

temperature was between 5° C. and 10° C. higher than at present, and the cloud amount about two tenths greater; from these data he calculated that the sun is a variable star with a range of 40 per cent in the intensity of its radiation.

Since the chief purpose of the paper was the array of geological evidence in support of the theory, the discussion was mainly carried on by the geologists. The present writer gained the impression that the latter accepted the general implications of the theory, but found considerable difficulty in agreeing to the details. On one point, however, there was general agreement: the explanation of the discrepancy between the centre of glaciation and the present north pole by purely geographical reasoning was welcomed as a relief from the difficult assumption of a shift of the poles.

The difficulties of detail are threefold. In the first place, Penck and Brückner's simple scheme of four major glaciations cannot be applied directly to countries outside the Alps. In the British Isles, for example, the succession was much more complicated than that suggested in Dr. Simpson's scheme, and even the number of major glaciations has not yet been determined. The second difficulty concerns the place in the scheme of the archæo-

logical stages. Some competent authorities place the Acheulean not in the Riss-Würm interglacial but in the Mindel-Riss, which according to the theory was cold and dry. Even the climate in which Acheulean man lived has not been surely determined, for the interglacial which contains Acheulean implements also includes a loess. Allied to this is the difficulty that the Great Chalky Boulder Clay has features which show that the end of that particular glaciation was dry, though by Dr. Simpson's scheme it leads up to a wet warm interglacial. Finally, one of the fossils used most definitely as an index of a warm climate—*Corbicula fluminalis*—has recently been found associated with a marine cold fauna, and its climatic value is open to doubt. Dr. Simpson was not worried by these objections, maintaining that if his theory is correct, he had given geologists a useful means of aligning new discoveries, while existing discrepancies would gradually be cleared up.

One interesting point brought out in the discussion was that no difficulty exists from the astronomical point of view in the sun being a variable star. A range of 40 per cent means very little in terms of stellar magnitude, and is unimportant compared with some known variations.

Obituary

PROF. W. H. WELCH

THE death of Prof. William Henry Welch, of Baltimore, on April 30 at the age of eighty-four years, removes from the scientific world a man who enjoyed an international reputation as a reformer of medical education, sanitarian, pathologist and bacteriologist.

Shortly after obtaining his medical degree at Yale, Welch spent two years in Europe, where he studied normal histology, pathology, physiological chemistry and practical medicine at Strasbourg, Leipzig, Breslau and Vienna under the leading teachers of that day, visited various Paris hospitals and attended Lister's lectures at King's College Hospital, London. He was thus fully equipped with the latest and best medical teaching on his return to New York in the spring of 1878, where he was soon appointed lecturer on pathology at Bellevue Hospital Medical College.

In 1884 Welch was made professor of pathology at Johns Hopkins University and pathologist to the Johns Hopkins Hospital. Before entering on his new office, he made another journey to Europe, where he studied bacteriology and hygiene under von Pettenkofer, von Flüge and Koch. On his return he played an important part in the development of the Johns Hopkins Hospital, and was largely responsible for the election of the other three original members of the staff, namely, Osler, the physician, Halsted, the surgeon, and Kelly, the gynaecologist, who figure with him in Sargent's well-known picture. From 1893 until 1898 he was dean of the Johns Hopkins Medical

School, being succeeded by Osler. In 1916 he was appointed the first director of the new School of Hygiene and Public Health at Baltimore and held this post until 1926, when he became professor of the history of medicine in the Johns Hopkins University.

Welch's work may be summed up under the headings of sanitation, pathology, bacteriology and medical education. As president of the Maryland State Board of Health—an office which he held for twenty-four years—he played an important part in converting Baltimore, which had hitherto been a focus of typhoid fever, into a healthy city. His advice on sanitary matters was often sought by presidents of the United States and other public authorities, and it was due to him that a Yellow Fever Commission was created, which led to the discovery of the rôle of the mosquito in the spread of the disease. He was the author of numerous important articles on pathology, the best known being those on thrombosis and embolism, which were published in 1899 in Allbutt's "System of Medicine". In 1892 he described the *Staphylococcus epidermidis albus* and the *Bacillus aerogenes capsulatus*, the cause of gas gangrene, commonly known as the Welch bacillus.

As medical educationist, Welch is to be credited with having introduced modern methods into the medical schools of the United States and to have trained a large number of pupils, jocularly described as 'Welch rabbits', who afterwards attained a high distinction in the world of medical science.

time engaged in research work at Cambridge. His first book on "Buddhist Legends" appeared in St. Petersburg in 1894. In 1895 he was appointed to the chair of Indian languages and literature in the University of St. Petersburg, which he held for thirty years. His election to the Academy of Sciences in 1903 was followed in the next year by his appointment as permanent secretary of the Academy and soon after he was made director of its Asiatic Museum.

At this time Germany, France and Great Britain, through Grünwedel and von Le Coq, Pelliot and Stein respectively, were engaging in a campaign of intensive archaeological exploration in Chinese Turkestan. Attention had been attracted to this territory by the Russian expedition under Klements in 1898 and by Sven Hedin's explorations; but the full extent of the opportunities for archaeological research had been revealed only by Stein's discoveries. Russia's desire to participate in this important work in the field was met by the organisation under Oldenburg's direction of an expedition of exploration to the oasis of Kucha under the leadership of Berezowski (1906-7). Later, another expedition was sent out by the Academy under Oldenburg himself, which explored Karashahr and Turfan and brought back a rich store of manuscripts, paintings and sculpture from the caves of Tung-hwang discovered by Sir Aurel Stein. The results of the expedition were published in Oldenburg's valuable book, "The Russian Expedition to Turkestan" (1914: in Russian).

After the revolution of 1917, Oldenburg

retained his chair and his secretaryship of the Academy for twelve years. His experience in the organisation of research both at home and in the field was of material assistance to the Soviet Government in carrying out its desire to re-establish archaeological and ethnological exploration. In 1929, however, he was dismissed from his posts for political reasons by the Government; but he was so far readmitted to favour that the Academy and other scientific bodies were permitted to express recognition of the celebration of his seventieth birthday.

WE regret to announce the following deaths:

Col. Arthur Lynch, author of several original books on psychology, philosophy and relativity, on March 25, aged seventy-two years.

Prof. C. Matignon, professor of inorganic chemistry in the Collège de France, president of the Société Chimique de France, on March 18, aged sixty-six years.

Sir Thomas Muir, C.M.G., F.R.S., formerly superintendent-general of education in Cape Colony, author of works on the history of determinants, on March 21, aged eighty-nine years.

Prince Sixtus of Bourbon-Parma, whose expeditions to Central Africa produced valuable scientific results, on March 14, aged forty-seven years.

Dr. E. W. Washburn, chief chemist in the United States Bureau of Standards, on February 5, aged fifty-two years.

News and Views

Petroleum in Great Britain

OCCURRENCE of petroleum in Britain is once again in the limelight, this time focused by what, from a public point of view, seems to be sudden and dramatic action on the part of the Government. On March 22, the President of the Board of Trade announced in the House of Commons that the whole question of oil exploration has recently been reviewed following renewed activities in this direction. It is intended to introduce legislation forthwith to remove certain difficulties existent under the Petroleum (Production) Act 1918, and to secure orderly development of any oil which may be discovered. The most far-reaching and drastic proposal is that ownership of all petroleum at present unknown shall be vested in the State. A licence to explore for oil must be obtained from the Board of Trade, payment being made to the Exchequer on any oil produced. The bill was introduced in the House of Lords on March 22. In addition to the provisos mentioned above, the bill makes possible compulsory acquisition of rights to enter on land; further, that in considering any application made to the Railway and Canal Commission under that Act, the Commission shall have regard to the effect on the amenities of the locality. Compensation in respect of granting prospecting rights is to be made subject to

additional allowance of not less than ten per cent on account of compulsory acquisition.

OTHER clauses of the bill deal with the Board of Trade receipts and expenses in connexion with licences; payments to the Exchequer; the manner in which and persons by whom applications may be made; fees; size and shape of chosen areas; right to inspect all plans, etc., the Board throughout exercising its powers through the Secretary for Mines. The opportunity was obviously one too good to be missed by certain more sensational sections of the Press, which translated what is essentially a sober, political measure into actual discovery of oilfields; one paper even going so far as to give a map depicting the 'track of the oil belt' from the Humber to Cardigan Bay! In a long experience we doubt whether British geology has ever received such flagrant affront. Aside from technicalities, it is common knowledge that the existing licences held under the Act of 1918 are in respect of Hardstoft, Derbyshire (1923), Heathfield, Sussex (1930) and Three Bridges, Sussex (1931), trial borings also being made at Hythe, Kent, in 1929. In no case have these activities attained commercial status. The drilling epic of 1918-22, a War-time measure, though forgotten by the public, is still fresh