

The main portion of the experiment hinged upon Ascension. The umbral cone passed from west to east, and was expected to affect in succession the strength in which signals were received at such stations as Demerara, Jamaica, the stations on the coast of the United States and Canada, stations in Ireland, England, France, Italy, the Mediterranean, and Egypt.

The shadow of the moon struck the earth first at dawn on the coast of South America and swept across the continent in the course of half an hour, at first with enormous velocity, but losing speed as the Atlantic Ocean was approached. About the middle of the Atlantic Ocean and near the equator the speed of the shadow was about one-third of a mile per second. On crossing the African continent from the Gulf of Guinea to the Mozambique Channel the speed gradually increased, and the eclipse finished at sunset near Madagascar. The effects of the moving shadow were investigated under three heads:—

- (1) Strays.
- (2) Signals not crossing the denser parts of the shadow.
- (3) Signals crossing through or near the umbra.

#### *Strays.*

These were bad on the day of the eclipse and on the preceding day in Europe, North America, and temperate latitudes on the Atlantic Ocean. They were very few in Central and South America and in the central equatorial Atlantic. In Central America the conditions were exceptional meteorologically, the day having less rain than nearly every day of the preceding three weeks. The preliminary survey of the results recorded throughout the part of the globe reaching from Constantinople to Rio de Janeiro suggests that there was no outstanding occurrence in regard to frequency or intensity of strays that could be directly ascribed to the passage of the shadow.

#### *Signals not Traversing the Dense Shadow.*

Many observations were made in northern Europe and America on the signals from the Azores, which were arc-signals of 4700 metres wave-length. The observing points extended from Berlin through Holland, France, Italy, Spain, and Great Britain to stations near the Atlantic coast of the United States. There were no unusual variations in the strength of the signals from the Azores.

Another class of experiment comes under this heading. It was suggested by the effect sometimes observed at sunset or sunrise, in which the twilight band when on one side of a transmitting station appears to strengthen as if by reflection the waves received at a station on the other side of the transmitting station. In order to test whether such reflections occurred during an eclipse certain stations on the south of the central line of the eclipse were asked to listen to Ascension, which was also south of the central line. The stations at Durban and Port Nolloth (South-West Africa) found no trace of the effect, and, in fact, the former concluded that the signals from Ascension were rather worse after the eclipse began. An analogous experiment on the northern side was carried out by one of the Malta stations and also at Rosyth, listening to Cairo, with similar conclusions.

#### *Effect of Signals Passing across the Central Line.*

Arrangements were made for the transmission of signals from the Darien station of the Panama Canal zone, and several stations in South America attempted to receive the signals. The report from the Falkland Islands has not yet come to hand, and the other stations in South America did not succeed in picking

up the signals. The only observation made on the earlier stages of the eclipse are those of Demerara listening to Ascension. Fluctuations in signal strength are reported, but no steady increase or decrease in strength. Ships at sea within the penumbra report a strengthening of all signals during the eclipse. The most striking results were obtained at some of the stations in France, Malta, and Teneriffe. At Meudon and at Rousillon the signals from Ascension were received practically only while the eclipse was in progress. Both Malta and Teneriffe found that the eclipse produced a great improvement in the strength of signals. On the other hand, Durban was unable to pick up Cairo, though this is usually possible, but Aden was picked up with greater intensity than normal. On the whole, the records show that the improvement in signal strength reached its highest value long before the umbra intervened between the stations, and this value persisted after the umbra had passed; that is to say, if ionising processes are the cause of the change in the strength of signals, the results indicate that the processes are practically fully accomplished in a given region of the air before the arrival of the umbra at that place, so that there appears to be nothing left for the umbra to do in the few minutes of complete shadow it brings.

The thanks of the committee are due especially to the Admiralty for arranging that their stations at Ascension and the Azores should transmit the necessary signals, and also to the American Government for making similar arrangements regarding Saville and Darien. Thanks are due also to the American, French, and Italian Governments, the Admiralty, the War Office, the Air Ministry, and Marconi's Wireless Telegraph Co., Ltd., for undertaking observations and recording the variations in signal strength.

### UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—The council of the Senate reports that, after consultation with Sir W. J. Pope, it is considered desirable to establish a professorship of physical chemistry, the stipend of 1000l. per annum to be furnished out of the benefaction of the British Oil Companies.

The General Board of Studies has recommended the appointment of Mr. A. Amos, of Downing College, as University lecturer in agriculture. This appointment is proposed in view of the new scheme of study in agriculture, extending over three years, and the large increase of students in the department of agriculture.

GLASGOW.—President Poincaré was installed as Rector of the University on November 14, and delivered his rectorial address in English to an assembly of four thousand students and other members and friends of the University in St. Andrews Hall. The proceedings were conducted in admirable order, the students recognising that M. Poincaré was not only their Rector, but also the honoured chief of an Allied State, visiting this country as his Majesty's guest. The Vice-Chancellor, Sir Donald MacAlister, K.C.B., conferred on him the degree of LL.D. *honoris causa* before the installation. The Vice-Chancellor wore the Cross of Commander of the Legion of Honour, with which the President had privately invested him before the public ceremony.

At a meeting of the University Court held afterwards, the Rector in the chair, a number of important gifts to the University were announced. Among them were contributions amounting to about 20,000l. for the erection of a memorial chapel in commemoration

of graduates and students who had fallen in the war; and 2000*l.* from Mr. Bonar Law and other heirs of the late Mr. J. R. K. Law, of Glasgow, for the foundation of a post-graduate studentship in applied science, to be held by bachelors of science pursuing advanced study or research at universities or scientific institutions in Canada, the United States, or France. The Rector was also asked to accept, on behalf of the French Government, a collection of about 500 volumes, chiefly Scottish, illustrative of the ancient Franco-Scottish alliance. These had been contributed by members of the University as a fraternal gift to the University of Nancy, in M. Poincaré's native province of Lorraine, the library of which had been completely destroyed by a German incendiary bomb in October, 1918, a few days before the armistice. The Rector accepted the gift, and presented to the University of Glasgow a fine Sèvres vase for the Hunterian Museum as a souvenir of his visit. In the afternoon President Poincaré was made an honorary freeman of the City of Glasgow.

Mr. John T. Cargill has offered the University a gift of 20,000*l.* to found a chair of applied physics.

DR. R. H. PICKARD, F.R.S., principal of the Municipal Technical School, Blackburn, has been appointed principal of the Battersea Polytechnic.

MRS. MARIA LOUISA MEDLEY has bequeathed 20,000*l.* to the University of Oxford to be applied for a George Webb Medley scholarship for the promotion of the study of political economy.

LORD MILNER, Secretary of State for the Colonies, has appointed a Committee to consider whether the staff of the Agricultural Departments in the Colonial Services is adequate, and, if necessary, to recommend increases of staff; to consider whether the rates of salary offered to the agricultural staff are adequate, and, if necessary, to suggest improvements; and to make recommendations for improving the arrangements for recruiting agricultural staffs for the Colonies. The members of the Committee are:—Sir Herbert Read, Assistant Under-Secretary, Colonial Office (chairman); Lt.-Col. Sir David Prain, director of the Royal Botanic Gardens, Kew; Sir Henry Birchenough, chairman of the Empire Cotton-growing Committee; Prof. J. B. Farmer, professor of botany, Imperial College of Science; Sir Francis Watts, Imperial Commissioner of Agriculture for the West Indies; Major R. D. Furse, Assistant Private Secretary (Appointments), Colonial Office; and Mr. F. L. Sidebotham, of the Colonial Office (secretary).

THE KING has approved the appointment of Royal Commissioners to consider the applications which have been made by the Universities of Oxford and Cambridge for financial assistance from the State, and for this purpose to inquire into the financial resources of the Universities and of the colleges and halls therein, into the administration and application of these resources, into the government of the Universities, and into the relations of the colleges and halls to the Universities and to each other, and to make recommendations. The Commissioners constitute one body, but are authorised to sit for purposes of inquiry in three separate committees. They consist of the following:—*Chairman of Commission*: Mr. H. H. Asquith. *Oxford Committee*: Mr. H. H. Asquith (chairman), Lord Chalmers, Sir John A. Simon, the Very Rev. T. B. Strong (Dean of Christ Church, Oxford), Sir H. A. Miers (Vice-Chancellor of Manchester University), Prof. W. H. Bragg (Quain professor of physics in London University), Prof. W. G. S. Adams (Gladstone professor of political theory and institutions, Oxford), Miss Emily Penrose (Principal

of Somerville College, Oxford), and Mr. Albert Mansbridge. *Cambridge Committee*: Mr. G. W. Balfour (chairman), Mr. Arthur Henderson, Sir W. Morley Fletcher (fellow of Trinity College, Cambridge), Sir Horace Darwin, Mr. G. M. Trevelyan, Dr. H. K. Anderson (Master of Gonville and Caius College, Cambridge), Miss B. A. Clough (Vice-Principal of Newnham College, Cambridge), Dr. Montagu R. James (Provost of Eton College), and Prof. A. Schuster (secretary of the Royal Society). *Committee on Estates Management*: Lord Ernle (chairman), the Hon. Edward Strutt, Sir Howard Frank, Sir J. H. Oakley (past-president of the Surveyors' Institution), and Mr. H. M. Cobb (fellow and member of the council of the Surveyors' Institution). The secretary of the Commission is Mr. C. L. Stocks. There are three assistant secretaries, namely:—For the Oxford Committee, Mr. Marcus N. Tod, fellow and tutor of Oriel College, Oxford; for the Cambridge Committee, Mr. Edward Bullough, fellow of Gonville and Caius College, Cambridge; and for the Estates Committee, Mr. C. B. Marshall. The offices of the Commission are at 2 Queen Anne's Gate Buildings, Queen Anne's Gate, S.W.1.

## SOCIETIES AND ACADEMIES.

### LONDON.

**Physical Society**, October 24.—Prof. C. H. Lees, president, in the chair.—Dr. N. W. McLachlan: The effect of pressure and temperature on a meter for measuring the rate of flow of a gas. The theory of an instrument for measuring the rate of flow of a gas is outlined, the effects of variation in the temperature and pressure of the gas being taken into consideration. This theory is tested experimentally for pressures varying from 1250 to 250 mm. Hg, and for temperatures from 10° C. to 100° C. It is found to be fairly accurate. The results are applied to the measurement of the rate of flow of gas on an aeroplane in the upper atmosphere, where a reduction in temperature and pressure is encountered. It is shown that the instrument reading for a certain N.T.P. volume of gas depends on the altitude, but that this volume can be obtained by using a correction factor.—Capt. J. H. Shaxby: A cheap and simple microbalance. The instrument, devised for bacteriological use, had to be cheap and moderately robust. It consists of a long horizontal fibre joining the lower ends of two vertical beams, each pivoted very little above its centre of mass. A small weight acting at the middle of the fibre thus causes a considerable depression. This is read off by arranging a slider on a vertical millimetre scale about 2 ft. in front, so that the middle of the fibre and a second short fibre placed just behind it are in line with a "peephole" on the slider. Adjustment is provided for quickly and largely altering the sensitiveness. The deflections are converted to masses by the use of calibrating weights. The apparatus is built up from a "Meccano" set.—J. W. T. Walsh: The resolution of a curve into a number of exponential components. The paper gives a method for the resolution of a curve of the compound exponential form

$$B = \sum a_i e^{-\lambda_i t}$$
 into its components, the values of  $a$  and

$\lambda$  for the  $n$  different exponential terms being found from  $2n$  values of  $B$  equidistant along the axis of  $t$ . A method is also given for finding the most probable values of these constants from any number ( $>2n$ ) of observed values of  $B$  taken at irregular intervals of  $t$ .

**Aristotelian Society**, November 3.—Prof. James Ward, president, in the chair.—The **President**: Inaugural address: In the beginning . . . The problem that the uni-