

of the party. "We all associate Scott's disaster with the terrible Barrier blizzards, and in the end a blizzard did prove fatal, but at this time a blizzard, a succession of blizzards would have been the salvation of them all."

The temperatures experienced by Scott on the south of the Barrier were between 10° and 20° F. below the normal for the time of year. In these conditions the returning party struggled on, becoming weaker and more dispirited every day. On March 16, Oates made his heroic sacrifice in order to give his companions a chance of safety. Then at last—on March 20—the blizzard did come. But it came too late, and continued too long. When it commenced the party had food and fuel enough to reach the depôt at One Ton Camp only eleven miles away, but as the blizzard continued to rage day after day the fuel was used and food consumed.

"There is little doubt that this blizzard removed the cold stagnant air and the conditions over the Barrier became much better for sledge travelling. But it was too late; by the time the blizzard ceased, every man of the polar party had passed away, and in doing so had left a record and created a tradition of which every Englishman is, and always will be, proud."

Movements of the Earth's Crust.

PROF. HANS STILLE of Göttingen has issued, under the title of "Die Schrumpfung der Erde" (Berlin: Borntraeger; price 1s. 8d.), a "Festrede" given to his university, in which he aptly reviews old and new theories as to the effect of the earth's contraction on the features of the surface. He holds that the conception of a general contraction towards the interior is well founded; but there are many ways in which it may become manifest by wrinklings of the outer crust. He finds that what G. K. Gilbert styled "epeirogenic" (now written "epirogenetic") movements, the sinking or uplifting of the crust over wide areas, are more in need of explanation than the folding of mountain-ranges, which has been differentiated as "orogenic." The rhythmic pulsation, however, that causes mountain-building to occur simultaneously and even catastrophically over the whole earth presents an unsolved problem. Prof. J. Joly has suggested in a recent lecture (NATURE, May 5, p. 603) that the heat generated by radioactive minerals accumulates at intervals of some millions of years and so causes a catastrophe. Cooling of the uplifted layers by their being brought into proximity with the overlying oceans starts a new era of quiescence.

We may ask, with an equal sense of adventurous speculation, if the pulsation may not be still more primordial and connected with the beating of the last heart of an undivided universe. Prof. Stille keeps us from any such rash imagining; but he points out that the facts of orogenic episodes are opposed to the uniformitarian doctrines of von Hoff and Lyell, which are applicable only to the intervals between great crustal foldings. Epirogenetic movements occur during these intervals, and characterise the epoch in which we live. On the whole, the earth loses heat by radiation faster than it acquires it by contraction; in this remark we recognise an adherence to views that some geologists regard as quite old-fashioned.

Prof. Stille's ten pages of "Anmerkungen" are almost as readable as the text of the pamphlet, since he adds to a wide range of references critical observations on many of the opinions cited. He remarks that Wegener's epochs of continental drift do not coincide with those in which orogenic movements actually occurred. In these notes the author writes, as others have lately done, "Thetys" for Suess's well-chosen

name "Tēthys," possibly by a confusion of Thetis, daughter of Nereus, with the wife of Okeanos, lord of the great outer seas. A. Sander's review of diastrophism and earth-history (*Geol. Rundschau*, vol. 13, p. 217, November 1922) should be read in connexion with Stille's memoir. Its author concludes similarly in favour of the contraction-theory, but regards epirogenetic movements as not necessarily very slow. Like Stille, he points out that we are moving a little way back to the views of the catastrophists.

The Steel Works of Hadfields, Ltd.

VISIT OF H.R.H. THE PRINCE OF WALES.

MUCH scientific interest is attached to the visit paid by H.R.H. The Prince of Wales to the works of Messrs. Hadfields at Sheffield, on May 29, when he started up the new 28-in. rolling mill, which has been installed at the firm's East Hecla works. This marks an important phase in the transition from war to peace production of this great establishment, the head of which is Sir Robert Hadfield, whose discovery of manganese steel in 1882 may justly be said to have originated the development of modern alloy steels. The new reversing 28-in. blooming and finishing mill is unique in several respects, having been designed to deal satisfactorily with steels of special nature, and in particular it is equipped with all the necessary improvements and labour-saving devices to obtain the most economical production. The mill motor has a maximum rating of 11,600 horse-power, and is supplied with current from a fly-wheel motor generator set, the cast-steel fly-wheel of which is 11 ft. 6 in. in diameter and 30 tons in weight. The mill motor is capable of being reversed from full speed in one direction to full speed in the other direction in three or four seconds. The rolls are 28 in. in diameter, and from 6 ft. 6 in. to 7 ft. long, being manufactured by Messrs. Hadfields of their special forged steel, and the mill is capable of rolling 15-in. square ingots, weighing 25 cwt., and reducing them to 2½-in. square billets at one heat. It will also be used for rolling special alloy steels, and rails up to their heaviest sections and 55 ft. long in manganese steel. The rolling plant accessories are all of the most modern type, including the necessary appliances for special treatment of manganese steel. The whole works show that British engineering is quite capable of designing, manufacturing, and running rolling mills and other steel plants second to none in the world. In addition to the 28-in. mill, the rolling plant also includes 11-in. and 14-in. mills for rolling round and square bars of alloy and other special steels.

An interesting feature of the Prince of Wales's visit was that he cast his own portrait on a plaque or medallion 22 in. in diameter of Hadfield manganese steel. The medallion was designed by Mr. S. Nicholson Babb, who has several sculptures in this year's exhibition of the Royal Academy. In the course of his tour the Prince was shown a number of exhibits illustrating the scientific work of the Hadfield Research Department. These included a complete equipment for all branches of the mechanical testing of iron and steel, and the latest apparatus in use for iron, steel, and fuel analysis, and oil testing. The scientific instruments used in the exact control of the heat treatment of special steels were also shown, and it is of interest to note that at one time no less than 15,000 pyrometer readings per week were taken in the works in the various steel making and treating departments. A demonstration was

also given of the effect of low temperature on the properties of steel. Other interesting research exhibits included furnaces and methods of testing refractories; also apparatus for testing the electrical and magnetic properties of steel and its micrographic structure. A visit was paid to the firm's experimental proof butt in which are developed the large calibre projectiles for which Messrs. Hadfields are notable. Exhibits of historical interest included old metallurgical books from the valuable collection of Sir Robert Hadfield, and a number of ancient iron specimens from Egypt, India, etc. The Prince was also shown the original small transformer made in 1903 of the low hysteresis steel invented by Sir Robert Hadfield, which material, on the authority of Dr. T. D. Yensen, has since saved the world a sum equal to the cost of the Panama Canal.

Technology and Schools.

THE Association of Teachers in Technical Institutions held its annual conference on May 21 at Leicester. The new president, Mr. W. R. Bower, of Huddersfield Technical College, delivered an address on the position of technical education, in the course of which, after quoting with approval the views on this subject expressed in the Board of Education's Draft Regulations of 1917 for Continuation, Technical, and Art Courses, he described the aim of technical teachers as "to blend education with the life and work of the people." The special characteristic of their method is to bring education by means of part-time courses, not only to the homes of the people, but also into their workshops and offices. Comparing their work with university work, he said, "Our principal function is to develop character and mentality by means of higher education amongst the many: the university should be more concerned with the individual and his fitness to become a specialist of the first order; their successes so far have been in letters, mathematics, and science rather than in technology, even if physicians and lawyers are included amongst the technologists." The principal problem of technical education is "the satisfaction of the ambition of the young adult as a scholar, a craftsman, and a citizen."

Among other matters touched on in the address were: the increase since 1859 of the number of students in technical institutions from 500 to nearly a million; and science courses in secondary schools. "Dabbling in technology" is strongly condemned, as is the planning of school science courses for direct connexion with possible university courses or advanced professional study. On the other hand, close correlation with the work of the local technical college is commended. Mr. Bower also referred to the imminent prospect of publication by the Burnham Committee of a list of technical qualifications of teachers to be deemed equal to degrees—a prospect regarded with mingled feelings by the teachers, who foresee excessive stress being laid on paper qualifications. It was stated that the source of supply of prospective technological teachers is to be found only in industrial districts. The admission of advanced technical students to share in post-graduate and research work in universities, even when they do not hold the ordinarily pre-requisite degrees, was mentioned, and it was maintained that this concession would be of considerable benefit to the universities.

A resolution was passed by the Conference pressing for a committee of inquiry with the view of correlating technical education with education generally.

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University and Educational Intelligence.

ABERDEEN.—Prof. Matthew Hay has resigned the position of Medical Officer of Health to the City of Aberdeen, which he has held for thirty-five years.

CAMBRIDGE.—Mr. S. M. Wadham, Christ's College, has been reappointed as senior demonstrator in botany. It is proposed to confer an honorary M.A. degree on Mr. H. F. Bird.

LONDON.—A course of four free public lectures on "Tropical Hygiene" will be delivered by Dr. A. Balfour, of the Wellcome Bureau of Scientific Research, at St. Bartholomew's Hospital Medical College on June 12, 14, 19, and 21, at 5 o'clock.

Notice is given that the election of a Sharpey physiological scholar will shortly take place. The scholarship, which is of the value of 200*l.*, is for one year, but renewable in the department of physiology at University College. Applications, with particulars of academic training and list of publications, if any, must be sent by, at latest, June 23, to the Secretary of University College, Gower Street, W.C.1.

MANCHESTER.—The Court of the University has approved of the institution of a special diploma in bacteriology. This is the first diploma in this subject instituted in this country, and the courses of instruction which candidates will be required to attend before presenting themselves for examination are designed to supply a thorough training in the general principles of the subject, together with advanced courses in one or more special branches. Graduates in medicine and in science of any approved university may enter for the course, and the syllabus has been designed to meet the requirements of medical graduates who wish to qualify for bacteriological posts or to obtain a special knowledge of medical bacteriology, and of graduates in science who desire to take up some branch of bacteriological work. The diploma will be awarded to candidates who, after graduation in science or in medicine, have attended the prescribed courses over at least one academic year, satisfied the examiners in the written and practical examinations, and presented a satisfactory thesis on an approved subject. It is hoped that the action of the University in instituting this new diploma will meet the needs of a considerable number of post-graduate students for whom no adequate provision has hitherto been made, and will help to supply efficiently trained bacteriologists for the numerous posts for which they are now required.

A NUMBER of research studentships are being offered to university graduates by the Empire Cotton Growing Corporation, and will be awarded in July next. The studentships, which are each of the annual value of 250*l.* plus certain extra allowances, are intended to provide opportunities for additional training in scientific research bearing on plant genetics and physiology, entomology, physics, etc., or for the study of those branches of tropical agriculture which may be of service in agricultural administration or in inspection in cotton-growing countries. A studentship is offered by the British Cotton Industry Research Association to candidates having special knowledge of physics, engineering, or technical technology. Accepted students must be prepared to spend the period of their studentship at the West Indian Agricultural College, Trinidad, or in some other