32–2,000 and 4,400–20,000, respectively. High values were obtained even after the plants analysed had been washed to eliminate soil particles.

The histo-chemical analysis of hides of sheep from Maella during the degenerative process showed, by means of a Perls reaction, that there is a large quantity of iron in the sweat glands as well as in the cuticle of the sheath and fibre and in the epithelial scales; this is drawn up by the growing fibres and comes out at the surface.

The possible effects on sheep of ingesting abnormally large quantities of iron, on the general metabolism and the formation of the wool fibre, are under investigation and the results will be published elsewhere.

G. Gonzalez
J. Garcia
E. Fernandez

Department of Bromatology and
Animal Nutrition,
Centre for Biological Research
of the Higher Council for
Scientific Research, Madrid.

[1] Lopez, B., *Pub. Junta Fomento Pecuario Zaragoza*, **No. 3**, (1941).
[2] Gil, F., *Pub. Ministerio de Agricultura*, 1946.
[3] Gonzalez, G., and Garcia, J., *Annales Nutrition et de l'Alimentation*, **No. 3-4** (1957).
[4] Pacios, B., Thesis in course of publication. (private communication.
[5] Fernandez, E., Thesis in preparation.

PATHOLOGY

Geology and Multiple Sclerosis

Most areas where there is a high prevalence of multiple sclerosis coincide in a highly suggestive fashion with areas where glaciation has played an important part in providing parent material for soils. However, the converse is certainly not true: all glacial soils cannot be correlated with areas where the prevalence of multiple sclerosis is high. Maps showing the distribution of multiple sclerotic cases in Northern Ireland, south-eastern Ontario, Sweden, and Denmark are alike in one respect—they all bear a remarkable resemblance to maps illustrating the distribution of boulders or geochemical anomalies in any map prepared for the purpose of searching in a glaciated area for buried ore bodies.

A consideration of some epidemiological maps reveals the following facts. In Scandinavia and northern Scotland, where on the whole the prevalence of multiple sclerosis is high, there are at least five 'islands' where it is significantly low, namely, (1) Gävleborg province north of Gävle, Sweden, (2) Södermanland province, Sweden, (3) large sections of Holland, Göteborg and Bohus Provinces, Sweden, (4) the Norwegian coastal provinces of Rogaland, Hordaland, Sogn og Fjordane, and Møre og Ramsdale, (5) the Outer Hebrides of Scotland. With the solitary exception of Rogaland and southern Hordaland all the above areas are substantially underlaid by old gneisses, which in a general map of Scandinavia are mapped as being similar. Conversely, if we note areas where prevalence is high, we find an entirely different set of geological formations, namely, in Norway and Sweden either Eocambrian sediments or granitic rocks, and in northern Scotland by Old Red Sandstones and granitic rocks.

In North America I have seen few distribution maps indicating the prevalence of the disease; but it is generally considered to be high in south-western Quebec, the southern part of Ontario, and in central Nova Scotia. In all these areas there are abundant limestones, in places dolomitic, and some granitic rocks.

One other point appears worthy of note: higher than 'normal' quantities of lead are known to occur in those rocks referred to above as occurring in areas where the prevalence of multiple sclerosis is high. The Eocambrian sediments of Norway and Sweden, some granites in Telemark, Norway, the Old Red Sandstones of northern Scotland, and many of the limestones of southern Quebec, Ontario, and central Nova Scotia are all known to contain significant, although not necessarily commercial, amounts of lead. Similar rocks in the north-eastern United States and southern Manitoba may likewise be assumed to carry lead. It should also be noted that anomalous amounts of lead may, on occasion, be accompanied by anomalous amounts of some other elements such as silver, barium, magnesium, and fluorine.

These observations are founded on the published work and personal communications of many workers in the fields of medicine and geology. Acknowledgement will be made to these authors in a paper now being prepared for publication.

Harry V. Warren

Department of Geology and Geography,
University of British Columbia,
Vancouver, 8. June 1.

An Experimental Enterococcal Pyelonephritis in Mice

In the course of studying the animal pathogenicity of various bacterial species obtained from human infections, we noted that certain strains of enterococci localized and persisted in the kidneys of mice subsequent to intravenous challenge. Moreover, this enterococcal pyelonephritis could be induced with regularity in mice simply by intravenous injection, and did not require kidney traumatization as described by Braude *et al.*[1] for the initiation of enterococcal kidney disease in rats. Since enterococci, particularly *Streptococcus faecalis*, are frequently associated with urinary tract infections in man[2,3] we felt that it would be pertinent to conduct further experiments on the murine disease. This communication presents our initial observations on certain bacteriological aspects of experimental enterococcal pyelonephritis. Additional results, including the histopathological characteristics of this mouse infection, will be reported elsewhere.

The strain of *Str. faecalis*, designated '*MGH*-2', which was employed in our studies was submitted by Dr. B. A. Waisbren of the Milwaukee County General Hospital, Wisconsin, shortly after its isolation from the urine of a patient. This organism was maintained on ordinary blood agar and apparently did not require passage through mice to sustain its virulence. The growth from a 6–8 hr. culture in trypticase soy broth at 37° C. was diluted with an equal volume of saline, and 0·2 ml. was injected into the dorsal tail vein of each mouse. Male, albino *CF*-1 mice, 4–5 weeks old and weighing approximately 16 gm., were used in the