

barren stony tracts, with highly inclined slabs of rock and a fringe of fallen blocks, call to mind descriptions of kopjes.

Prof. Watts, in an interesting essay (*Geographical Journal*, June), shows clearly that here we have the "veritable peaks and arêtes" of a mountain system, formed of slates, hornstones, and agglomerates, with intruded syenites and granites, which jut out from a thick covering of Triassic marls, with basement breccias and sandstones.

Pre-Cambrian in age, these rocks have been subjected to various earth-movements, producing cleavage and jointing, and such intense induration that they appear to be equally strong, and the structures probably were impressed upon them in Cambrian times. Be this as it may, Prof. Watts concludes that they must have formed a mountainous tract in Old Red Sandstone times, and that then the mass was cut up by rapid streams into fiord-like valleys with ever-sharpening ridges. Some features are indicative of marine action, and it is probable that these were formed when the area was submerged in Lower Carboniferous times, and the ridges appeared as islands. After re-elevation in Permian times, subaerial waste contributed the materials of the breccias, and the conditions led on to those of the Trias, when salt-lake and desert, akin to the features of the Great Salt Lake and of Baluchistan, characterised the scene. The landscape which had been blocked out in Old Red Sandstone

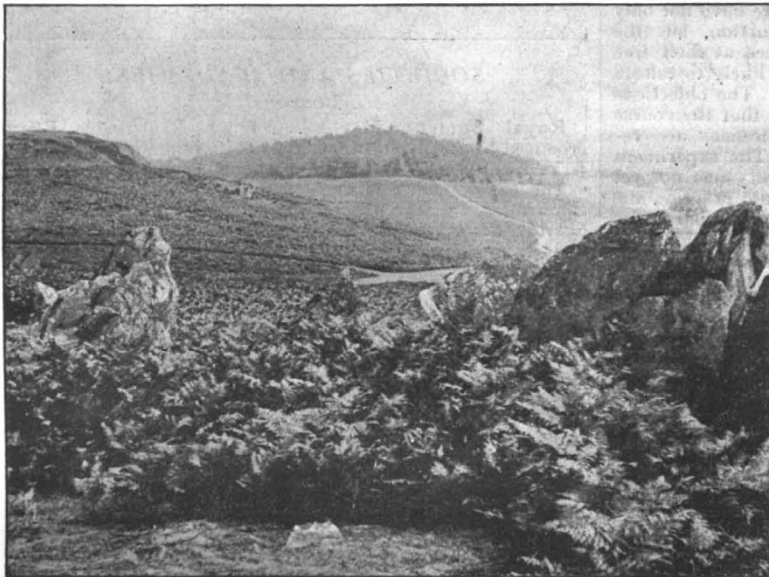


FIG. 1.—Bradgate Park, Charnwood Forest. Crags of Charnian Rock rising from Triassic ground. (From the *Geographical Journal*.)

times, and modified in the Carboniferous period, was now subjected to much weathering, and ultimately the thick deposits of Keuper Marl buried up many, if not all, of the summits, to be partially revealed again by later denudation. Not until the Glacial period is there any positive evidence of the subsequent exposure of the ancient rocks, but blocks from the higher summits do appear in the Boulder-clay of the neighbourhood.

Of the development of the present features Prof. Watts gives an interesting sketch. The Trias appears to have filled fiords which have been revealed by the present streams, and although they have deepened and altered the character of the older rocks when they excavated to them, the main outlines of the old scenery, uncovered by the denudation of the Keuper Marls, belong to the original Triassic landscape. As he points out, the granite of Mount Sorrel, when unbarred for quarrying, shows often a smoothed and terraced surface, which was at first attributed to glaciation. More recently these surfaces have been found to extend beneath coverings of Keuper Marl, and the evidence is conclusive that the rounding and terracing must have been due to wind-erosion in the Triassic deserts before the peaks were buried under the Keuper Marl. H. B. W.

### UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—Mr. Howard Marsh, surgeon to St. Bartholomew's Hospital, London, and formerly professor of pathology and surgery at the Royal College of Surgeons of England, has been elected to the professorship of surgery, which has been vacant since the death of Sir G. M. Humphry, F.R.S.

Prof. Ewing, F.R.S., has sent in his resignation of the chair of mechanism and applied mechanics, to take effect on September 30.

Mr. C. E. Inglis, King's, and Mr. A. H. Peake, St. John's, have been appointed demonstrators in the engineering department.

Mr. W. E. Hartley, Trinity, has been appointed assistant observer at the observatory, *vice* Mr. A. Graham, retired.

THE eleventh summer meeting of university extension students was opened last Saturday at Oxford, when the United States Ambassador, Mr. Choate, delivered the inaugural address, taking for his subject American university education. After describing how Harvard was founded in 1636, and referring

to the rise of the other older universities in the United States, such as Yale and Columbia, Mr. Choate explained that it was found at the beginning of last century that, if American universities were to hold their own, they must greatly increase their numbers, change their methods, and assume new and closer relations with the people. At that time there were only twenty-six colleges and universities in the whole territory of the United States, and many of these were in an undeveloped state. They are now numbered by hundreds, many of them richly endowed, and most of them furnishing an adequate training, adapted to qualify youths for business and for any duty to which they may be called. These new colleges are not all on the same model, but afford a wide choice of courses of study to suit the varied necessities of a diversified community. With the exception of a few of the older States which are already well provided with them by private means, each State in the Union has, by the use of public funds and lands, created a State university; and it has been the ambition of several of their multi-millionaires to create universities by the generous application of portions of their fortunes. By this means powerful institutions of learning have been created in a few years. The University of Chicago, founded in 1892, and endowed chiefly by the generosity of one man, now numbers more than 3000 students. By far the most signal advance in university extension yet made in America is the latest in date—the creation of the Carnegie Institute at Washington—with an endowment of ten million dollars to be devoted absolutely to original research. Another reason for the success of the efforts to improve university education in the United States was brought out by Mr. Choate, who made it clear that the work of the universities, colleges, and technical schools rests on the broad and firm foundation of the common schools, which from the beginning have been the peculiar care of the people, and that educational authorities in America adhere rigidly to the theory that special study for professional or business life should be postponed until a broad and general education has developed the faculties and character. Referring to the Rhodes scholarship scheme, Mr. Choate remarked that it provides that henceforth there shall at all times be at Oxford 100 American youths selected from all the States, there to receive the best fruits of her nurture and instruction. "And now would not some rich American respond to Mr. Rhodes's challenge, and forthwith in his lifetime make a similar and equal provision for 100

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young Britons—English, Scotch, and Irish—to be maintained at universities in the United States?"

THE Lord Mayor of Liverpool, Mr. W. Watson Rutherford, has received in his capacity of chairman of the university committee the charter of the new University of Liverpool. Since the publication of the first draft of the charter, a clause has been added specifying that degrees representing proficiency in subjects of technology shall not be conferred without proper security for testing the scientific and literary knowledge underlying technical considerations. Mr. Rutherford has addressed a letter to the Liverpool City Council suggesting that the new university "be directly allied with the city, and should be free," and the letter is to be considered by the council as we go to press. In his letter Mr. Rutherford says:—"Let the matriculation examination be as severe as any in the country, and let every degree remain as high a standard of knowledge as that of any university in the world; but let there be no fees, no financial barrier whatever to the poorest citizens of Liverpool obtaining all the advantages of the Liverpool University," and he goes on to point out that a maximum rate of one penny in the pound would cover the students' fees and leave a considerable margin. The letter maintains that another benefit would be a sense of proprietary interest in the university on the part of the citizens of all classes in Liverpool, who would thereby at this juncture have not only elementary, secondary, and technical instruction, but the highest regions of advanced education, placed at their free disposal, and would, therefore, be far more likely to take a keener interest in the Liverpool University. The objections that what is not paid for is not valued, and that the course proposed would discourage private munificence, are regarded by Mr. Rutherford as ill-founded. The experiment of conducting a free university in this country has not yet been tried, and should the proposal be put into practice, the results will be awaited with keen interest by all who desire the spread of higher education. At the first meeting of the council of the university held on Tuesday, Lord Derby, the Chancellor, pledged himself to the utmost of his power to help to lay the foundations of a university in which studies of the arts, science, and other subjects should receive all possible expansion. Mr. E. K. Muspratt was appointed president, and Mr. J. W. Alsop vice-president, of the university council.

THE Board of Education has published "Syllabuses and Lists of Apparatus Applicable to Schools and Classes other than Elementary" for next session, that of 1903-4. The divisions in science and art subjects other than mathematics, formerly described as Elementary Stage and Advanced Stage, are now described as Stage 1 and Stage 2, and the divisions in science subjects, formerly known as Honours Part i. and Honours Part ii., are now described as Stage 3 and Honours. We notice that the examination tables supplied to mathematical candidates have been revised, and that notice is given that the alternative Stage 1 of theoretical inorganic chemistry will probably be discontinued after next session's work. Section i. of the first stage of the hygiene syllabus has been transferred to the subjects in which the Board of Education does not hold examinations. The second part of the volume is wholly devoted to two sets of syllabuses, styled concise and detailed respectively, in a great variety of subjects suitable for evening continuation schools, but in which the Board does not hold examinations.

NEW buildings, for which the sum of 80,000*l.* is required, will shortly be erected for University College, Reading. Of this amount, 30,000*l.* has already been contributed by five donors, including 10,000*l.* given by Mr. G. W. Palmer, M.P., and 10,000*l.* by Lady Wantage. The late Lord Wantage was president of the college from 1896 to 1901.

THE "Year-book" of the Armour Institute of Technology at Chicago for the session 1903-1904 contains not only full particulars of the courses in mechanical, electrical, civil, and chemical engineering, as well as in architecture, at the College of Engineering, but also of the preliminary studies which have been arranged at the Armour Scientific Academy, where students are prepared for the more advanced work of the college. Taking into their own hands in this way the early training of their engineering students, the

authorities of the Armour Institute are able to provide the professors with students possessing a sufficiently good education to benefit by the lectures.

THE issue of *Science* for June 19 reprints Prof. R. H. Thurston's address at the dedication of Engineering Hall, Iowa State College. The subject chosen is the functions of technical science in education for business and the professions, and in the course of the address Prof. Thurston pleads powerfully for the full recognition of the importance of scientific knowledge to men whose business is in any way connected with technical matters. Perhaps the part of the address which will most interest the English reader is that which deals with the employment of American students after they have left the universities or colleges. The demand for college-trained men seems to be much greater in America than it is here, the "captains of industry" in that country having apparently realised the value of sound theoretical training in those whom they put in charge of their technical manufactures. "I have a deep file of letters calling for such men," says Prof. Thurston. "There is practically none unemployed unless on the sick list. All the professional engineering schools are thus situated. Turning out a thousand or more annually, the whole output is absorbed by the great industries, and immediately upon leaving the doors of the college." Can English professors say the same?

## SOCIETIES AND ACADEMIES.

LONDON.

**Royal Society, May 28.**—"On a Remarkable Effect produced by the Momentary Relief of Great Pressure." By J. Y. Buchanan, F.R.S.

The experiment was made first during the cruise of the *Challenger* on March 27, 1873, in lat. 21° 26' N., long. 65° 16' W., where the depth of the sea was 2800 fathoms, and it was repeated on board the yacht *Princesse Alice* (H.S.H. the Prince of Monaco) on March 11, 1902, in lat. 43° 8' N., long. 19° 48' W., where the depth of the sea was 3000 fathoms.

Fig. 1 shows the effect produced on a stout brass tube 13 inches long and 1½ inches in diameter, which was perfectly cylindrical before it was exposed to the momentary relief of high pressure which has produced so deep a corrugation. In Fig. 2 the corresponding effect on a copper sphere of 5 inches diameter is shown; it takes the form of a multitude of small creases in place of the single deep corrugation produced on the tube. The experiments were made on the sounding cord on board the yacht *Princesse Alice* on September 10 and 11, 1902. The brass tube contained an ordinary 50 c.c. pipette sealed up at both ends, and empty except for the air which it contained. It occupied the part of the tube which has been so disfigured, and was kept in its place by a loose packing of cotton waste. Water had free access both at top and bottom.

The copper sphere contained a small spherical glass flask of 1 to 1½ inches in diameter, and it was kept more or less in the centre of the sphere by loose cotton packing; small holes at each pole of the sphere admitted the outer water. The brass tube was attached to the sounding cord and sent

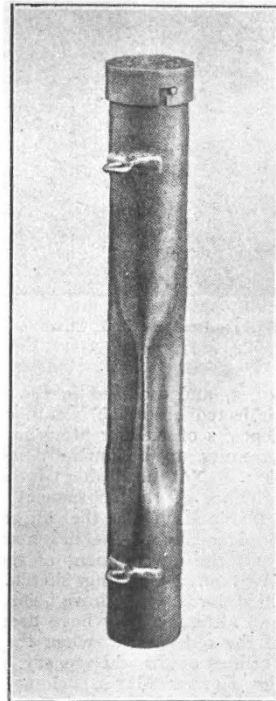


FIG. 1.