reported by B. Karlemo (Sweden) in a description of methods for production of geophysical maps.

At a joint evening meeting with the Danish Geophysical Society, D. Malmqvist (Sweden) gave a review of electrochemical ore-prospecting methods and emphasized the utility of this prospecting method. The 'polarization provoquée' method proposed by Schlumberger about forty years ago seems to be very suitable, especially in cases dealing with disseminated ores, and Mr. Malmqvist demonstrated some survey examples from northern Sweden.

The chairman, H. Brækken (Norway), introduced at the business meeting the very important problem of education of mining geophysicists. The meeting appointed a committee (Brækken, Werner and Tengstrøm (Sweden)) to consider the different points and to report at the next meeting.

With regard to the planning committee for the third meeting, which is contemplated within two years, the meeting appointed B. Tornqvist as chairman (Sweden), and H. Brækken, M. Puranen (Finland), and S. Saxov (Denmark) as members.

In all, the second Nordic Meeting for Mining Geophysics proved to be most successful, the attendance being about 100 per cent higher than at the first meeting at Boliden, Sweden, during November 7–9, 1956; the discussions were many and the opinion of the meeting strongly supported the arrangements for future meetings and co-operation in common problems. SVEND SAXOV

THE MEDICAL RESEARCH COUNCIL

REPORT FOR THE YEAR 1957–58

THE recent report of the Medical Research Council for the year 1957–58, prepared by the Committee of Privy Council for Medical Research, adopts once more the form now used for several years (Cmnd. 792. Pp. viii+288. (London: H.M. Stationery Office, 1959.) 13*s*. net). Instead, that is to say, of giving detailed accounts of all the researches in progress, it gives articles based on certain aspects of the Council's very varied programme, the intention being to deal, once every few years, with all the important fields of research undertaken by the Council's staff. These articles are also published separately under the title "Current Medical Research" (Pp. iii+46. (London: H.M. Stationery Office, 1959.) 3*s*. 6*d*. net).

In this publication and also in the report itself we are given a description of the Council's Laboratory in Gambia, West Africa. As part of its contribution to research in tropical medicine, the Council maintains three laboratories, in Uganda, Jamaica and Gambia, respectively, and that in Gambia here described is the oldest and largest. Unlike the others, it is self-contained and is not attached to any local institution. Situated at Fajara, it was originally part of the Council's Human Nutrition Research Unit in London, but its scope has now been widened to include research, not necessarily on tropical medicine, but in other fields as well. Many research workers use its increased facilities—cardiologists, chest and other specialists, pædiatricians, public health workers and others. The centre is visited by many research workers from Britain and has lately been used by a team representing the Council's Research Group on trachoma, a cause of blindness which, because of the menace it is, is engaging the attention of research workers all over the world. This centre is also developing research on the hyperendemic malaria of the Gambia region, a region which offers special facilities for work of this kind, and this is discussed in a separate article in the report. Much of it is done at Keneba, and to facilitate communication between Keneba and the laboratories at Fajara a radio-telephone has been set up, and the Wellcome Trust has generously provided a cabin-cruiser, *The Lady Dale*, which can also be used as a floating laboratory.

As well as the article just mentioned on the hyperendemic malaria of the Gambia area, the report includes articles on the remarkable work being done by members of the Council's staff on intracellular organelles and on the enzymes contained in them. Other articles discuss the work being carried out on the viruses of trachoma and inclusion blenorrhœa, the types of the bacillus that causes Sonne dysentery, the cancer-producing viruses and their immunology, the ultra-microscopic analysis of body fluids, the performance of coal miners in hot atmospheres, the fertilization of the mammalian egg and the rehabilitation of schizophrenic people. Another article of interest discusses research in general medical practice, a line of work which is much to be encouraged. An innovation in the report is the introduction of two photographs, one of which shows *The Lady Dale*, and two line illustrations.

For the rest the report contains its usual features. Brief summaries of the work of each of the Council's research units are given, together with the names and research addresses of the Council's many workers. A long bibliography lists the varied work that these workers have published. G. LAPAGE

COMPARISON OF RAIN-GAUGES

THE measurement of precipitation is a difficult problem because of the great variations in the nature of the precipitation and of the effects of wind eddies around the gauge. The radii of liquid drops and their rates of fall range from 0·2 mm. at 0·7 m./sec. of drizzle to 5 mm. at 8 m./sec. of the heaviest thunderstorm rain, while the speed of the wind around the gauge can vary over a somewhat greater range. Solid precipitation is even more difficult to measure. It ranges from fine snow to heavy fast-falling hail-stones and may at low temperatures completely choke the gauge if, as is usual, no heating is provided for melting. In addition to these inherent difficulties, rain-gauges must be cheap and simple to operate because, on account of the great variations in rainfall from place to place, it is necessary to have many of them widely distributed. Different types of gauge have been evolved in different countries in the endeavour to meet these difficult requirements.

The ordinary British type is fixed in the ground and has a catching cylinder with a diameter of 5 in., and which is set with the rim 1 ft. from the ground. Some Continental countries fix rain-gauges to posts so that the rim is 1 m. to 1·5 m. above the ground. The shapes of the interior of the cylinders differ considerably, while in some countries the catching cylinder is contained in a much wider coaxial cone called a shield intended to minimize the effects of wind eddies.

One of the basic principles of meteorological measurement is that observations, though their absolute accuracy is to some small extent inevitably uncertain, shall be comparable. With this aim in mind, the Royal Meteorological Institute of Belgium has recently completed a five years comparison of Belgian, British, German and French rain-gauges at the Uccle Observatory near Brussels and at Yangambi in the Congo. The work is described by Dr. L. Poncelet in a recent publication by the Institut Royal Météorologique de Belgique (Publications Série A. No. 10 : Sur le Comportement des Pluviomètres. Pp. 58. Uccle-Bruxelles : Institut Royal Metéorologique de Belgique, 1959). The results are analysed according to season, intensity and continuity of fall, occurrence of sunshine after rain (because of evaporation of some of the catch), and wind speed and direction. The amounts collected in individual months vary greatly from gauge to gauge and a long period of averaging is needed to produce a consistent pattern of differences. Over the whole period the differences were less than 1 per cent, with the German and French high-level gauges giving lower readings than the low-level Belgian and British gauges. Dr. Poncelet considers that different types of gauge can be compared to an accuracy of 1 per cent, and that the relation of the annual totals to the precipitation which would actually reach the ground where the gauge stands during a year is of the same order of accuracy. The accuracy is appreciably less for snow at 2–3 per cent.

Dr. Poncelet, in his capacity as chairman of the World Meteorological Organization Working Group on the International Comparison of Precipitation Gauges, has also written an article in the October 1959 edition of the World Meteorological Organization's *Bulletin* on the use of a specially designed international reference precipitation gauge. This gauge is fixed in the ground and has its rim at a height of 1 m. and is contained in a conical coaxial shield the width of which at rim-level is 1 m. Arrangements are in hand for comparisons to be made in most countries between the readings of this reference gauge and the national gauges. The latter may, it is believed, differ from one to another by 5–15 per cent. Most of the reference gauges will be made by the same (British) manufacturer. In any event, every effort is being made to ensure uniformity down to the degree of polish of the copper surface and the wetting properties of the polythene receiving bottle and measuring glass.

It is hoped that this comparison, which will take several years, will provide means of reducing rainfall observations for comparison with an accuracy of 1–2 per cent, which will permit computations of water balance to be made and rainfall maps drawn without discontinuities at national frontiers.

G. A. BULL

MEASUREMENT OF VISUAL RANGE

By DR. P. CROSBY

Department of Supply, Weapons Research Establishment, Salisbury, South Australia

TWO photoelectric instruments have been constructed at the Weapons Research Establishment, Salisbury, South Australia, for measuring the scattering coefficient, b, of the atmosphere. Because the associated 'visual range' V is more commonly understood, it is our practice to quote the results as 'visual range' values, where $V = 3{\cdot}912/b$ (see ref. 1).

Polar nephelometer. The first instrument is a version of Waldram's polar nephelometer[2]. The light source is an ionic flash tube. The light beam is defined by a baffle-box with square apertures. A second baffle-box with a photomultiplier tube forms the photometer. The apertures are square and the field of view of the photometer passes through the light beam. The photometer is rotated about a fixed point of the light beam to receive light scattered at various angles, from 15° to 165°. The volume of illuminated atmosphere that lies in the field of view of the photometer being known from the dimensions of the apparatus, a polar diagram of scattering of the light flux scattered by unit volume of atmosphere is obtained and extrapolated over the regions 0°–15° and 165°–180°.

The polar diagrams show a strongly forward scattering, indicating that most of the scattering is from large particles.

A measurement of the intensity of the source is made by directing the photometer at the source with a very dense neutral filter in the light-path. Integration of the polar curve produces a value of b or V.

The filter is required to prevent overloading the photomultiplier. Its transmission factor is calibrated against the reflexion of light from two magnesium oxide surfaces.

Integrating nephelometer. The second instrument is a version of the Beuttell and Brewer integrating nephelometer[3]. The light-source behind a piece of opal glass is an ionic flash tube. The photometer consists of a photomultiplier tube and baffle box with circular apertures. It is directed across the opal glass towards a black box in order to receive light scattered at angles between 10° and 170°. A correction of 6–7 per cent is required to allow for light scattered between 0°–10° and 170°–180°, according to the polar nephelometer results. The