about December 10; he will then stay at Java for some time to recover from the fatigues of the voyage before his return home on board a mail steamer. It may be recorded with satisfaction and thanks that the commander, the officers, and the crew of the submarine did all they could to facilitate the fulfilment of his task.

After the receipt of particulars about the rest of the voyage up to the arrival at Surabaya, I propose to give a brief account of the later results and to complete the present information.

Since the above was written, I have received from Washington the isostatic reductions of the observations made between Helder and Curaçao. These have been computed by the U.S. Coast and Geodetic Survey as a token of appreciation of the work of Dr. Vening Meinesz, which is justly considered to be of international interest. I must express here a word of thanks for this valuable co-operation, especially to Dr. William Bowie, Chief of the Division of Geodesy.

For the present it may suffice to mention that the excess of gravity in the Atlantic is confirmed, after the isostatic reductions have been taken into account.

The Burning of Carbonic Oxide.

IT was a sound movement on the part of the directors of the Gas Light and Coke Company to invite Prof. Bone to lecture before the Company and others on the work which he is carrying out on gaseous combustion, and particularly on the investigations made by Mr. F. R. Weston, the first holder of the Gas Research Fellowship, founded by the Company three years ago, at the Imperial College of Science. Prof. Bone had no difficulty in proving what important scientific results can be secured by means of such endowments of research, and Mr. Milne Watson, governor of the Company, showed that he realised that the development of chemical industries depended on the successful prosecution of strictly scientific investigations in the laboratory.

After comparing and contrasting the flames of hydrogen and carbonic oxide, and the effect of their mixture in water-gas, Prof. Bone took up the tale of the burning of carbonic oxide as it began to be studied in Oxford fifty years ago, when H. B. Dixon, in repeating Bunsen's experiments on the distribution of oxygen between hydrogen and carbonic oxide, showed that the latter apparently did not react directly with oxygen but was oxidised by the steam, and that the final division of the oxygen depended on an equilibrium being established between this and the reverse action—the reduction of the carbon dioxide by the hydrogen:

$$CO + H_2O \rightleftarrows CO_2 + H_2.$$

The non-inflammability of dried mixtures of carbonic oxide and oxygen led to many conjectures as to its cause, and as to the mechanism of steam in the reaction. That no chemical reaction can take place without 'conducting' water; that *liquid* water particles are the necessary electrical go-between; that gases can only react molecule with molecule, *i.e.* in equal volumes; that the oxygen molecule is too stable to be broken up, but steam is more yielding—these and other explanations were advanced by men of scientific eminence. For some years Dixon has held the more prosaic view that the direct oxidation of carbonic oxide in explosions is limited by the thermal dissociation of the carbon dioxide molecules, and that steam afforded the means of producing comparative cool molecules. The burning of dry cyanogen and the direct union of carbonic oxide and oxygen in contact with heated platinum seemed to show that steam was not essential, but this and the function of the steam were matters of inference. No direct proof of what happened in the flame was forthcoming.

Prof. Bone, whose first research on gaseous combustion, carried out at the Owens College, was the study of the slow union of carbonic oxide and oxygen when circulated over heated surfaces, now brings forward direct evidence of two kinds. He shows, first, that a very well-dried mixture of the two gases, which cannot be inflamed by an ordinary spark, can be exploded (at all events partially) when the electric discharge is made sufficiently powerful. In such conditions the flame traverses the bulb containing the mixture, though not with violence, and a large percentage of the gas combines in the flame. Again, Prof. Bone and Mr. Weston have shown that as the moisture is gradually removed from the mixture, the energy of the condenser discharge required to ignite it progressively increases. Lastly, the spectra of the flames of the well-dried mixture, the moist mixture, and of mixtures containing hydrogen have been photographed. The flame of the dried mixture burning under 25 atmospheres pressure shows a *continuous* spectrum and no steam lines. The flame of the undried mixture shows a strong *continuous* spectrum overlying a '*steam-line*' spectrum. On the addition of hydrogen the continuous spectrum grows less and the lines emerge, so that there is direct evidence that two reactions are taking place simultaneously in the ordinary flame—the direct oxidation of carbonic oxide by oxygen, and the indirect oxidation by steam. The intense electric discharge, on one hand, and the high pressure on the other, can confer on carbonic oxide the power of direct union with oxygen; in the presence of much steam the indirect reaction is predominant; with traces of steam both reactions occur together.

University and Educational Intelligence.

BIRMINGHAM.—The degree of D.Sc. has been awarded to Sydney Raymond Carter for numerous published papers on the oxidising properties of sulphur dioxide and other subjects.

LEEDS.—Sir Berkeley Moynihan, Bart., has resigned the professorship of surgery on his retirement from the full staff of the Leeds General Infirmary. In recording its regret at Sir Berkeley's retirement, the Council referred to his brilliant career as student in the Yorkshire College, with which the Leeds Medical School became incorporated, and after. "Throughout his career he has followed the tradition of the Leeds Medical School in bringing scientific knowledge into the service of surgery. With this he has associated a consummate skill in the art of surgery, thereby contributing substantially to the efficacy of surgical methods and the accuracy of diagnosis."

LONDON.—A lady, who desires to remain anonymous, has offered the University the sum of 10,000*l.* towards the establishment of a chair of dietetics.

Subject to certain conditions, the offer of Mr. J. G. Wilson to present to the University a 24-inch reflector telescope has been accepted. Lady Godlee is giving a sum of money, to be held in trust for University College and University College Hospital Medical School, to found a Rickman Godlee Lectureship in memory of her husband, the late Sir Rickman J. Godlee. The managing director of the Vultex Products, Ltd., on behalf of Mr. Patrick Gow, is to give a sum of money for three years for lectures on colloidal chemistry.

The following doctorates have been conferred:—*D.Sc. in Botany* on Mr. T. G. Hill, University reader in plant physiology, for a thesis entitled "The Water Economy of Maritime Plants"; *D.Sc. in Physics* on Mr. S. C. Roy (King's College), for a thesis entitled "On the Total Photo-electric Emission of Electrons from Metals as a Function of Temperature of the Exciting Radiation"; *D.Sc.* (*Engineering*) on Mr. L. B. Pfeil (Imperial College, Royal School of Mines, and Battersea Polytechnic), for a thesis entitled, (1) "The Deformation of Iron, with particular reference to Single Crystals," and (2) "The Effect of Cold Work on the Structure and Hardness of Single Iron Crystals, etc."; *D.Sc. in Chemistry* on Mr. T. H. Durrans, for a thesis entitled "The Preparation of Sulphuryl Chloride and the Chlorination of Substances of the Aromatic Series"; together with subsidiary contributions.

Dr. Percival Hartley has been awarded the William Julius Mickle Fellowship for 1927 in respect of the work which he has carried out during the past five years on special problems in connexion with diphtheria and other problems of a more general character in connexion with serology and immunity. The Fellowship this year is of the value of about 280*l*.

THE Educational Commissioner with the Government of India in his Report for 1924–25 gives a new and very convenient summary of statistics showing totals of 88,750 students, 5700 teachers and 7500 graduations in arts and science of the fifteen universities. 52 per cent. of the students, 50 per cent. of the teachers, and 48 per cent. of the graduations belonged to the two universities of Calcutta and Madras; Bombay and the Panjab account for 25 per cent. of the students, 21 per cent. of the teachers, and 20 per cent. of the graduations; leaving 29 per cent., 23 per cent. and 32 per cent. respectively as the share of the remaining eleven universities. These eleven, namely, the recently reconstituted Allahabad University and the ten new universities of Aligarh, Benares, Dacca, Delhi, Hyderabad (Osmania University), Lucknow, Mysore, Nagpur, Patna, Rangoon, had in the aggregate not much more than two-thirds of the number of students of the single university at Calcutta. An act constituting a new "Andhra" university was passed in 1926. Every one of the universities had a faculty of arts; all except the Osmania University of Hyderabad (Deccan) had a faculty of science; all except Aligarh and Mysore a faculty of law; all except Aligarh, Allahabad, Benares, Dacca, Delhi, Nagpur, and Osmania, a faculty of medicine. There were faculties of education at Aligarh, Madras, Nagpur, Patna, and Rangoon; of theology at Aligarh, Benares, and the Osmania University; of agriculture at Madras and the Panjab; of forestry at Rangoon; of engineering at Calcutta, Madras, Mysore, Patna, and Rangoon; of economics at Allahabad and Rangoon; of commerce at Allahabad, Lucknow, and the Panjab. The total expenditure on universities, arts colleges, professional colleges, and intermediate colleges in India in 1924–25 was Rs. 83,76,000, Rs. 1,06,28,000, Rs. 65,16,000, and Rs. 28,00,000 respectively; in all Rs. 2,83,20,000 or, say, 2,124,000*l*. The sources from which the expenditure was met were: Government funds Rs. 1,43,29,000, district board and municipal funds Rs. 76,000, fees Rs. 1,08,43,000, other sources Rs. 30,73,000. Universities, notably Bombay and Calcutta, have received in recent years substantial additions to their resources through the generosity of private donors, but it will be seen that they are in the main dependent on Government funds and fees.

Contemporary Birthdays.

December 26, 1838.	Sir W. Boyd Dawkins, F.R.S.
December 26, 1881.	Sir Thomas Lewis, F.R.S.
December 28, 1882.	Prof. A. S. Eddington, F.R.S.
December 28, 1853.	Dr. Alexander Scott, F.R.S.
December 30, 1850.	Dr. William Garnett.
December 31, 1849.	Prof. Sydney H. Vines, F.R.S.

Sir WILLIAM BOYD DAWKINS, honorary professor of geology and palæontology in the University of Manchester, celebrates his eighty-eighth birthday to-morrow. We offer our very hearty congratulations. A fellow of the Geological Society for sixty-five years, he will, next year, attain diamond jubilee fellowship of the Royal Society. He is the author of two classical works, "Cave Hunting" and "Early Man in Britain."

Sir THOMAS LEWIS, born at Cardiff, was educated at Clifton College; his medical training was conducted at University College Hospital, London. Eminent in long-continued developmental studies relating to the mechanism and clinical disorders of the mammalian heart-beat, he has established conclusions of prime importance in physiology and practical medicine. Sir Thomas was Croonian lecturer at the Royal Society in 1917, delivering an address on "The Excitation Wave in the Heart."

Prof. EDDINGTON was born at Kendal. A student at Owens College, Manchester, he graduated at Trinity College, Cambridge, as senior wrangler, and was Smith prizeman. He was chief assistant at the Royal Observatory, Greenwich, from 1906 until 1913, leaving this post to become Plumian professor of astronomy in the University of Cambridge. Prof. Eddington was president of the Royal Astronomical Society, 1921–23; in 1924 he received its gold medal for his work on star-streaming, on the internal constitution of a star, and on generalised relativity. In the same year he was awarded the Henry Draper medal of the National Academy of Sciences of the United States.

Dr. A. SCOTT, a native of Selkirk, and educated there at the Grammar School, graduated at the University of Edinburgh, and also at Trinity College, Cambridge. From 1896 until 1911 he was superintendent of the Davy-Faraday Research Laboratory, Royal Institution. Dr. Scott was president of the Chemical Society, 1915–17, after many years of service to the Society in various administrative capacities.

Dr. GARNETT, born at Portsea, was educated at the City of London School and Royal School of Mines. Proceeding to St. John's College, Cambridge, he graduated fifth wrangler, becoming later a fellow of his college. Entering the Cavendish Laboratory, he had the distinction of being the first demonstrator of physics there under James Clerk Maxwell. After teaching at University College, Nottingham, he did valuable work as principal of the Durham College of Science. The advancement of technical education in London and elsewhere claimed earnest attention at his hands; from 1904 until 1915 he was educational adviser to the London County Council. Dr. Garnett is Hon. D.C.L., Durham.

Prof. VINES, distinguished as a botanist, is a Londoner. Educated privately, he graduated at Christ's College, Cambridge. For many years he was Sherardian professor of botany in the University of Oxford. He was president of Section K (Botany) at the Bradford meeting of the British Association in 1900, when he gave, in his address, a conspectus of botany in the nineteenth century. Prof. Vines was president of the Linnean Society, 1900–4.