SILURIAN AND DEVONIAN HETEROSTRACI (VERTEBRATA) OF THE CANADIAN ARCTIC ARCHIPELAGO

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ABSTRACT

Late Silurian and Early Devonian heterostracans representing eight orders are described from localities on Bathurst, Cornwallis, Ellesmere, Prince of Wales and Somerset islands and Boothia Peninsula in Nunavut, and also the Yukon and Northwest Territories. Much of the fauna comes from Cornwallis and Prince of Wales islands and mainly from the Cape Phillips, Peel Sound, Somerset Island and Drake Bay formations. The heterostracan faunas range in age from middle Silurian (early Wenlock) to the Early Devonian (late Lochkovian) and are mostly dated by co-occuring graptolites. They thus encompass both the earliest known heterostracans and the period of their greatest diversity.

The Arctic strata yielding the vertebrates described here comprise the Cape Philips, Cape Storm, Douro, Somerset Island, Devon Island, Drake Bay and Snowblind Bay formations. The Cape Philips Formation is a unit of graptolitic shales and siltstones that forms part of the Early Paleozoic Franklinian Margin passive margin succession and ranges from Late Ordovician to Late Silurian in age in Cornwallis Island. It was deposited in relatively deep water, the sea floor deepening to the northwest during deposition. To the south there is a facies change into carbonates which include the Allen Bay, Cape Storm, Douro and Barlow Inlet formations. The Drake Bay Formation is present in western Prince of Wales Island where it lies unconformably on the Douro Formation. It consists of shales and carbonates and forms the western equivalent of the Peel Sound and Somerset Island formations. The lower Member of the Peel Sound Formation represents deposition of a series of coalescing deltas that prograded westward from the tectonic high of the Boothia Uplift. The Upper Member has been divided into five northerly trending facies belts grading from conglomerates in the east to the western carbonates now named the Drake Bay Formation and all were deposited in shallow marine environments. The Somerset Island Formation is the lateral equivalent of the Lower Member of the Peel Sound Formation on Somerset Island.

The heterostracans comprise eight orders of which two are new (Listraspidiformes, Natlaspidiformes); eleven families of which five are new (Jarvikaspididae, Listraspididae, Rimasventeraspididae, Westollaspididae and Toraspididae); eight subfamilies of which seven are new (Pionaspidinae, Paralaspidinae, Prionotaspidinae, Anglaspidinae, Nahanniaspidinae, Teleaspidinae,and Eumorphaspidinae); 37 genera of which 21 are new (*Genetaspis*, *Jarvikaspis*, *Thuleaspis*, *Prosobranchiaspis*, *Paralaspis*, *Kyphaspis*, *Prionotaspis*, *Pseudoanglaspis*, *Teleaspis*, *Eumorphaspis*, *Trygonaspis*, *Denisonaspis*, *Anomalaspis*, *Whiteaspis*, *Orthogoniaspis*, *Toraspis*, *Westollaspis*, *Soehnaspis*, *Geissonaspis*, *Idanaspis and Aenigmaspis*); and 66 species of which 52 are new (*Genetaspis incohata*, *Jarvikaspis arctica*, *J. mauryensis*, *Thuleaspis canadensis*, *Archegonaspis cornwallisensis*, *Vernonaspis parryi*, *V. suffusca*, *V. magna*, *Pionaspis ebenina*, *P. rossi*, *Prosobranchiaspis prolatata*, *P. smithbayensis*, *Paralaspis franklini*, *Kyphaspis boothiaensis*, *Prionotaspis miranda*, *Prionotaspis*? *abbottensis*, *Pseudoanglaspis aquilonaris*, *P. minima*, *Dinaspidella elegans*, *D. tenuicostata*, *Nahanniaspis mclintocki*, *Teleaspis tersa*, *Eumorphaspis borealis*, *E. lata*, *E. solitaria*, *E. goodsiri*, *Ariaspis cristata*, *A. nassichuki*, *A. multijubata*, *A. majuscula*, *A. perryi*, *Arctictenaspis borealis*, *Trygonaspis sicula*, *Canadapteraspis formosa*, *C. uniformis*, *Denisonaspis borea*, *Rimasventeraspis septentrionalis*, *R. halsteadi*, *Traquairaspis longicarinata*, *T. pristina*, *Anomalaspis lacruma*, *Whiteaspis spinifera*, *Orthogoniaspis magnijubata*, *O. loeffleri*, *Toraspis somersetensis*, *Westollaspis hyperborea*, *W. cordata*, *W. gigas*, *Corvaspis porphyretica*, *C. ellesmerensis*, *C. woodwardi*, *Soehnaspis polaris*, *Geissonaspis mutabilis*, *Idanaspis dimidiata*, *I. reinsoni* and *Aenigmaspis falcata).*

This collection includes the oldest known heterostracans and so provides information important to phylogenetic studies. It also covers most of the history of heterostracans including the peak of diversity in the late Silurian and comes from localities that have been accurately dated.