years in the galaxy, and a probability of 1/4. The observation threshold is then adjusted such that the period distribution above the maximum at ~0·6 s is matched. The results are found to be insensitive to the birth rate and observing probability in the sense that they may both be varied substantially and the threshold adjusted such that the period distribution above ~0·6 s is reproduced.

The calculated and observed magnetic fields agree at all ages, as they must if this model is tenable. At ages less than ~10^6 yr, however, the model predicts many more pulsars (and with higher luminosity) than the two, NP 0531 and PSR 0833, which are actually observed; this is the same problem which faced Setti and Woltjer[2] for periods below ~0·6 s. Among the variety of possible additional assumptions which could account for both the small number of observed young pulsars and their low radio luminosity, one is particularly interesting. If, for young pulsars, the pulsar beam is extremely narrow (so that the probability for observation of the beam is much smaller than the ~1/4 assumed earlier), then we would expect to see no pulsars younger than ~10^6 yr on the beam. If also there is a roughly isotropic pulsed component four or five orders of magnitude less intense than the component on the beam, this would explain why NP 0531 and PSR 0833 (both young close pulsars) are observed at a lower intensity than expected for the pulsar beam, and why more distant pulsars which are younger (for example, the pulsars which might be associated with Cas A and SN 1572) are below the threshold of observability.

S. S. Holt
R. Ramaty

NASA/Goddard Space Flight Center,
Greenbelt, Maryland.

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Volcano on Jan Mayen Alive Again

On September 19–20 the Beerenberg volcano on Jan Mayen Island in the Norwegian Sea (71° N, 8°–9° W) became reactivated after being dormant for several hundred years, perhaps thousands of years. Reports by whalers at sea of activity on the southern slope of the volcano in 1732 and 1818 have been subject to doubt. But steam and carbon dioxide occur in fractures, and earthquakes are common.

The present eruption was preceded for 1 or 2 days by earthquakes with epicentres which were, however, some distance to the north-east. On the morning of September 20, smoke and steam rose to 30,000 feet on the north-east flank of the volcano, apparently coming from a 5–6 km long fracture (Fig. 1) with five main parasitic crater centres. Geologists from the Norsk Polarinstitutt were rushed to the island and are observing the activity from land, sea and air. After 2 days, explosive activity decreased, but a great amount of basaltic lava continues to emerge, and cascade down the slope to build up a new coastal platform at least 500 m wide and 3·5 km long. Because most of the volcano is covered by glaciers, a great deal of meltwater has caused floods (Jökulhlaup) that have formed deltas in other places. The lava has formed a dense basaltic rock with conspicuous olivine phenocrysts up to cm size. Phenocrysts of plagioclase (An 60) occur, but these are smaller.

The geology of Jan Mayen has been studied extensively in recent years, in particular by British geologists[1]. The formation of the island was started by extensive submarine basaltic flows. Rocks of phyric basaltic, trachy-basaltic and even trachytic composition then built up the island as lava and pyroclastics emerged from vents and fractures, generally following two principal directions, an older N 50° E and a younger N 40° E. The present fracture seems to coincide with the latter, and falls in line with the earlier development of the Beerenberg volcano as described by Fitch, Roberts and Hawkins[2,3].

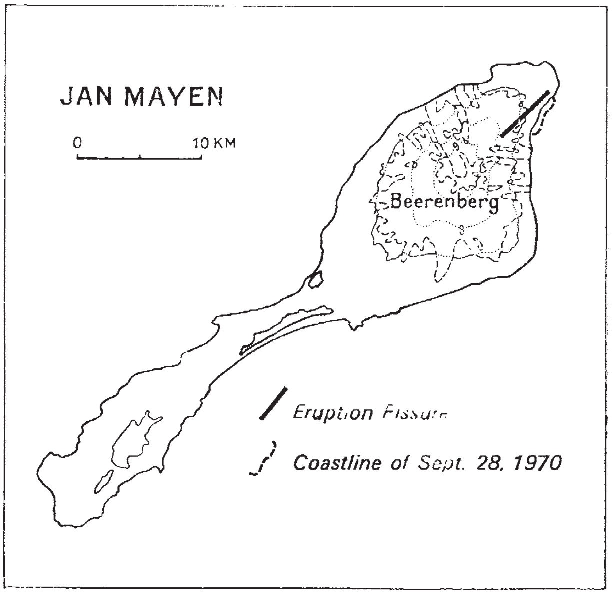

Fig. 1. The volcano on Jan Mayen Island.

The structural setting of Jan Mayen is intricate. According to Johnson[4], it is located on the intersection of an important NW–SE striking fracture zone and an N–S trending easterly marginal ridge of the Icelandic Plateau that occupies the major part of the Mid-Atlantic ridge in the region. Johnson interprets the morphological and earthquake data in favour of a displacement of the crest of the Mid-Atlantic ridge 200 km laterally eastwards along the Jan Mayen fracture zone. It should be noted, however, that the island of Jan Mayen itself is trending SW–NE, parallel to the direction of the crest both to the south of Iceland and to the north of the fracture zone (the Mohn ridge), and occupying a central position within the ridge.

The renewal of the volcanic activity of Jan Mayen calls for a close study of the island itself, as well as of the structural relationship of the Mid-Atlantic ridge in the Norwegian Sea.

Tore Gjelsvik

Norsk Polarinstitutt,
Middlethunsgt, 29/PO Box 5054,
Majorstua, Oslo 3, Norway.

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