on light and the eye, on how the eye is used in seeing, on the experience of sight, on action, and on memory. C. S. M.

The "J.R.B." Patent Adjustable Curve Ruler. (London: W. H. Harling.) Price 7*s.* 6*d.*, 10*s.*, and 12*s.* 6*d.*

DRAUGHTSMEN and students of engineering will find this curve ruler a useful addition to their stock of instruments. The instrument consists of a transparent strip of celluloid, which may be bent to fit any given curve, or to pass through a series of plotted points. The strip is clamped to two slotted brass bars, one of the clamps forming a swivel, which may be locked at any horizontal angle. The slotted bars may be clamped in any position and at any angle to a slotted wooden bar, which holds the whole appliance. Two other slotted brass bars may be clamped to the wooden bar in any position, and have hooks formed at the outer ends; these assist in bending the celluloid strip into the proposed curve, and give steadiness to the strip. Two celluloid strips are supplied, one about 0·05 and the other about 0·1 inch in thickness.

We have tested the appliance in drawing several curves, such as a curve to fit four points plotted at random, and the curves of a beam when loaded in various ways, and find that the maker's claims are justified. Curves of large or small radii of curvature are easily produced, and these are even and regular; the appliance is adjusted very simply, and retains the shape when once set, so that a curve may be duplicated many times.

Post Mortems and Morbid Anatomy. By Dr. Theodore Shennan. Pp. xv+496. (London: Constable and Co., Ltd., 1912.) Price 18*s.* net.

DR. SHENNAN is to be congratulated on having written a treatise that gives a full and lucid account of the whole art of performing necropsies; of studying scientifically the evidences of disease in the organs and tissues of the body, so far as these can be investigated in the post-mortem room; and of making permanent preparations of the material so obtained, either for investigation in the laboratory or for demonstration purposes in museums.

There is, perhaps, no branch of the work of the practising medical man for which such a guide-book is so urgently needed; and this work is sure to prove most helpful not only to the practitioner who is called upon to do autopsies, but also to the student who is acquiring a practical knowledge of pathology.

Though lacking originality, either in treatment or in matter, it is probably the most complete and well-balanced text-book in English dealing with practical pathology.

The illustrations are for the most part successful reproductions of photographs taken by the author and Mr. Norman; but some few of them (*e.g.*, Fig. 79) might with advantage have been replaced by drawings.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

Forced Vibrations.

WITH regard to the subject of "Forced Vibrations" dealt with by Prof. Perry in his letter in NATURE of June 27 (p. 424), Prof. E. H. Barton, of Nottingham, puts the matter very clearly on p. 150 of his "Text-book of Sound," 1908, where he states:—"The frequency of the impressed force to make the amplitude a maximum is *lower* than that natural to the system with friction, while the frequency of the impressed force to make the kinetic energy a maximum is *above* that natural to the system with friction, and equals that if friction be absent." "Moreover, the squares of these three frequencies form an arithmetical progression whose common difference is proportional to the square of the damping coefficient."

I think Prof. Perry means to convey that these slight eccentricities from syntonic symmetry may be negligible in acoustical investigations (owing to their being well within the limenal region of physiological audition), but may rise to values at which they can be no longer neglected in other branches of interest, such as the æther-acoustics of radio-telegraphy, &c.

Prof. Perry would be doing real service by furnishing a non-mathematical explanation of these eccentricities; the graphical demonstration is a somewhat lengthy process. JOHN L. DUNK.

July 1.

Mendel and Nägeli.

MR. L. DONCASTER has recently given one explanation of the strange neglect of Nägeli to appreciate the results of Mendel. Perhaps the following footnote from Eimer's "Organic Evolution" (tr. J. T. Cunningham, 1890), p. 53, may supply another:—"Nägeli in the introduction to his book speaks very severely of those who without any justification undertake to express opinions upon the origin and evolution of organisms. He claims this right exclusively for physiologists, and counts among the non-physiologists both Darwin and Haeckel. Against such a close corporation I protest."

The "book" referred to seems to be the "Mechanische-physiologische Abstammungslehre," published in 1884, and Mendel, who, if I remember rightly, was a professor of physics, is not likely to have fared better than Darwin or Haeckel, except for his then obscurity, at the hands of his distinguished correspondent. The treatment of Fleeming Jenkin's criticisms by Darwin himself forms a pleasing contrast to this misplaced pontificality. H. H. O'FARRELL.

The Avenue, Kew Gardens, July 1.

CONGRESS OF UNIVERSITIES OF THE EMPIRE.

IN an article which appeared in our issue of June 13 it was stated that fifty-four universities would send delegates to this Congress. The nascent university of Calgary was subsequently excluded from the official list, on the ground that for the present it proposes to confine its degrees to agriculture. It is not difficult to imagine the Secretary's feelings when he found that with the

exception of one of the smallest of the Canadian institutions which boasts the right of conferring degrees every university of the Empire would be represented. At the last moment the Chancellor of the Western University of London, Ontario, arrived in the somewhat better-known city of the same name, and the tale was complete. This is a fact of no small significance, especially when the character of the delegation is considered. Fourteen of the universities over seas were represented by their Executive Heads, and amongst the remaining delegates were thirty-six professors.

The proceedings of the Congress have been so fully reported in the daily Press that it is unnecessary to go into details. We can but attempt to give a general idea of the trend of its deliberations. Each of the six chancellors who presided over its sessions touched upon a different aspect of university work. Lord Rosebery, in his opening address, dwelt, very naturally, upon the importance of the Congress from an Imperial point of view.

"I cannot but help hoping that this congress, when it shall have separated, will leave behind it in some shape or another some permanent channel, however slight, through which the universities of the Empire can continue to communicate with each other when necessity shall arise, either as to methods or as to men, or to obtain hints from each other as to the best ways of working out their several problems." "I do not think that any intelligent observer can watch the course of the world without seeing that a great movement of unrest is passing over it—I cannot doubt for good. For the purpose of guiding that movement we need all the men that the universities can give us—not merely the higher intelligences that I have spoken of, but also men right through the framework of society from the highest to the lowest, whose character and virtues can influence and inspire others."

Lord Curzon pleaded that whatever further developments may occur in professional and technical education—and it is inevitable that it should become still more highly specialised—there is need for the humanities. Mr. Balfour, presiding over the session devoted to a discussion of the special problems which face a university in the East, dwelt upon the "collision which must occur between the growth of scientific knowledge in all its branches, and the traditions, beliefs, customs, which, after all, are the great moulding forces of social man." Lord Rayleigh placed the advancement of his subject in the forefront of a professor's duties. He also strongly urged the exaction of a higher standard of English from students, and of the capacity of giving expression to their thoughts. Lord Kenyon, who took the place of Lord Haldane, whose new duties made it impossible for him to attend, presented the case for the modern universities. The veteran Lord Strathcona gave an eloquent account of the history of university education in Canada.

Among the subjects which attracted most attention may be mentioned the specialisation of universities. Sir Alfred Hopkinson, Dr. T. H. Warren, Sir Arthur Rücker, and Sir J. J. Thomson pointed out that it is no longer possible for any university to represent all branches of knowledge. Any attempt at external control would be a fatal mistake. Universities must meet local needs; they must also give the most generous opportunities to the departments over whom their greatest teachers preside. As the Vice-Chancellor of Manchester expressed it—

"A great teacher arose in some subject—no one could foresee where it would be—he attracted students to hear him, drew to his lectures and laboratories men keen in pursuit of learning and science, whose researches he would direct, encourage, and stimulate. A wise university would provide him with assistants, enlarge his laboratories, even when it involved serious strain on its resources."

Specialisation requires greater mobility both of teachers and students. Interchange of teachers was urged by Dr. Barrett, of Melbourne, and others; especially in such subjects as geography, economics, Colonial history, and anthropology the migration of teachers would be as valuable to themselves as to the students and to the smaller universities which cannot maintain chairs in subjects for which the demand is relatively limited. Prof. Smithells urged the whole-hearted acceptance of technical and professional subjects and their embodiment in the university system on the same basis as other subjects, since universities alone can exact such a standard of preliminary training as makes higher work and progress possible.

As was to be expected, the question of entrance tests gave rise to an animated discussion, in which Mr. Matheson, Sir Edward Busk, Sir Christopher Nixon, Sir Alfred Hopkinson, Sir Oliver Lodge, and representatives of the Colonies took part. The balance of opinion was strongly against a uniform matriculation examination, and equally strongly in favour of "greater trustfulness in accepting one another's results." If A. is satisfied that the students which it admits have received a satisfactory school education, B. should allow them to enter its portals without further examination, even though they have not complied with all the tests which it imposes upon its own matriculants.

As a tribute to the memory of Dr. R. D. Roberts, the first secretary of the Congress, who died last November, a whole session was set aside for the subject of University Extension, to which he devoted his life.

The project for establishing an Imperial University Bureau was warmly advocated by Dr. Parkin, and accepted by the Congress with equal enthusiasm. One of the delegates of the University of London opposed it at the private meeting, on the ground that the work would be done more effectively by the Education Department, but when the vote was taken he had but one supporter. All the other delegates present voted in its favour. It will be primarily a bureau of information. In its journal or yearbook will be recorded all changes in subjects taught, equipment and *personnel* which occur in the universities of the Empire. It will answer the questions of Colonial students who are selecting a university in the Mother Country, and of students and teachers who think of emigrating. Sir

Newton Moore, Agent-General for Western Australia, spoke of the immense saving of labour which such a bureau might have effected in his office last year, when the establishment of the University of Perth was under consideration. The delegates also resolved that it is desirable that the Congress should meet at intervals of five years, and that both in the United Kingdom, in the several great dominions and in India representatives of universities should meet annually.

The entertainments offered to the Congress were of remarkable interest. The Government invited the delegates to lunch at the Savoy Hotel. They were seated at thirty round tables, with a member of the Government or the Chancellor of a University at each. Prince Arthur of Connaught, President of the General London Committee, replying to the second Royal toast, said that the Royal Family had shown its appreciation of a university training by giving the Heir to the Throne the opportunity of sharing it for the last two generations, and that a university course is contemplated for the Prince of Wales. Mr. Lewis Harcourt, in a most felicitous speech, proposed the toast of the Congress, to which Lord Rosebery and Principal Peterson, of the McGill University of Montreal, replied.

In the evening Prince Arthur received the delegates in the Marble Hall of the University of London. Chancellors and Vice-Chancellors grouped themselves behind the Prince. The conversazione which followed was attended by 2500 people, most of the men and many of the ladies in academical robes. On Wednesday and Thursday, delegates were invited to dinner by the Clothworkers', Merchant Taylors', Fishmongers', Vintners', and Leathersellers' Companies; the Countess Beauchamp received them later at her house in Belgrave Square. The Victoria League and the Marchioness Dowager of Bute gave a garden party. There was an "at home" at the Mansion House. The Royal School of Medicine for Women gave an "at home." Mrs. E. B. Sargant gave a delightful party at Claridge's. The Principal and Staff of King's College invited a large number of delegates to dinner. The British Academy arranged the second annual Shakespeare lecture for the Monday night, and followed it with a *soirée*. The delegates from overseas are now on tour, receiving similar hospitality at Oxford, Birmingham, Manchester, Liverpool, Leeds, and Cambridge. Before the meeting in London they visited the Scottish universities, Dublin and Durham.

Not the least important result of the meeting of the Congress will be the Report, which will necessarily be a bulky volume, since it will contain, in addition to all the papers prepared for and speeches made at the Congress, appendices of information regarding the regulations and practices of all British universities with regard to the matters which were discussed at the Congress. It will be published early in the autumn, and will be obtainable from the Congress Office, University of London.

GEODETIC WORK IN THE ORDNANCE SURVEY.[1]

IT is with very great pleasure that we record the issue of the first of a new series of Professional Papers by the Ordnance Survey. The fundamental work of the Survey is recorded in a series of volumes which form one of the most important contributions to geodesy that have been made; but in more recent years new material has oftener been referred to in the annual progress reports than dealt with thoroughly in special publications such as the one before us. At the present time, when there is already high-grade work in hand, and much more will be required in the survey of all parts of the Empire, the experience gained by the great survey establishments is of the highest value to those engaged on similar work in the oversea Dominions and the Crown Colonies.

The present paper deals with the measurement of a base-line at Lossiemouth, which is the outcome of a representation made by the Council of the British Association for the Advancement of Science in 1908 to the Board of Agriculture and Fisheries, that it was highly desirable to ascertain the accuracy of a portion of the principal triangulation of the United Kingdom remote from the principal bases at Salisbury Plain and Lough Foyle.

Three invar tapes, 100 feet long, were employed, and the first two chapters of the paper describe the preliminary operations and the procedure employed in making the measurements. The next three chapters contain a very valuable and interesting account of the standardisation of the 10-foot Ordnance Intermediate Bar, OI_1, at the Bureau International des Poids et Mesures at Sèvres, the standardisation of a subsidiary standard bar, OI_2, at Southampton, and of a 100-foot base, as well as of two standard invar tapes, at the same place.

In the field a 100-foot base was laid down with the aid of these two standardised tapes, and with it the three invar tapes which were used for the measurement of the base were compared on four occasions during the work.

The last two chapters contain a very useful discussion of the theory of tapes in catenary, due to Prof. O. Henrici, F.R.S., and Captain E. O. Henrici, R.E., which ends with a summary of the errors affecting a base measurement, omitting, however, the possibility that the tapes or wires may not always be at the same temperature as the air. All possible errors should be considered in determining the probable accuracy of a base, and not only the discrepancy between the two or more measurements made, as is sometimes the case. The final value for the base is given as 23,525·97944 feet, with a probable error of 1 in 900,000.

[1] "An Account of the Measurement of a Geodetic Base Line at Lossiemouth in 1909, together with a Discussion of the Theory of Measurement by Metal Tapes and Wires in Catenary." Ordnance Survey Professional Papers. New Series, No. 1. Pp. 39. (London: H.M. Stationery Office; Wyman and Sons, Ltd.; Edinburgh: Oliver and Boyd; Dublin: E. Ponsonby, Ltd., 1912.) Price 2s.