further research would be most useful were therefore mentioned in the hope that the members of the Glasgow Geological Society would investigate them.

The problem is of interest from its bearing upon the early geological history and geography of north-western Europe. The structure of western Europe has been dominated by the formation of three great mountain systems, each due to pressure usually from the south, and each having its younger rocks exposed mainly on the northern flanks of the chain. The youngest is the Alpine system, formed mainly in Upper Cainozoic times, and including the Pyrenees, Alps, Carpathians, &c. A somewhat similar mountain system, of which fragments remain in southern Ireland, Devonshire, Brittany, and Germany, had been formed in Upper Palæozoic times; from its analogy with the Altai Mountains of Asia, Suess has called its mountains the European Altaids. Still earlier, in later Archæan times, there was formed the first of these European mountain systems, of which fragments occur in northern Ireland, the Grampians, and Scandinavia. There are many interesting analogies between these old Grampians and the later Altaids and Alps. The old mountain system to which the Grampians belonged probably extended far westward into the North Atlantic, and to its influence may be attributed the desert climate of Scotland during the deposition of the Torridon Sandstone.

THE ETIOLOGY OF LEPROSY.

THE eighteenth report of the Board of Health on leprosy in New South Wales contains the usual careful clinical records of the features of the disease in the patients admitted during the year, as well as a record of all the cases occurring in the Commonwealth during 1908. No case of leprosy has ever been heard of in Tasmania. In the other States the disease occurs apparently most frequently in Chinese and in aboriginals, and is more frequent in northern than in southern territories.

An account is given of a systematic test of Prof. Deycke's "nastin" treatment. Nastin is a vaccine made from a leptothrix found in some recent Lepromata, and not from the bacillus lepræ. It is pronounced valueless, any beneficial result being assigned to the natural fluctuations in the progress of the disease; one or more cases of spontaneous cure are noted. For the rest, the report is remarkable for the scepticism the author, Dr. J. Ashburton Thompson, expresses on the etiology of leprosy and on the value of isolation as a preventive of transference of the disease.

It will be remembered that the International Congress at Bergen last year endorsed the view that the bacillus lepræ of Hansen was the etiological agent. Dr. Thompson's views are seemingly published as a protest, and, holding the views he does, it is gratifying to learn that Dr. Thompson recognises that, as the presiding and executive member of the central health authority to which the Leprosy Act is entrusted, he has a clearly defined duty to perform, and that he performs it, notwithstanding his thinking "the *mère idée* on which that law is based to be of doubtful utility," and his statement, "I can at all events safely assert that its validity has not been demonstrated." One would have thought that the success which has attended the practice of isolation in Norway during the past forty years afforded sufficient evidence of its value even to the most sceptical, for Hansen's prophecy some forty years ago that in 1920 there would be no leprosy in Norway is in more than a fair way of being fulfilled.

HELIUM IN AIR AND MINERALS.

AN interesting paper on the occurrence of helium in the air of Naples and in minerals from Vesuvius is published by Prof. A. Piutti in the *Rendiconto* of the Royal Society of Naples (third series, vol. xv., p. 203). It is well known that in 1881 Prof. Palmieri read a paper before the same academy in which he claimed to have recognised the characteristic line D_3 of helium in the flame spectrum obtained by heating in a Bunsen flame "an amorphous, buttery substance of a yellow colour which was found as a sublimate on the edge of a fumarole near the mouth of Vesuvius." This is generally accepted as the first discovery of terrestrial helium, although Nasini and Anderlini in 1906, on examining the flame spectrum of a large number of volcanic incrustations, failed to recognise the presence of helium in any of the specimens they examined under the conditions described by Palmieri.

Prof. Piutti has now investigated with especial care, and by an ingenious method, the gas evolved on heating several Vesuvian minerals. The gas was expelled by heating the mineral in a quartz tube connected, through a three-way cock, with a Plücker tube, a Gaede air-pump, and a glass bulb containing cherry-stone carbon, which could be cooled to $-192°$ C. The latter served to absorb nitrogen and inert gases other than helium. All air was first entirely removed from the apparatus by the Gaede pump, special care being taken to ensure its complete absence prior to heating the mineral and during the course of the experiments. When the carbon is cooled by liquid air and the vacuum applied, any nitrogen present is first absorbed by the carbon, and the lines of argon and neon appear until the kathode space is formed. At this point, if even the smallest trace of helium is present, the D_3 line is seen distinctly by the side of the sodium lines. Control experiments showed that 0·073 cubic mm. could be detected in the apparatus employed. Helium can also be detected in the same way in 3·5 c.c. of ordinary air.

The examination of several radio-active forms of sanidinite from Vesuvius showed that the radio-activity was due to particles of zircon contained therein. This zircon was found to evolve helium, and other samples of zircon from different localities, Italian and otherwise, were also found to contain helium in varying proportions. No relation could, however, be traced between the proportion of helium and the radio-activity or density of the samples. The Vesuvian zircon had the highest radio-activity, but the proportion of helium was relatively low.

THE SUGAR INDUSTRY IN HAWAII.[1]

HAWAII and its associated islands, Maui, Oahu, Kauai and others, form a volcanic group in the Pacific 20° north of the equator, largely devoted to sugar production. In 1895 the Sugar-planters' Association established an experiment station at Honolulu, and some five years later the islands were annexed by the United States. The enormous importance of these two events is reflected in the statistics for sugar production :—

	Hawaii	Maui	Oahu	Kauai	Total
1895	61,643	27,735	17,433	42,816	149,627 tons
1896	109,259	29 097	35,782	51,650	225,828 ,,
1900	115,224	57,347	53 625	63,348	289,544 ,,
1901	134,618	58,349	99,534	67,537	360,038 ,,
1905	126,405	100,434	123,095	76,314	426,248 ,,
1908	180,159	122,629	137,013	81,322	521,123 ,,

The increase during the fourteen years has been from less than 150,000 tons to more than 520,000 tons, and detailed statistics show that the produce per acre, as well as the total acreage, has increased.

Practically all phases of the sugar industry are dealt with at the experiment station. Varieties of canes are tested, seedlings are raised and examined, and the effect of change of variety is investigated, the object being always to obtain plants more prolific, better adapted to the local surroundings, and more resistant to the local diseases or insect pests than those at present grown. Considerable attention is paid to insect pests, which naturally do an increasing amount of damage as cultivation becomes more and more intense. Methods of working up the sugar are also studied, the chemical and milling problems involved are gone into, nothing within the power of the staff and likely to benefit the planters being omitted.

In consequence there is a constant tendency to economy in production; thus in the early years fertilisers were often applied without any reference to the specific requirements of the crop or the general deficiencies of the soil; now, however, these, and also climatic considerations, are taken into account, and the staff are able to give useful definite information as to the mixture of fertilisers required.

1 Tropical Life, No. 2, vol. vi., 1910. Bulletins of the Sugar-planters Associations, Hawaii.