Book Reviews

Fiery Iceland

Iceland and Mid-Ocean Ridges. Report of a symposium, Reykjavík, Feb.–Mar. 1967. SVEINBJÖRN BJÖRNSSON, Ed. Leiftur, Reykjavík, 1967 (distributed by Jonsson, Reykjavík). 209 pp., illus. Paper, Kr. 250. A publication of Societas Scientiarum Islandica.

The Eruption of Hekla, 1947–1948. Vol. 1 of *The Eruptions of Hekla in Historical Times: A Tephrochronological Study.* S. THORARINSSON. Leiftur, Reykjavík, 1967. 183 pp., illus. Paper, Kr. 250. A publication of Societas Scientiarum Islandica.

". . . a wide chasm formed diagonally across the island from southwest to northeast, through which the trachytic paste gradually emerged." Thus, as early as 1864, in *Journey to the Centre of the Earth,* Jules Verne described the rift of Iceland, a geological feature that has come to the attention of most North American geologists only in the last few years. Iceland rests astride the Mid-Atlantic Ridge, the central rift of which has recently [F. J. Vine, *Science* **154**, 1405 (1966)] been described as the axis of a symmetrically spreading sea floor related to continental drift.

The general topic of midocean ridges as applied to Iceland was discussed during a symposium held in Reykjavík during February and March 1967. The 26 participants were Icelandic earth scientists who have actively studied the phenomena. Nineteen papers by 13 authors discussed the geological, geophysical, and geochemical aspects of Iceland in relation to the Mid-Atlantic Ridge. The discussion that followed presentation of the papers has been included in the proceedings volume; it not only gives more depth to the volume but also gives insight into the personalities of the participants.

Iceland is indeed divided by a Quaternary neovolcanic zone which separates the Tertiary plateau basalt province into a western and an eastern portion. In this zone there have been many eruptions in historical times, and there is much faulting. The lavas found in the zone are mainly basaltic. Sigurdur Thorarinsson and Gudmundur Kjartansson point out the striking similarity between products of volcanic eruption beneath Quaternary glaciers and those beneath the sea. As a whole, though, the papers demonstrate that care must be taken in using Iceland as a natural laboratory for the study of midocean ridges. The neovolcanic zone is quite wide and sinuous, and eruptions take place over an area larger than the active part of the ridge. A new magnetic survey over Iceland does not show the well-defined anomalies present on the ridge to the south. Other evidence also shows dissimilarities. However, the papers amply demonstrate the active nature of Icelandic tectonics and uniformly demonstrate that Iceland must be considered an emergent, if atypical, portion of the Mid-Atlantic Ridge rather than a portion of a sialic continent. The authors are divided, however, as to the interpretation of the data. Most of the authors adhere to the concept of rifting in the neovolcanic zone and some of these adopt the hypothesis of active continental drift and sea floor spreading. On the other hand, a few authors are opposed to active rifting and hence to the attendant broader concepts. They propose other models. The volume includes recommendations for further studies.

In contrast to the short general papers in the symposium volume, S. Thorarinsson's book presents a definitive study of one Icelandic volcano of a special type. The volcano of Hekla lies in the southeastern branch of the neovolcanic belt, about 50 kilometers from the southern coast, and is the most active volcano of Iceland. The volcanic eruptions of Hekla have been interwoven into the history of Iceland since the first settlement of the island a thousand years ago. The ash (tephra) from the eruptions destroyed farms with their crops and animals. At times widespread famine developed. The ash falls have been recorded as far away as the Shetland Islands, 1300 kilometers southeast. By combining studies of the ash layers (tephrochronology) and studies of history, Thorarinsson shows that 14 eruptions of Hekla have occurred since settlement of Iceland, beginning with the 1104 eruption. The latest is that of 1947–1948. Hekla is intermediate between a typical Icelandic linear crater row and a symmetrical stratovolcano like Vesuvius. It has built by repeated eruptions from a fissure, often with several small craters active at the same time. Thorarinsson shows that each eruption begins with a violently explosive Plinian-type eruption of silica-rich ash which generally lasts for a few hours at the most. Most eruptions then change and produce both lava and ash of a more mafic chemistry. The silica content of the initial ash is closely related to the length of the interval between eruptions, during which the lava differentiates in a reservoir at an intermediate depth.

This volume is a rarity in the scientific literature, being at the same time a significant scientific treatise, an important historical analysis, and a pleasure to read. These qualities reflect those of the author, who is not only a renowned volcanologist but a scholar of Icelandic history and a poet famed in Iceland as well. His flowing writing style, even through the translation by Peter G. Foote, wastes few words, while avoiding the intensely dull scientific style of most writers. The reader comes away with a significant insight into both the volcano and the history of a culture living in a harsh environment.

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Viewing the Deeps

Deep-Sea Photography. JOHN BRACKETT HERSEY, Ed. Johns Hopkins Press, Baltimore, 1967. 310 pp., illus. $17.50. Johns Hopkins Oceanographic Studies, No. 3.

The published world of underwater photography has been unequally divided between slick magazines and scientific journals. The former present a profusion of polychromatic underwater scenes, frequently featuring bikini-clad biology, always esthetic, and generally taken in shallow, gin-clear, tropical waters. The latter have published, in the context of scientific data, a smattering of monochromatic photographs, never as pretty but always as revealing, of the relatively drab deep-sea environment. This book goes a long way to even the score, and while it is first a weighty scientific document, it is the 372 remarkable and handsomely