accomplishments are the measuring of the charge on the electron and the study of cosmic radiation. Former recipients of the Roosevelt medal for work of a scientific nature include: Prof. Henry Fairfield Osborn, president of the American Museum of Natural History; Dr. Frank M. Chapman, curator of ornithology for the Museum; Dr. Herbert Putnam, librarian of Congress; and Richard E. Byrd, explorer.

Cambridge Philosophical Society

A BRILLIANT company assembled in the hall of Pembroke College, Cambridge, on Saturday, November 12, to celebrate by a dinner the centenary of the grant of a Royal Charter to the Cambridge Philosophical Society. Dr. A. Hutchinson, the Master of the College and president of the Society, was in the chair, and the occasion was honoured by the presence of H.R.H. Prince George. Among other distinguished people present were Mr. Stanley Baldwin, Chancellor of the University, the presidents of the Royal Society and of the British Association, and presidents or directors of many other leading scientific societies and institutions. The toast of the Society was proposed by Prince George and replied to by Dr. Hutchinson. The Master of Trinity proposed the toast of the guests, and responses were made by Mr. Baldwin and Sir William Bragg.

IN his reply to the toast of the Society, Dr. Hutchinson gave an interesting account of its origin and early work, and he was able to show that throughout its existence members of the Royal Family have honoured it by their favour and patronage. H.R.H. the Duke of Gloucester, a nephew of King George III and Chancellor of the University, accepted the office of patron on November 19, 1819, and made a handsome donation to the funds of the Society. Two years later H.R.H. Augustus Frederick, Duke of Sussex and a younger son of King George IV, became a vice-patron of the Society; afterwards he accepted the office of president of the Royal Society. When the Charter was granted by King William IV in 1832 he specifically confirmed his two kinsmen in their offices. The Prince Consort was patron of the Society when he was Chancellor of the University; and Dr. Hutchinson in the course of his speech said that he had been empowered by the Council of the Society to propose that the office of patron be revived, and that the present Chancellor, Mr. Baldwin, be invited to accept it. In his speech later in the evening, Mr. Baldwin stated that he regarded the office as one of high honour and accepted the invitation with pleasure.

Gaseous Combustion at High Pressure

AT the meeting of the Royal Society on November 10 when the Duke of York was admitted to the fellowship of the Society, Prof. W. A. Bone gave an account of Parts 14, 15 and 16 of his researches on gaseous combustion at high pressure. These record an exploration of the phenomena of explosion of hydrogen-air and carbon monoxide–air mixtures into regions of pressure much higher than those hitherto examined and the apparatus specially designed for the purpose was described. Hydrogen–air mixtures explode quite normally with initial pressures up to 500 atmospheres but at 750 atmospheres detonation occurs with violence sufficient to damage the apparatus. Carbon monoxide–air mixtures have been successfully exploded at initial pressures up to 1,000 atmospheres. As previously observed, the nitrogen is activated, absorbing during the early stages energy which is released during the later stages so as to retard the cooling of the products. This activated nitrogen reacts with excess oxygen, if present at the high temperature of explosion, giving oxides of nitrogen, the formation of which is favoured by increase of pressure. Nitric oxide dissociates readily during the process of cooling, so experiments were made in which the cooling is accelerated by causing the gas to expand suddenly at a predetermined instant after firing. Exploding mixtures of ($2CO + 3O_2 + 2N_2$) at an initial pressure of 70 atmospheres, the yield of nitric oxide is 5·4 per cent, and results at 88 atmospheres indicate a probable maximum of about six per cent. Such yields exceed those previously recorded but are probably insufficient to serve as a basis for the commercial fixation of nitrogen by explosive combustion. Experiments were shown to demonstrate how a rise of pressure increases the luminosity of carbon monoxide–air flames and leads to the formation of oxides of nitrogen.

Heavy Oil Aeroplane Engine

THE Air Ministry has issued some particulars of the first British heavy oil aeroplane engine. The Rolls-Royce 'Condor' compression ignition engine has successfully passed an Air Ministry test of 50 hours, and flight tests are now being undertaken in a Hawker 'Horsley' aeroplane. The engine has been developed from the 'Condor' petrol aeroplane engine, which has been strengthened where necessary to take the increased forces due to the raising of the compression ratio from 6½ to 12½. The maximum explosion pressure within the cylinders is 800 lb. per square inch. At the normal speed of 1,900 revolutions per minute, the engine develops 500 brake horse power. The increase in weight over that of the petrol engine is less than ten per cent, the engine weight being 1,504 lb. or 3 lb. per brake horse power, a weight-power ratio which represents a very large reduction over that of the Beardmore 'Tornado' engines installed in the airship *R 101*. As a petrol engine, the Rolls-Royce 'Condor' has a weight-power ratio of approximately 2 lb. per brake horse power. Assuming that the fuel consumption of the heavy oil engine is twenty-five per cent less than that of the petrol engine, there should be a saving in the total weight of engine and fuel for a lengthy flight such as the present types of aeroplanes are capable of making. In addition, the experimental flight tests are intended to investigate the extent to which the size of the radiator and the weight of cooling water can be reduced as compared with standard petrol engines.