was associated with the novelty of the situation. Drs E. Glassman and J. Wilson (University of North Carolina) described how they taught new behaviour to mice injected with radioactive uridine, which they found was incorporated to a greater extent into the brain RNA than it was in untrained mice. These results suggested a general increase in the synthesis of rapidly labelled RNA. No significant differences, however, were observed in liver or kidney. Glassman and Wilson concluded that it was not clear whether the chemical response had anything to do with the learning process *per se* or with a response incidental to this process. Dr R. E. Bowman (University of Wisconsin, Madison) had injected rats intravenously with radioactive cytidine and then trained them to a new behaviour. He found increased total RNA synthesis in the hippocampus but not in any other parts of the brain. This increased RNA disappeared, however, after 5 or more days. Although these three contributions differed in detail, they agreed that there is temporary storage of new brain proteins as new behaviour is learned but, as Dr B. W. Agranoff (University of Michigan) pointed out, this protein synthesis may not be specific for memory, but may be part of "housekeeping arrangements".

Drs A. Geller and M. E. Jarvik (Albert Einstein College of Medicine, Bronx, New York) threw more light on long term memory when they showed that various treatments such as electroshock may interfere with the process taking place during an "incubation" period required for the establishment of long term memory, Dr T. J. White (Cleveland, Ohio, Metropolitan General Hospital) did not deny the importance of these developments. Nevertheless, he emphasized that the extrapolation of these findings to human memory and intellectual performance may be irrelevant, especially because the human brain is undoubtedly the most complex of such structures. Rather he looked forward to studies on humans which may finally turn out to be relevant to the understanding of mental disease and cerebral dysfunction.

GEOLOGY

Oldest Rocks on Earth

from a Correspondent

THE symposium on the Archaean rocks held in Perth from May 23 to 26 was a notable achievement for the West Australian Division of the Geological Society of Australia. The attendance of more than 600 Earth scientists, the largest ever such gathering in Australia, reflected both the present mineral exploration activity in the local Archaean and the recognition of the need for a fuller understanding of the special character and problems of the oldest rocks of the Earth's crust.

Although no formal deposition of the Archaean was agreed, there was general acceptance of Professor J. Sutton's (London) thesis that the oldest greenstone–gneiss complexes in all continents mark a highly unstable crust which has not recurred. From about 2,400 million years ago onwards stable continental areas appeared and have been maintained.

Petrologically unique characteristics of the Archaean were postulated by Drs M. J. and R. P. Viljoen (Johannesburg) from their recognition of a distinctive group of intrusive and extrusive ultramafic (komatiites) in the uniquely well exposed Barberton Mountain Land. Drs A. J. R. White, P. Jakes and D. M. Christie (Canberra), however, emphasized the similarity in chemistry between Australian Archaean lavas and low-potassium tholeiites from recent island arcs. They attempted to apply modern ideas of ocean floor spreading to the Archaean, albeit with shorter orogenic cycles and higher temperature gradients. This was a development of the island arc model which has long been adopted by Canadian workers for the Archaean and which was used by Professor A. M. Goodwin (Toronto) in a review of metallogenic patterns and crustal growth in the Canadian Shield. The model implies a later origin for much of the granitic crust, as indeed is suggested by the isotopic ages. The evidence provided by Professor H. B. D. Wilson (Winnipeg) that Archaean volcanic and sedimentary belts are related to present differences in crustal thickness and that negative gravity anomalies underlie the greenstone belts casts doubt on this view; and other speakers, notably Dr B. F. Windley (Leicester), Dr C. W. Stowe (Salisbury) and Professor A. F. Wilson (Brisbane) emphasized the importance of ancient granite gneiss and granulite terrains incorporating relicts of even earlier greenstone belts.

Windley and Mr D. Bridgwater (Copenhagen), in particular, offered a synthesis suggesting that Archaean granulite terrain in Greenland represents a lower level of erosion in the Archaean crust than the greenstone–granite–gneiss complexes. They saw a possible analogy between basic stratiform complexes characterized by calcic meta-anorthosites in the early crust and the calcic anorthosites reported from the lunar highlands. They suggested that the younger age of granite gneisses adjacent and subjacent to greenstone belts is a consequence of structural control for the rise of younger anatectic granites by the interface between the greenstone belts and their ancient basement.

HELIUM

Search in the Earth

from our Geomagnetism Correspondent

THE concentration of the isotope ^3He in the Earth's present atmosphere is 4.4×10^{13} ccSTP g^{-1}—but where does it come from? Is it, as some have suggested, produced chiefly by the auroral precipitation of solar wind plasma, or is the source within the Earth itself? Clarke *et al.* (*Earth Planet. Sci. Lett.*, **6**, 213; 1969), for example, suggested that most of the original ^3He present at the Earth's formation may well be retained in the deep Earth but may leak very slowly through the ocean floor to maintain the observed atmospheric concentration. Certainly the figures alone do not rule out this possibility if the original ^3He content of the Earth was about the same as that of the average chondritic primordial abundance. The concentration of primordial ^3He in gas rich meteorites can be up to about 10^{-6} ccSTP g^{-1} and the ordinary chondrite contains about 10^{-10} ccSTP g^{-1}. The "average chondrite", taken to be 10 per cent gas rich and 90 per cent ordinary, thus contains a ^3He concentration of about 10^{-8} ccSTP g^{-1}.

Thus the figures fit; but is the ^3He actually there in the Earth? Fisher (*Earth Planet. Sci. Lett.*, **8**, 77; 1970) has looked for it but finds that the concentration is less than 10^{-10} ccSTP g^{-1}. Because of the high