

and arctic Eurasia. The Iceland cockle *Clinocardium ciliatum*, the Greenland cockle *Serripes groenlandicus*, and the whelk *Buccinum hydrophanum* are widespread members of this fauna.

On the Pacific Coast an even richer fauna occurs. The northern portion of the Transition Zone between the Californian and Aleutian faunal regions extends to Puget Sound and southern Vancouver Island. Characteristic species of that region are Lewis' moon-snail *Polinices lewisi*, the purple dwarf olive *Olivella biplicata* and the geoduck clam *Panope generosa*. The Aleutian faunal region extends from southern Vancouver Island to the Alaska Peninsula. Typical species of that region are the frilled dogwinkle *Thais lamellosa*, the false jingle shell *Pododesmus macroschismus*, and the giant Pacific scallop *Pecten caurinus*.

The freshwater molluscs of Canada (gastropods and pelecypods) number about 175 species and subspecies and these are restricted, in part, to separate watersheds. The Maritimes and eastern Quebec are populated by the Atlantic Coastal Plain Fauna. This is typified by the freshwater mussels *Margaritifera margaritifera*, *Elliptio complanata*, and *Anodonta cataracta*. The Great Lakes-St. Lawrence drainage, especially the Lake Erie and Lake St. Clair portion, contains a rich fauna derived principally from the Mississippi Basin through post-glacial confluence. Characteristic species here are the freshwater mussels *Amblema plicata*, *Lasmigona costata*, and *Actinonaias carinata* and the snails *Pleurocera acuta* and *Goniobasis livescens*. Unfortunately, many species in this region are in danger of gross reduction or possible extinction through pollution.

North of that region the huge Hudson Bay and Arctic watersheds contain about 100 species derived from adjacent source areas after deglaciation. Some species (*Stagnicola arctica*, *Pisidium* spp., etc.) occur as far north as southern Baffin Island and southern Victoria Island. The Red River system in Manitoba supports more freshwater species than any other drainage in the Hudson Bay or Arctic watershed because of long-term confluence with the Mississippi Basin. Such freshwater mussels as *Amblema plicata*, *Quadrula quadrula*, *Proptera alata* and many others occur there. Elsewhere within the subarctic region the distribution of some species is broadly co-ordinated with phytogeographic zones but since internal zoogeographic barriers are absent there is little concordance between molluscan distributions.

The Rocky Mountains and the Pacific coastal region contain a distinct freshwater molluscan fauna characterized by the snail *Fluminicola nuttaliana* and the mussels *Anodonta wahlametensis* and *Gonidea angulata*. Some elements of this fauna (*Anodonta kennerleyi*, *Menetus cooperi*, *Helisoma binneyi*, etc.) have also penetrated east of the mountains into north-central Alberta. The Yukon Territory, Alaska and adjacent portions of the Northwest also contain a few endemic species (e.g., *Anodonta beringiana*, *Stagnicola atkaensis* and *S. kennicotti*) presumably isolated in the Beringian Refugium during the Pleistocene.

The land molluscs of Canada (snails and slugs—about 240 species and subspecies) are broadly assignable to three zoogeographic areas designated as Eastern, Central and Western, although many distributional anomalies are known. Examples of these fauna are: Eastern Region—*Triodopsis albolabris*, *Mesodon thyroides*, and *Mesodon sayana*; Central Region—*Triodopsis multilineata*, *Mesodon zaletus*, and *Discus patula*; and Western Region—*Oreohelix strigosa*, *Haplotrema vancouverensis*, and *Prophysaon andersoni*. A number of terrestrial species occur in all three regions, however (e.g., *Zonitoides arboreus*, *Discus cronkhitei*, and *Cionella lubrica*), and some occur even at the treeline which is the usual climatic limit for land snails. In addition, many European species have been introduced at various locations in Canada (e.g., *Arion ater* in Newfoundland, *Cepaea memorialis* in southern Ontario and in the Vancouver area, and *Hygromia striolata* at Quebec City) but as yet no foreign agricultural pest species have become established here.

Canadian Marine Invertebrate Life

Canada's extensive coastline is bounded by three major ocean masses, the North Atlantic, Arctic and North Pacific. As a result of physical characteristics of each of these