

Australasia, the latter those of Europe, certain countries in Asia, Morocco, the United States, Brazil, Chile, and Uruguay. In Scotland the shale industry has had a somewhat chequered career, being influenced in the past by the extent of importation of crude oil and sodium nitrate from the New World; the war failed to stabilize the industry as anticipated, and latterly decline has been rapid, largely due to abnormal economic conditions, and not, as frequently stated, to the exhaustion of raw material. The recent amalgamation of the companies concerned and their union with one of the premier oil companies have preserved the industry from extinction, the intention being to satisfy the capacity of the refineries by supplementing with crude oil from extraneous sources. The Norfolk shale field is in process of development, and a concise account of the occurrence and of the products obtainable from the shale is given here. Other prospects in the British Isles are not very hopeful. In South Africa, the Wakkerstroom district is being actively exploited at the moment, a test yield of 31 gallons of oil per ton of shale from one locality being an encouraging feature. Mennell has frequently reported on the Rhodesian resources of oil shale, while in Canada the Mackenzie River region offers possibilities in this connexion in addition to its crude oil potentialities. New South Wales is the largest producer of oil shale in Australia, the other interesting occurrences being those of Tasmania and Queensland. In Europe, the Esthonian shales are of both palæontological and technical importance; dry distillation of the material resulted in the production of 61 gallons of oil per ton, containing 20 per cent light fraction. The deposits of Yugo-Slavia (at Alexinatz) are valuable for their burning oil yielded on refining, while those of France, Spain, and Germany are sufficiently known to preclude further comment here. The resources of the United States are immense, some fascinating figures being given by Alderson in the work previously cited; the present author confines himself to mere statement of fact, though he omits reference to the difficulties met with in refining much of the shale hitherto tested. Finally, the discovery of shale deposits in Uruguay is important, and may lead to the opening up of a wide area in South America.

A map showing the oil shale-bearing districts referred to in the text is included, while a useful, though brief, bibliography is appended.

H. B. MILNER.

THE NEPHELINE ROCKS OF SEKUKUNILAND. By S. J. SHAND. Trans. Geol. Soc. S. Africa, vol. xxiv, 1921. pp. 111-49, with 3 plates and 6 text-figures.

THE nepheline-syenite body of Sekukuniland forms a plug or stock intruded into the red granite of the Bushveld laccolith, and has an outcrop of from six to nine square miles, occupying a

shallow depression surrounded by granite ridges. The junction between the syenite and granite can be fixed to within 100 yards or so except to the north, where it is covered by quartz-laterite, whose appearance is taken as approximating to the hidden junction. The intrusion is remarkable for the occurrence of a great limestone inclusion, the actual contact between the nepheline-syenite and the limestone being, unfortunately, hidden.

The rocks comprising the stock are all nepheline-syenites, ranging from extremely leucocratic to rather melanocratic, from almost saturated to highly undersaturated varieties. The amount of nepheline varies from being quite subordinate to being the principal light-coloured mineral, and the same applies to orthoclase and albite. The predominant dark mineral is a soda-bearing pyroxene, ranging from diopside to ægirine. Pale yellow sphene occurs, and apatite is abundant in some varieties. A titaniferous lime-iron garnet and primary calcite are also found. Cancrinite often replaces nepheline. Iron oxides and pyrites are extremely rare.

The author draws up a table showing the "subdivision of the syenoids", and takes three "ranges", the foyaite, ijolite, and canadite, characterized by the type of felspar (if any) with the nepheline. These "ranges" are further subdivided according to the percentage of dark minerals present.

A detailed petrographic description of the varieties of nepheline-syenite found in the area follows, special attention being paid to the contact facies of the foyaite.

The limestone xenolith occupies an area of at least 57 square mile, and is a white crystalline marble, showing little sign of contact metamorphism, except recrystallization. In places, however, opal, crocidolite, and apatite, with some granular magnetite, are developed.

Speculation on the form and nature of the intrusion, and the source and mineralization of the limestone, and its bearing on Daly's hypothesis of the alkaline rocks, followed by a short description of the economic geology of the area, bring the paper to a conclusion.

R. S.

ELEMENTS OF ENGINEERING GEOLOGY. By RIES and WATSON.
Published by Chapman & Hall. Price 22s.

THIS is an excellent book, and one that should be included in the library of every engineer. Besides being a good general textbook on economic geology, the engineer's point of view prevails throughout.

The volume is a condensation of *Engineering Geology* by the same authors, parts having been re-written and amplified, and contains over 250 diagrams and illustrations; the greater part of these are from actual cases where the geological formations have been the outstanding considerations to the engineer.