with the word trilobite, Antelope Springs. The mere mention of the name is guaranteed to bring a tear to the eye of the trilobite enthusiast.

The area was first discovered by members of the King Survey during the late 1860's, although the trilobites were known to prehistoric Indians, as evinced by the occurrence of drilled trilobites (presumably used as amulets or charms) associated with other artifacts found at ancient burial sites.

Interest in the fossil resources of the area has intensified to the point where there are now several commercial trilobite guarries operating under a State Lease. The best known of these quarries is operated by Mr. Bob Harris of Delta, Utah, who has excavated and prepared over 1.5 million specimens since he began operations in 1960. The specimens are much sought after by collectors and institutions around the world.

My own opportunity to pay homage at this shrine of the trilobite came during the late summer of 1985, being drawn back to the area after realizing the potential from a previous very brief visit.

A group of friends, namely Harvey, Wayne, Don and myself (APS members) decided that for a short summer break we would launch a small scale expedition into some relatively inaccessible area. Our original plan had been to travel by road and helicopter to a remote area of N.E. British Columbia, thus being prepared for cold, wet weather conditions and equipping ourselves accordingly. However, due to the vagaries of the Canadian climate, British Columbia experienced a blistering, rainless summer resulting in raging, uncontrollable forest fires in the area of our intended destination.

This necessitated an abrupt change of plan, and so it was that on a bright, sunny August morning, equipped with our arctic supplies, we headed south to the Utah desert.

Our means of transport was a 12 seater Bonneville GMC Van with all but four of the seats removed to provide room for our equipment, and more importantly, room for our fossils for the return journey.

The drive from Calgary took approximately two days, staying overnight on organized campsites, allowing us the luxury of a hot shower. Anyone who has ever slept four to a tent will appreciate the need for such luxuries.

We made one brief detour at Brigham City to call upon the Gunthers (Lloyd and Val) whose work on Middle Cambrian faunas is almost legendary. Their devoted service to the science of palaeontology has been recognized by several major institutions, including the Smithsonian. They were more than happy to show us their own magnificent personal collection and generously provided us with information on collecting sites around Antelope Springs.

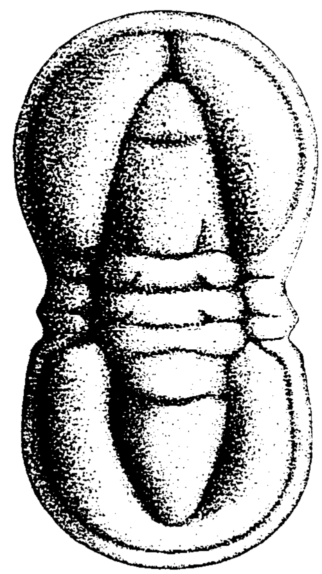
Back on the road once more we finally arrived at Antelope Springs in time to witness a beautiful sunset. Disaster struck immediately and we were compelled to set up an impromptu campsite at the bottom of a deep gully into which a certain team member had driven us and was, of course, unable to get us out.

Prior to our departure we had phoned Mr. Harris to advise him of our intended visit and he very generously extended to us the privilege of collecting in all but his current working quarry. The abandoned excavations which are dotted around the area are still extremely rich in trilobites. To re-work one of these excavations is to guarantee a fine collection, primarily the ubiquitous Elrathia kingi (see sketch) for which the area is famous and, to a lesser degree, Asaphiscus and agnostids. These trilobites are found in a highly calcareous fissile shale which rapidly weathers to a grey mud. A diligent search of this mud will turn up literally hundreds of small, matrix free trilobites, much sought after by jewelry makers. Other fossils include brachiopods (Acrothele) and sponges (Choia).

Acting upon information supplied to us by the Gunthers and, under the guidance of an amiable character named Isaac whom we encountered in the area, we were able to visit several other locations each exhibiting a diverse and prolific fauna.

The first of these, less than a half mile south of the Harris quarry, is crowded with the small agnostid trilobite Peronopsis. The agnostids were small, blind trilobites possessing only two thoracic segments, the cephalon and pygidium being of almost equal size.

Travelling further to the south, an exposure of thinly bedded fine grained mudstone is crowded with imprints of the much larger trilobites Bathyuriscus and Ogygopsis which, whilst not exhibiting the spectacular state of preservation as the specimens at Antelope Springs are of interest if only for the variety and sheer volume of numbers. In the immediate area an exposure yielding well preserved Elrathia kingi and the agnostid Ptychagnostus is unusual in the fact that the trilobite carapace exhibits a pink coloration, as opposed to the black coloration normally associated with the Antelope Springs trilobites.



Ptychagnostus (greatly enlarged)

Another exposure we visited exhibits a faunal content of rare and unusual creatures, most notable of which being the eocrinoid Gogia. The eocrinoids were a group of primitive echinoderms known only from Cambrian and Ordovician rocks, their physical appearance being not unlike that of their close relative, the crinoid.

Other oddities at this site include the mollusc? Hyolithes and carapaces of the primitive crustacean, the phyllocarid (leaf shrimp).

Collecting activities were usually confined to the morning and late afternoon, the heat at mid-day being almost unbearable. At this time, as temperatures soared above the 100°F mark, we would seek the shelter of a convenient tree and consume our supplies of hot chili or Irish stew.

Apart from the occasional encounter with a scorpion or lizard, or being "buzzed" by large, black, armour plated insects with a three foot wing-span (or so they appear), our brief sojourn at Antelope Springs was pleasant and without incident, and we were all somewhat reluctant to depart this wild but beautiful area.

Our trip then took us into Wyoming to visit the famous fossil fish beds of the Green River Formation, but that's another story.

* * * * * * *

For those intending to visit Antelope Springs, or anyone with an interest in the unique fauna of the Middle Cambrian, an invaluable book is available:

BRIGHAM YOUNG UNIVERSITY
GEOLOGY STUDIES VOL. 28, PART 1

Some Middle Cambrian Fossils of Utah
by Lloyd F. Gunther & Val G. Gunther

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DATES TO REMEMBER:

March 20, 1987	General Meeting, Room 1032 Mount Royal College
April 3, 1987	Class - Room 1032 Mount Royal College - Subject to be announced
April 24, 1987	General Meeting, Room 1032 Mount Royal College
May 1, 1987	Class - Room 1032 Mount Royal College - Subject to be announced
May 22, 1987	General Meeting, Room 1032 Mount Royal College
June 20, 1987	Field Trip No. 1 - Location & details to be announced
July 18, 1987	Field Trip No. 2 - Location & details to be announced
August 22, 1987	Field Trip No. 3 - Location & details to be announced
Sept. 18, 1987	General Meeting, Room 1032 Mount Royal College

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PLEASE NOTE OUR NEW MAILING ADDRESS FOR ALL CORRESPONDENCE, EXCHANGE BULLETINS, MEMBERSHIPS, ETC. IS:

ALBERTA PALAEONTOLOGICAL SOCIETY
P. O. BOX 7371, STATION E
CALGARY, ALBERTA, CANADA
T3C 3M2

ALBERTA PALAEONTOLOGICAL SOCIETY MEMBERSHIP AS AT MARCH 1, 1987

Names and contact information removed to protect members' privacy.

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to protect members' privacy.

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TYPE CATEGORIES USED BY THE GEOLOGICAL SURVEY OF CANADA — By Harvey Negrich

Often, while reading through the published literature of the Geological Survey of Canada, one comes across the words HOLOTYPE, LECTOTYPE and others. These are terms used by the professional people to describe the type of specimen on which they have based their work. When reviewing this literature a better understanding of these terms is helpful. As amateurs we do not see these often enough to remember them, so I keep a list beside my desk at all times.

For the convenience of our readers the list of commonly used terms is as follows:

HOLOTYPE - A single specimen taken as a TYPE by the original author of a species.

PARATYPE - A specimen or specimens, supplementary to the Holotype, used by the author as the basis of a new species.

SYNTYPE - One of several specimens of equal rank upon which a species is based, no one specimen being designated as the Holotype.

LECTOTYPE - A single specimen selected from a Syntype series, subsequent to the original description, to serve as the Holotype.

NEOTYPE - A specimen preferably from the original locality and stratigraphic horizon selected to replace the Holotype if the latter is lost or destroyed.

HYPOTYPE - A described, listed or figured specimen.

(Fig. Spec. - Various figured specimens.

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