

the wastes of panic expenditure. Complete reserves for very exceptional droughts are unnecessary so long as they are adequate for other emergencies and plans are prepared for surmounting the difficulties of exceptional drought. Long views must be cultivated, since large water schemes take years to carry out. Where neighbouring areas have common interests, needs can best be met and expenditure saved by the formation of regional committees. Since water is so much a matter of local provision, and it is so important for democratic government to avoid excessive centralisation, water authorities must shed their parochialism and work out regional policies which, when dovetailed, will provide a national policy of the best sort, namely one fashioned from the needs of the areas which have to be served. If they do not co-operate in this way, compulsion may have to be applied. For rural supplies, help must be, and has been, provided. But rural consumers must pay their fair proportion towards the cost. If all parties do their share, the back of the rural problem can be broken with the million of money made available by the Government.

#### Bacteriological Examination of Water

IN a report recently issued by the Ministry of Health, a routine procedure is described for the bacteriological examination of water supplies (Reports on Public Health and Medical Subjects, No. 71. London: H.M. Stationery Office. 9d. net). Hitherto, almost every laboratory has employed its own technique, so that reports by different analysts on the same samples of water may show considerable variation and discrepancies. In a quantitative procedure like water analysis, it is especially important that all workers should employ the same methods, otherwise results, and the interpretation thereof, must vary from one laboratory to another. The procedure described in the present report, drawn up by an influential committee which included the late Sir Alexander Houston, if generally adopted, should go far to ensure more uniformity than formerly. The Committee, while describing in detail the general procedures, allows considerable latitude for the determination of the various indexes of excretal pollution. One of the principal innovations is the substitution of agar for gelatin medium for the count at 20° C., and tables are provided by which the most probable numbers of *B. coli* in 100 ml. may be determined. Standards are suggested, and precise details are given for the taking of samples.

#### Finds in the Kharga Oasis

AT the British Museum, exhibits from the Libyan Desert have been arranged at the head of the main staircase, primarily for the International Congress of Anthropological and Ethnological Sciences which is being held on July 30–Aug. 4, but the exhibition will remain open until the autumn. Under the auspices of the Royal Anthropological Institute, the expedition was conducted by Miss Caton-Thompson, the geological work being undertaken by Miss E. W. Gardner. The oasis is an area below the general level of the

desert about 120 miles west of Thebes and 400 miles from the Mediterranean; and the most prolific sites on the floor of the Depression were fossil springs, which forced up sands and clays and formed mounds with the help of vegetation, such as palms and reeds. The mounds contain St. Acheul types of flint implements, with Aterian (Upper Palaeolithic) after an interval. There is a general likeness to specimens from Palestine, and typical Levallois artifacts include several plunging flakes. The remarkable gloss, like porcelain, on many hand-axes is here accounted for by the friction of sand-charged water. On the scarp of the Depression Tufa deposits have yielded a number of flint implements ranging from St. Acheul to a phase preceding the Sebilian of the Nile Valley. The deposits include three species of fig, with land and freshwater shells all of living species. The rainfall can be studied from the combined evidence; and the exhibits include specimens of raw material roughly shaped, a fine series of arrow-heads from the surface, and contemporary beads of ostrich egg-shell. Finally, there is an object-lesson in patination, flints of a single culture showing at least three kinds of surface alteration.

#### Panama Earthquake of July 18

THE first movements of a great earthquake were recorded at Kew Observatory on July 18 at 1 h. 48 m. 29 s., G.M.T., the record indicating that the centre was at a distance of about 5,800 miles, probably in the Pacific Ocean off Ecuador. On the same day, a series of severe earthquakes occurred in the isthmus of Panama, one of which was strong enough to cause such damage in Ciudad David, in the extreme west of Panama, that it will have to be almost entirely rebuilt. No serious injury, it is said, occurred in the canal itself. From the first brief accounts, it would seem that the origin may be connected with that of the Colombia earthquake of January 31, 1906 (about 135 miles west of Esmeralda), possibly also with that of the Ecuador earthquake of last October 2 (NATURE, 132, 779, Nov. 18, 1933), though perhaps to the north or north-west of both.

#### National Institute of Agricultural Botany

AT the annual general meeting of fellows of the National Institute of Agricultural Botany at Cambridge on July 19, the chairman of the Council, Sir John Russell, in the course of his address stated that the year 1934 is one of the most important in the history of British agriculture for it is the year in which great schemes of organisation are being attempted. Gluts are good for no one, and it is far better to obtain supplies by definite organisation than by trusting to luck. For successful organisation, the best materials are essential, and the Institute, though not concerned with schemes for the organisation of marketing, is concerned with technical problems connected with improvement of agriculture. Its activities cover three broad fields. It helps the farmer by advising him as to the best varieties: it helps the scientific worker by telling him whether a new variety is worth marketing: and it helps the

seed trade by forming a link between the genetical laboratory and the industry. The Institute is marketing this autumn a new oat, Resistance, which has yielded 32 per cent more than Grey Winter in the Institute's 1931-2 and 1932-3 trials; but this new variety requires clean, rich soil, and early autumn or February sowing in situations which are not too exposed, if its high yielding capacity is to be fully exercised. Sugar beet is another crop on which the Institute has done valuable work. The average yield for Britain is about 8 tons per acre. Many farmers, however, obtain 12-15 tons per acre. From this, it is apparent that the average yield can be, and will be, considerably increased if farmers grow the right strain.

#### Beit Fellowships for Scientific Research

THE following Beit Fellowships for Scientific Research at the Imperial College of Science and Technology, during the Academic Year 1934-35, have been awarded: New Fellowships for one year, renewable for a second year, to Mr. H. I. Stonehill, of East London College, for research into the applicability of the modern theories of strong electrolytes due to Debye, La Mer, Bjerrum, Davies, etc., the experimental work taking the form of measurement of the E.M.F. of certain cells, under Prof. J. C. Philip; Mr. J. R. Tillman, of the Imperial College, for research on electron diffraction, both from the point of view of studying crystal forms and the mechanism of diffraction, under Prof. G. P. Thomson; Mr. J. Bell, of the Imperial College, 1927-34, for a spectrographic investigation of hydrocarbon combustion, under Prof. W. A. Bone. Extensions of fellowships already satisfactorily held for one year have been awarded to Dr. K. Bailey, for research on seed mucocellulose and its relation to the chemistry and hydration of the plant cell wall; Mr. M. Blackman, for research in mathematics on the several different properties of crystal lattices with particular reference to the specific heat; and Mr. S. F. Boys, for research in chemistry and particularly a review of the theoretical work on optical rotatory power.

#### Beit Memorial Fellowships for Medical Research

IN announcing the awards made this year of Beit Memorial Fellowships for Medical Research, the trustees state that they were influenced by a special desire to promote research in relation to mental disease. The following elections were made, the subject and place of the proposed investigation being indicated after the name: *Fourth Year Fellowships* (£500 per annum): Mr. R. Hill, to continue his research on the properties of hæmoglobin and cytochrome (Dunn Institute of Biochemistry and Molteno Institute, Cambridge); Dr. L. H. Stickland, to continue work on the metabolism of the strictly anaerobic bacteria of the genus *Clostridium* (Dunn Institute of Biochemistry, University of Cambridge). *Junior Fellowships* (£400 per annum): Dr. S. Zuckerman, experimental study in animals of the neurovascular control of reproductive functions (Department of Human Anatomy, University of Oxford); Mr. H. W.

Fullerton, etiology and treatment of hypochromic anaemia of women of the poor classes (Department of Medicine, University of Aberdeen, and Rowatt Research Institute, Aberdeen); Mr. E. M. Lourie, chemotherapy in protozoal disease (Liverpool School of Tropical Medicine); Mr. J. S. Mitchell, effects of radiation on thin protein films (Laboratory of Colloid Sciences, University of Cambridge); Dr. D. E. Green, effect of hormones and vitamins upon metabolism of individual organs (Institute of Biochemistry, University of Cambridge); Dr. G. A. Grant, metabolism of galactose and the physiological synthesis of lactose by the active mammary gland (Lister Institute of Preventive Medicine, London); Mr. S. L. Cowan, to continue study of the chemical exchanges occurring in crustacean nerve, as a result of stimulation and oxygen want; to study the blood flow through the kidney during diuresis (Pharmacology Laboratories, University of Cambridge); Dr. M. Jowett, metabolism of the central nervous system with reference to the effects of narcotic and basic amines in cases of mental disorder (Biochemical Laboratory, Cardiff City Mental Hospital).

#### Thunderstorms and Lightning

PROF. B. F. J. SCHONLAND, of the University of Cape Town, has recently given an interesting account of recent advances in our knowledge of thunderstorms (Science Service of June 19). The first noticeable point is that the quantity of electricity stored up in the average thunderstorm is surprisingly small. It is only about twenty coulombs, that is, the quantity of electricity that flows through an electric glow lamp in a minute. The thundercloud generates this quantity in five seconds, and after maintaining it at this value for some time it is forced to let it disappear as a lightning flash at a pressure of about 5,000 million volts. It is this enormous pressure that makes the discharge so spectacular and so dangerous. The thundercloud machine is continuously generating electricity at this high pressure. The author estimates that a single cloud can develop three million kilowatts of power. The motive power behind this great electrical machine is the wind, which blows up from below the cloud with tremendous force, like a gale up a chimney. It is this upward current of air which supports the cloud which may contain 300,000 tons of water, and sometimes hailstones of considerable size are suspended by it. The photographs taken of flashes in South Africa by slow-speed photography show that at first a little tongue of light stretches earthwards about 50 yards from the cloud. The light then pauses and fades out for the ten thousandth part of a second. It then reappears and stretches another 50 yards and so on until the ground is reached. Branching tongues may come from it, but the instant the leader touches the ground the main part of the stroke begins. A brilliant flame sweeps upward from the ground towards the cloud retracing the path blazed by the leader. This second stroke is much quicker, lasting only about fifty millionths of a second. The full explanation of the mechanism of this phenomenon is not yet understood.