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FRESHWATER MOLLUSKS OF THE HUDSON BAY WATERSHED,
DISTRIBUTION PATTERNS AND DETERMINANT INFLUENCES.
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(Abstract)

Just north of the Mississippi-Missouri and St. Lawrence basins lies a vast area of partially interconnected river systems, the Hudson Bay Watershed. About 100 species and subspecies of freshwater mollusks occur here, and all major North American families except Pleuroceridae are represented.

Based on distribution, three general groups can be distinguished: (I) endemic elements (about 10% of the total); (II) holarctic elements (about 15%); and (III) southern elements (about 75%). Group I contains several taxa which appear to have evolved since the Pleistocene (e.g., *Valvata sincera ontariensis* and *Stagnicola arctica*). Group II includes species which penetrate farther into the Canadian arctic than any others, i.e., to Baffin Island and Victoria Island. Members of this group include *Lymnaea stagnalis*, *Stagnicola palustris*, several sphaeriids, etc. Group III is composed principally of species which reach their northern limits within this region, and it is sometimes possible to correlate these limits with biological and geological factors and with isotherms.

In the Unionidae, for example, several species apparently invaded the Hudson Bay Watershed during postglacial confluence from the Mississippi-Missouri Basin by way of the Red River. Some of these (*Fusconaia flava*, *Quadrula quadrula*, *Crenodonta plicata*, *Lasmigona costata*, and *Proptera alata*) have not penetrated beyond southern Manitoba; others (*Ligumia recta*, *Lampsilis ovata ventricosa*, and *Strophitus undulatus*) have spread into northern and western Manitoba or to eastern Saskatchewan; and one (*Lasmigona complanata*) has spread even through central Alberta to the Lake Athabasca drainage. All range expansions in this group have been northward and west-

ward, never eastward into the soft-water habitats of the Precambrian Shield. The varying degrees of success in penetrating colder regions may be related to threshold spawning requirements. In only two cases (*Ligumia recta* and *Strophitus undulatus*) does absence of the known fish host appear to be limiting.

Other Unionidae have used alternate invasion routes. *Elliptio complanatus* has penetrated the Hudson Bay Watershed only from the St. Lawrence System and is confined to that part of Ontario and Quebec east of Lake Nipigon and south of James Bay. It is uncommon or rare in this region, however, and competition with the abundant and nearby ubiquitous *Lampsilis radiata siliquoidea* may be a limiting factor. Two other species, *Lasmigona compressa* and *Anodontoides ferussacianus*, appear to have used dual invasion routes, one from Lake Superior through Lake Nipigon and Long Lac and one from the Mississippi-Missouri Basin through the Red River, but the distribution of neither species in the Hudson Bay Watershed appears to be correlated with bedrock geology or with temperature.

Anodonta grandis and *L. radiata siliquoidea* may have utilized multiple invasion routes. Both species occur throughout the entire boreal forest region even including the Mackenzie River north of Great Slave Lake. Summer water temperature data are desirable but unavailable. The northern limits of both species fall within the zone bounded by the 55° and 60°F. July average daily temperature isotherms, however, and are probably indirectly related to these average values.