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.

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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.

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# 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.

The workers at the Liverpool School of Tropical Medicine, under the direction of Prof. B. G. Maegraith and Dr. A. R. D. Adams, R.A.M.C. officers at Colchester and Woolwich, and Major-General Covell in India, are studying the effect of paludrine on the relapse-rate of benign tertian malaria, while in Australia a team of research workers in the Australian Army, led by Brigadier N. H. Fairley, is making an intensive study of its prophylactic action. The work of Brigadier Fairley is noteworthy for the great use which is made of volunteers, and the consequent rigorous control which is kept over all aspects of the experiments.

The full significance of all the work, which has been done under the auspices of the Medical Research Council, has still to be assessed, but paludrine appears to be a notable advance in the chemotherapy of malaria. The Liverpool workers, who were the first to treat human cases with the new substance, are impressed by the latitude allowed the clinician in treatment, for doses fifteen or twenty times the size of those necessary to control clinical symptoms can be given with impunity, while Brigadier Fairley is impressed by the remarkable suppressive action which the drug possesses. Unlike mepacrine, paludrine is not coloured and does not stain the skin. It is also a simpler substance, chemically, and it should be easier to manufacture. The two qualities, potential cheapness and freedom from undesirable effects at therapeutic doses, are themselves sufficient to make paludrine an important new drug.

## Government Support for Research Associations in Britain

ANNOUNCING in an address to the Conference of Industrial Research Associations on November 6 that grants to such associations would form a permanent part of the activities of the Department of Scientific and Industrial Research, Mr. Herbert Morrison, Lord President of the Council, declared that we need research workers to-day as much as in 1940, and that the Government will do everything possible to encourage British industry to use scientific research. It is essential that some of the money gained to industry by relief from taxation in the new Budget should be invested in research. Large concerns, he hoped, would establish or extend their own research departments, but smaller concerns should give their full support to existing research associations, for no single section of industry can do without this essential scientific partnership and remain virile. Moreover, Government support of industrial research must be backed by readiness to use its results, and firms which cannot maintain fully equipped research staffs of their own should employ at least some trained scientific workers who can co-operate with the appropriate research association and help in the interpretation and application of its work.

Expenditure on research should be regarded as an essential cost, and dealing with the finance of research associations, Mr. Morrison said that with larger incomes the research associations would be able to carry out more of the expensive development work. The Government has therefore decided that in suitable cases it will make single grants to finance capital expenditure for such special purposes as buildings and re-equipment, the purchase of particularly expensive apparatus or the provision of semi-scale plant. Until a research association attains an appropriate scale, the present system of a block grant and an additional grant will continue. Eventually, the additional grant will cease, but a new block grant will be made, to continue indefinitely so long as the Department of Scientific and Industrial Research is satisfied with the activities of the association. The associations, Mr. Morrison said, can rely on the Government to proceed as rapidly as possible with the release and training of promising research workers, and all possible assistance will be given for rebuilding or extending laboratories. Sir Edward Appleton, referring to the importance of first-class research workers, pointed out that a monastic life is not stimulating to the young scientific worker, and there should be the closest contact between the research associations themselves, and with the universities and other research establishments.

## Air Speed Record by Jet Propelled Aircraft

GROUP CAPTAIN H. J. WILSON, R.A.F., piloting a Gloster Meteor aircraft powered with two Rolls Derwent gas turbine engines, regained the speed record for Great Britain on November 7, flying over a course in the Thames estuary off Herne Bay. The officially recognized speed, being the average of four flights over the course in opposite directions, was 606·2 miles an hour. Mr. Eric Greenwood, the chief test pilot of the Gloster Aircraft Co., also flew a similar course, on another machine of the same type, averaging 603 miles per hour. The previous speed record was held for Germany by Fritz Wendel. This was set up on April 27, 1939, when he flew a Messerschmidt Bs.109R monoplane at 469·2 miles per hour.

The development of the Gloster machine is the result of research and experiment principally by Air Commodore F. Whittle in conjunction with Messrs. Power Jets, Ltd. The final design and construction of the aircraft and the engine were the responsibility of the Gloster Aircraft Co. and Messrs. Rolls Royce respectively. The attainment of such speeds is due to developments that are perhaps less obvious than the actual result. The production of a gas turbine having a thrust at the jet that gives, at 600 m.p.h., a horse-power of from two to three times greater than anything reached by the conventional aero engine is the most important factor. The use of jet propulsion allows this power to be turned into useful thrust more certainly than the usual airscrew method of propulsion could have accomplished. The problems of control of the aircraft at speeds approaching the speed of sound were unique and have been overcome by the aircraft designer. The machine was designed for lower speeds with earlier and less powerful engines, and it is a tribute to his foresight that it has been able to stand up to the increased stresses with a minimum of local strengthening involving no radical redesigning. The actual record-breaking aircraft was a production type of the standard R.A.F. Meteor that is now in service, and has been used in operations both over Germany and for shooting down flying bombs over Great Britain. Special preparation of the machine and the development of the general flying technique for the attempt has been under the supervision of Group Captain Wilson at Manston Aerodrome.

## International Council for the Exploration of the Sea

AT a meeting held in Copenhagen during October 15–19, attended by delegates and experts from Great Britain, France, Norway, Denmark, Sweden, Finland, Holland and Iceland, the International Council for the Exploration of the Sea was formally reconstituted for a five-year period, as from July 22, 1945. Though