

Fossils from Heimaey, Iceland

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Fossiliferous sedimentary xenoliths are known from Mýrdalur and the islands Heimaey and Surtsey, South Iceland (Fig. 1). Data from a 1565 m deep drillhole on Heimaey show a 700-800 m thick series of sedimentary layers in the stratigraphic column below the island (Pálmason et al., 1965). These beds have probably supplied the fossiliferous xenoliths which were carried upward with hot magma and are now found in hyaloclastites on the surface. On Heimaey the marine part of the sedimentary sequence is about 640 m thick and marine strata occur inland at least as far as Mýrdalur. According to Alexandersson (1972), sedimentological evidence supports the idea that a sedimentary basin once existed in this part of the Neovolcanic zone and the sedimentary sequence might represent a wedge of sediments, derived from sources to the west.

In 1974 the present author published a preliminary report on fossils from xenoliths found on Surtsey. Since then xenoliths from Heimaey have been investigated and the fossils found in them are listed below:

A. Foraminifera:

- Quinqueloculina seminulum* (Linné, 1758) (3 specimens)
- Oolina* sp. (1 specimen)
- Cibicides lobatulus* (Walker & Jacob, 1798) (68 specimens)

B. Mollusca:

- Buccinum undatum* Linné, 1758 (1 fragmentary spire)
- Cylichna* sp. (1 fragmentary specimen)
- Nucula* (*Leionucula*) *tenuis* (Montagu, 1808) (1 umbonal fragment)
- Nuculana* (*Nuculana*) *pernula* (Müller, 1779) (3 fragments without umbo)
- Portlandia* (*Yoldiella*) cf. *lenticula* (Møller, 1842) (1 specimen with articulated valves)
- Portlandia* sp. (1 fragmentary specimen with articulated valves)
- Musculus* (*Musculus*) cf. *niger* (Gray, 1824) (1 fragment without umbo)

- Pododesmus* cf. (*Monia*) *patelliformis* (Linné, 1761) (1 umbonal fragment)
- Astarte* (*Astarte*) cf. *sulcata* (da Costa, 1778) (1 fragment without umbo)
- Tridonta* (*Tridonta*) *borealis* (Chemnitz, 1784) (1 fragment without umbo and 1 internal cast)
- Cerastoderma edule* (Linné, 1767) (1 fragment without umbo)
- Serripes groenlandicus* (Chemnitz, 1782) (1 fragmentary left valve)
- Spisula* (*Spisula*) *elliptica* (Brown, 1827) (1 umbonal fragment)
- Macoma* (*Macoma*) *calcareo* (Chemnitz, 1782) (1 fragment without umbo and 1 internal cast)
- Arctica islandica* (Linné, 1767) (2 umbonal fragments and several fragments without umbo)
- Hiatella* (*Hiatella*) *arctica* (Linné, 1767) (1 fragment without umbo)
- cf. *Mya* (*Mya*) *truncata* Linné, 1758 (1 internal cast)

C. Cirripedia:

- Balanus* (*Balanus*) *balanus* (Linné, 1758) (3 complete wall rings and several parietal plates)

D. Echinoidea:

Several indet. spines

The foraminifera are rather poorly preserved and most of the macrofossils are fragmentary. Only a few bivalves were found with articulated valves (paired). The shells are generally out of growth position and apparently somewhat transported.

All the species are marine and no extinct species was found. However, the occurrence of *Portlandia* (*Yoldiella*) cf. *lenticula* is interesting as this species does not belong to the present Icelandic fauna. According to Ockelmann (1958), the species is known from West and East Greenland, Jan Mayen, Svalbard, the Murman Coast, the Barents Sea, Novaya Zemlya, the Kara Sea, the Siberian Arctic Sea, Parry Islands and along the Norwegian coast southwestward to Bodø. It has been found at great depths north of the Faeroe Islands and the Shetlands, but only empty shells have been met with in southernmore local-

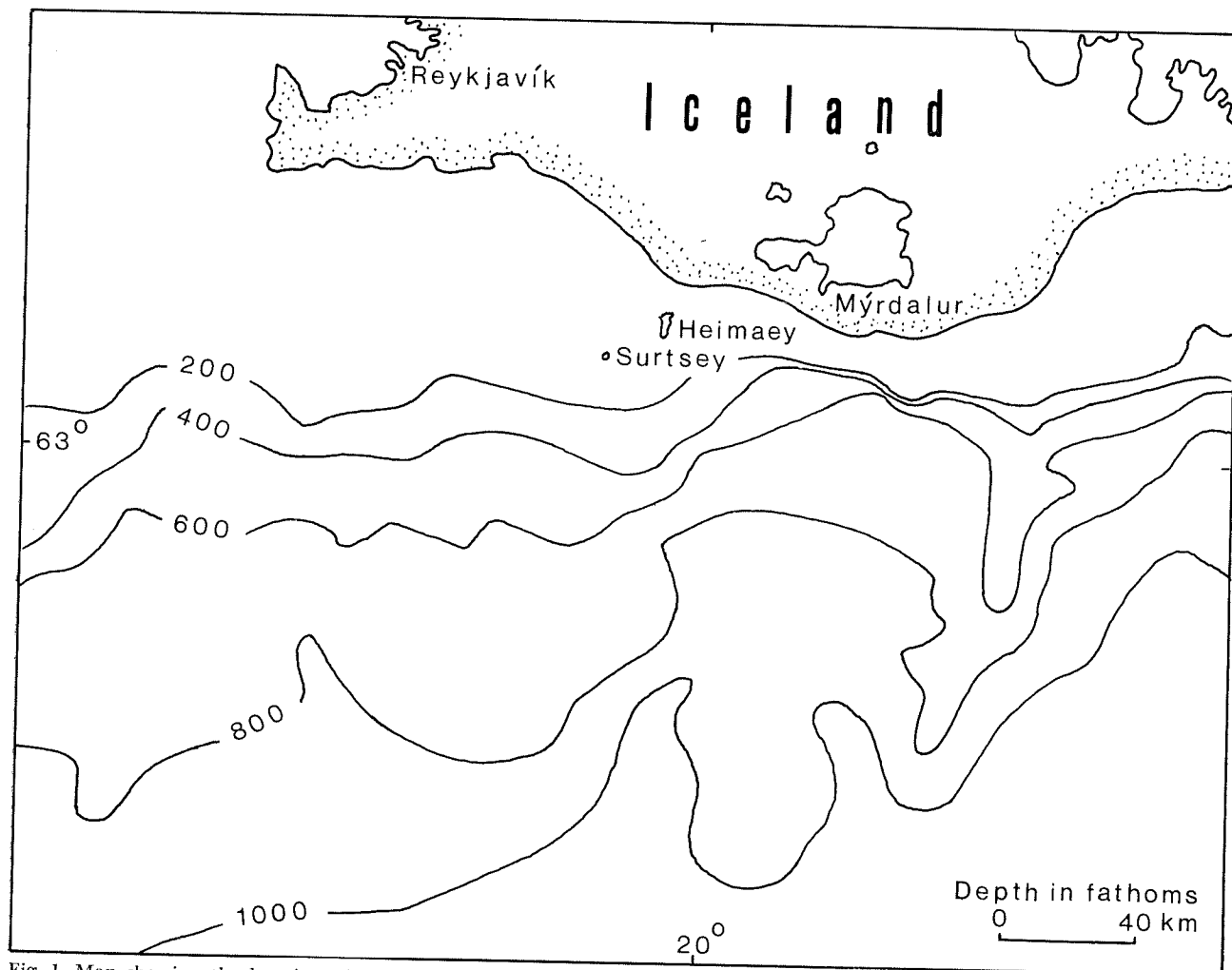


Fig. 1. Map showing the location of Myrdalur, Heimaey and Surtsey.

ities. The species seems panarctic, ?circumpolar, with a depth range from 0-13 m (East Greenland) to 1400 m (west of the Shetlands). In East Greenland the species seems to prefer a bottom of clay or mud, occasionally mixed with sand and gravel. In Iceland *P. (Y.) lenticula* is known in the Lower Pleistocene Breidavík deposits on Tjörnes peninsula, North Iceland (Gladenkov, 1974; Gladenkov et al., 1980) and the Upper Pleistocene Saurbaer deposits in Gilsfjörður, West Iceland (Bárdarson, 1921).

The Heimaey xenoliths may originate from any level within the sediments below the island and the species found apparently belong to faunas of different Quaternary ages. Alexandersson (1972 p. 106) had some fragments of *Arctica islandica* from xenoliths, collected on Surtsey, dated radiometrically. The dated fragments were taken from two blocks: "one block (mainly "outer fraction") was approximately 11,000 years old while the other (mainly "inner fraction") was 6200 years". These dates indicate Late Quater-

nary (Holocene) age. However, the occurrence of *Portlandia (Yoldiella) cf. lenticula* indicates that some of the xenoliths from Heimaey are of Pleistocene age. This is supported by the occurrence of *Cerastoderma edule*, known in the Lower Pleistocene Myrdalur (Skammidalur) xenoliths (Áskelsson, 1960), but unknown in autochthonous Icelandic sediments of younger Pleistocene or Holocene ages (cf. Símonarson, 1981). Apparently, the latter species did not reappear in Iceland until after 1940.

As it is impossible to separate different faunas, ecological conclusions seem inappropriate. However, it should be pointed out that species with their present northern limit of distribution within the high-boreal and low-arctic subregions are prominent. The depth of formation was apparently variable, but lack of sedimentary structures showing wave- and current-influence indicate depths where the hydrodynamic forces were relatively small (cf. Alexandersson, 1972).

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APPENDIX

Addition to the list of fossils from Surtsey (cf. Símonarson, 1974): *Serripes groenlandicus* (Chemnitz, 1782) (1 left and right valve almost articulated and certainly belonging to the same specimen).