

cent instead of 50–60 per cent usual in the lateritic bauxites of the Peninsula); it is also unusually low in iron oxide and of high density and hardness. The quantity is considerable, and one day it will be used, perhaps, with the aid of electric power generated from the high-grade Nummulitic coals that overlie it stratigraphically, or from a projected hydro-electric installation on the Chinat River.

The second paper to be mentioned is on the "Possible Occurrence of Petroleum in Jammu Province" (*Rec. Geol. Surv. India*, 49, 191; 1919), in which he demonstrates the existence of a structure (the Nar-Budhan dome) suitable for the storage of oil, and existing in rocks identical with those of the existing oilfields near Rawalpindi in the Punjab. This dome has not yet been tested. During the course of this latter survey, Middlemiss succeeded in measuring the angle of the thrust-plane or reversed fault (the Great Boundary Fault of the Himalaya) between the Siwalik and Murree zones of formations near Kotli. The angle was found to be only 12°–15°, a much lower figure than had been previously assumed by all who constructed geological sections across the Himalaya, but an angle in accordance with the modern views of *nappe* structure.

This notice is already too long to permit more than a passing reference to Middlemiss's important memoir on "The Kangra Earthquake of April 4, 1906" (*Mem. Geol. Surv. India*, 38, 1; 1910). In this disastrous earthquake more than 20,000 persons lost their lives. Middlemiss shows that there were two epicentral tracts or foci, a principal one in the Kangra Valley of intensity 10 on the Rossi-Forel scale, and

a subordinate one in the Dehra Dun of intensity 8. These two foci were situated at the two places where the Sub-Himalayan zone of Tertiary formations embays in a north-easterly direction into the Lower Himalayan zone, and separated by the bulge or bastion of Lower Himalayan formations upon which Simla stands. The earthquake represents, in Middlemiss's view, an attempt to reduce these embayments.

L. L. FERMOR.

WE regret to announce the following deaths:

Prof. F. Akerblom, formerly professor of meteorology in the University of Uppsala, on July 24.

Mr. C. E. Fairburn, chief mechanical and electrical engineer of the London, Midland and Scottish Railway, on October 12, aged fifty-eight.

Mr. G. S. Fawcett, managing director of The Tintometer, Ltd., on November 8.

Dr. R. D. Gillespie, the well-known psychiatrist, on October 30, aged forty-eight.

Prof. V. E. Henderson, professor of pharmacology in the University of Toronto, on August 6, aged sixty-eight.

Dr. H. K. Sen, professor of applied chemistry in the University College of Science, Calcutta, during 1920–36, director of the Lac Research Institute, Namkum, during 1936–44, lately director of industries, Bihar, on June 3, aged fifty-seven.

Prof. C. E. Wright, professor of gunnery and mathematics in the Military College of Science, Woolwich, on October 30, aged fifty-nine.

NEWS and VIEWS

Royal Society Medal Awards

THE King has approved the recommendations made by the Council of the Royal Society for the award of the two Royal Medals for the current year as follows: Prof. J. D. Bernal, professor of physics at Birkbeck College, University of London, for his work on the structure of proteins and other substances by X-ray methods, and for the solution of many other problems requiring a physical approach; Dr. E. J. Salisbury, director of the Royal Botanic Gardens, Kew, for his notable contributions to plant ecology and to the study of the British flora generally.

The following awards of medals have been made by the President and Council of the Royal Society: Copley Medal to Dr. O. T. Avery, emeritus member of the Rockefeller Institute, New York, for his success in introducing chemical methods in the study of immunity against infective diseases; Davy Medal to Prof. Roger Adams, head of the Department of Chemistry, University of Illinois, for his extensive researches in the field of organic chemistry and his recent work in the alkaloid field; Hughes Medal to Prof. B. F. J. Schonland, Carnegie-Price professor of geophysics and director of the Bernard Price Institute of Geophysics in the University of the Witwatersrand, for his distinguished work on atmospheric electricity and of his other physical researches.

Paludrine: a New Anti-malarial Drug

PALUDRINE, or 4888 as it was first called, the new drug for malaria, which was announced at the annual meeting of the Liverpool School of Tropical Medicine

on November 5, was discovered in the laboratories of I.C.I. at Blackley, Manchester. The chemical work was directed by Dr. F. H. S. Curd and Dr. F. L. Rose, and the biological work by Dr. D. G. Davey. The substance has two outstanding points of scientific interest. First, it marks a complete departure in chemical structure from the known antimalarial drugs; it is not a quinoline like quinine and pamaquin, and it is not an acridine like mepacrine—an account of it, together with its constitution, will be given in papers which will appear shortly in the *Annals of Tropical Medicine and Parasitology*. Secondly, in avian malaria it has a powerful action not only on the blood forms of the parasite, but also on the so-called exoerythrocytic forms. The latter are now known to occur in almost every type of avian malaria, and it is the working hypothesis of the I.C.I. group of workers, as it is of some others, that these forms also exist in human malaria although they have never been demonstrated microscopically.

According to this hypothesis, the two major problems of malarial chemotherapy, namely, complete protection against benign tertian malaria by the prophylactic use of drugs, and a radical cure of benign tertian malaria, will be solved by the discovery of drugs with an action on exoerythrocytic forms. Paludrine has such an action on these forms in avian malaria, and there is some evidence, admittedly very incomplete, that unlike quinine and mepacrine, it acts upon the as yet undemonstrated exoerythrocytic forms of *Plasmodium vivax* and consequently that it gives a better protective action. The investigation is still proceeding.