1916–17, including a high-grade copper ore from a boulder near Port Lockroy on the Neumayer Channel. The description of the varied lavas of Deception Island in both this and Mr. Tyrrell's paper is surely an argument in favour of collation and co-operation.

The reports of the British Antarctic ("Terra Nova") Expedition of 1910, published by the British Museum, are concerned, however, with another quadrant of the antarctic region. In the geological series, Nos. 3 and 4, recent and older sedimentary deposits are described by Mr. F. Debenham, from his personal observations as geologist to the expedition. Metamorphic rocks are dealt with in No. 5; but their relationships in the field are as yet but little known. Dr. A. Smith Woodward's account (No. 2) of "Fish remains from the Upper Old Red Sandstone of Granite Harbour," including Bothriolepis, provides more definite information. The remoteness and perils of the district excuse the uncorrelated nature of the results, and no doubt also explain the handsome method of their presentation in the year 1921–22. G. A. J. C.

Durability of Optical Glass.

By Dr. JAMES WEIR FRENCH.

IT is the custom of optical glass manufacturers to issue long lists of types characterised by their optical constants, without much regard to their qualities of durability, which are only occasionally indicated. To the practical computer these lengthy lists are not imposing. Experience has taught him that the number of sufficiently trustworthy types is really very limited, and that only in exceptional circumstances, that fortunately do not frequently arise, may an extension of his list be justified. But while the possibility remains that glass of an unstable kind may be used in the construction of his instruments, the optician has cause for anxiety in the knowledge that his reputation as well as the glass may become tarnished.

The British Scientific Instrument Research Association, the function of which is to provide for the industry the leaven of science, has been charged with the investigation of the durability of glass. According to the admirable report[1] that has recently been issued, "the object of the Research was to determine how far it was possible to establish simple tests by which the durability of different types and varieties of optical glass could be quickly ascertained without awaiting the results of experience by actual use over an extended period." To what extent this object has been attained may be realised from the frank confession at the conclusion of the report, that "it is not possible to recommend any simple test by which the durability of an optical glass can be determined, with such reliability as to avoid the chance of misleading users of the glass in some one or other application of it." With this pessimistic conclusion it is difficult to agree, as the object has already been attained in the workshop, if it is agreed that it is the reflecting or transmitting qualities of the surface with which the optician is concerned.

From the report it appears that numerous tests of Continental and British types of optical glass have been examined by the iodoeosin test of Mylius, the autoclave water and steam tests at four and two atmospheres of pressure, and the "dimming" test evolved by the Royal Arsenal Directorate of Chemical Inspection, which co-operated in the research. This dimming test is really an elaboration of the Zschimmer test. The three tests as applied indicate merely to what extent alkali can be dissolved from the surface, and, as is to be expected, the flint glass types appear more durable than the crown types—a conclusion that is misleading, as the report rightly indicates. Our industrial atmosphere unfortunately contains sulphuretted hydrogen, and if in the dimming test an atmosphere more representative of reality had been employed, the flint types would have been placed more nearly in the order accorded to them by Faraday.

The report confirms the interesting fact, already known in the workshop, that in the glass-polishing process alkali is dissolved from the surface layer, which, with a few exceptions, becomes more durable. Workshop experience shows that a new cloth polisher tested with litmus will usually be found to be slightly acid; after a few hours of working it will be neutral; and thereafter it becomes strongly alkaline. A pitch polisher reacts similarly, but it does not retain the dissolved alkali to the same extent.

The optician is concerned in practice not so much with those so-called optical glasses that are visually affected by the tests referred to, as with those that are labelled as being durable and unaffected. If a well-polished specimen of the most durable crown glass be boiled in water at atmospheric pressure for two hours and its reflecting power be then tested by means of a multi-reflection photometer, a loss of ¼ per cent. per reflection may be detected. After boiling for eight hours, the loss will be about 2 per cent., but thereafter the rate diminishes.

The drastic autoclave tests adopted in the research are not necessary to demonstrate how many of the types included in the optical glass-makers' lists are vitreous substances of but little value and a source of danger to the unwary.

[1] Report of an Investigation on the Determination of the Durability of Optical Glass carried out by T. Haigh. Pp. 51+10 plates. (British Scientific Instrument Research Association, 26 Russell Square, W.C.1.) 7s. 6d.

Volcanic Activity in Nigeria.

REPORTS have been received by the Governor from Mr. A. A. Reading, of the Bibundi Estate, of a recent volcanic eruption in the Cameroons Mountain, near the coast of Nigeria. Repeated earthquake shocks commencing on February 3 last were followed by an eruption at an altitude of about 4000 feet on the north-west side of the mountain, giving rise to a lava stream which flowed down in the direction of the Bibundi Estate, and entered the plantation area on March 3. The lava extended, roughly, one-third of a mile out to sea, and huge columns of steam were continually ascending. Attempts to photograph the scene failed on account of the dense smoke and ashes. The centre of the group of craters was estimated to be distant 9900 yards from the house at Bibundi Beach on a magnetic bearing of 128°, and the height above sea-level was believed to be about 4150 feet.

In May the northern stream was still advancing, and threatened to reach the sea along the water-courses on each side of Dollmanshohe. Sometimes there was a loud noise resembling that of a blast

furnace; at other times there was a series of explosions that sounded like big guns firing. On some days there were showers of ashes, which were so heavy that they broke the leaves of the palm trees.

When on open ground the lava stream came along like a wall of red-hot rock 30 or 40 feet high, which kept falling away in front as it advanced, but when it came down the deep ravine between Wernerfelde and Retzlaffelde, it flowed like a red-hot river moving at the rate of about 2 feet a minute. Mr. Reading threw a big stone on it to see if it would make a splash, but although it was moving and looked liquid, the stone bounded off just as if the lava were solid rock.

Since the outbreak of the volcano no severe earthquake shocks have been experienced, though the house was frequently felt to be shaking and two or three slight shocks were noticed.

Mr. Reading went round the edge of the lava in a canoe where it projected into the sea. He could not approach nearer than about 300 yards on account of the heat. At that distance the sea was so hot that he could not put his hand into it, and dead fish abound.

University and Educational Intelligence.

BIRMINGHAM.—Applications are invited from graduates in medicine of the University, of not more than five years' standing, for the Walter Myers travelling studentship (value 300*l.* for one year) for research in any branch of medicine or pathology approved by the selection committee. The studentship is tenable at any university, laboratory, or other approved institution, and the holder must devote his whole time to research. Full information is obtainable from the Registrar of the University.

LEEDS.—A Gas Research Fellowship, value 200*l.* per annum, established by the Institution of Gas Engineers at the University of Leeds for the prosecution of post-graduate research in gas chemistry, has been awarded to Mr. S. Pexton. For the last two years Mr. Pexton has worked in the department of coal gas and fuel industries of the University.

LONDON.—Applications are invited for the William Julius Mickle fellowship, which is of the value of at least 200*l.*, and awarded annually to the man or woman resident in London and a graduate of the University, who, in the opinion of the Senate, has done most to advance medical art or science during the preceding five years. Particulars respecting the appointment may be obtained from the principal officer of the University. All applications for the fellowship must reach him by, at latest, October 2.

ST. ANDREWS.—The honorary degree of LL.D. will be conferred on the Prince of Wales on the occasion of his contemplated visit at the end of September. There will be no public graduation ceremony.

THE Commissioners of the Exhibition of 1851 announce that Senior Studentships for 1922 have been awarded to the following: Mr. J. S. Buck (Liverpool), research student in chemistry, of the University of Liverpool; Mr. G. T. R. Hill (London), research student in aeronautics, of the University of London, University College, late experimental engineer and pilot to Handley Page, Ltd.; Mr. A. E. Ingham (Cambridge), research student in mathematics, of the University of Cambridge; Mr. J. E. Jones (Victoria), lecturer in mathematics, of the University of Manchester; and Mr. C. E. Tilley (Adelaide and Sydney), research student in geology, of the University of Cambridge. Science Research Scholarships (Overseas) have been awarded, on the nomination of the institution mentioned, as follows: Mr. J. M. Luck (University of Toronto), for biology; Mr. W. H. McCurdy (Dalhousie University), for physics; Mr. D. F. Stedman (University of British Columbia), for physical chemistry; Miss Marie Bentivoglio (University of Sydney), for crystallography; Mr. J. S. Rogers (University of Melbourne), for physics; Mr. J. C. Smith (University of New Zealand), for chemistry; and Mr. I. Low (University of Stellenbosch), for meteorology.

DR. W. D. HENDERSON, professor of zoology in the University of Bristol, has been appointed Ray Lankester Investigator at the Marine Biological Laboratory, Plymouth.

THE *Chemiker Zeitung* announces that the Society of Friends of the University of Jena has at its first annual meeting granted a sum of 700,000 marks for scientific purposes and 200,000 marks for the assistance of students. Of the first sum, 200,000 marks is for the Chemical Institute.

AN appointment is to be made by a committee of the Royal College of Physicians of London and of the Royal College of Surgeons of England of a Streatfeild research scholar. The scholarship was founded for the promotion of research in medicine and surgery and is of the annual value of about 250*l.*, tenable at the discretion of the committee for three years. Applications, marked "Streatfeild Scholarship," and stating the nature of the proposed research and where it will be carried out, should reach the Registrar of the Royal College of Physicians of London, Pall Mall East, S.W.1, on or before October 2.

STATISTICS for 1920–21 of 93 State Universities and State Colleges have been published by the United States Bureau of Education (Bulletin, 1921, No. 53), under the heads—teaching force, student enrolment, and property and income. Most of these institutions were originally "Colleges for Agriculture and Mechanic Arts," and their agricultural and engineering schools are still far larger than all their other professional departments put together; but nearly all of them have departments of arts and sciences, and seventeen have graduate departments with not less than 50 students each. The largest teaching staffs are maintained in the following universities: California (1016), Cornell (905), Minnesota (837), Illinois (780), Wisconsin (731), Ohio (569), and Michigan (543). Thirty-four other institutions have more than 100 teachers. Of the total number of teachers (about 15,000) one-sixth are women. Salaries of presidents (most of whom are provided with free quarters in addition) range in general between 5000 and 12,000 dollars; those of professors between 2000 and 6000. The student (regular term) enrolments in the seven large universities named above were: 14,445, 5771, 11,282, 8739, 7573, 7584, and 9611. Forty-two other institutions have enrolments exceeding 1000. Women students constitute nearly a third of the total. Besides the regular term students there are some 60,000 summer school students, of whom nearly two-thirds are women. Almost every one of the State universities and State colleges holds a summer school. Endowments exceeding, in each case, five million dollars, are possessed by the Massachusetts Institute of Technology, Cornell University, and the universities of Texas, California, and Washington. It is remarkable that in no less than five States the private benefactions received by the State universities and State colleges during the year amounted to one-fifth or more of their total incomes.