behindhand in the application of electricity to ammunition hoists and other purposes in our navy. The President pointed out that in matters of this kind the opinions and the wishes of those who have to work the appliances must be taken into account.

The concluding day was devoted to several papers of extreme interest. The business was begun with the consideration of a paper by Mr. Thornycroft on recent experiences with steam on common roads. After dealing with the impediment to progress due to the Locomotives on Highways Act of 1896, and making suggestions as to the steps which should be taken to remove these obstacles in future legislation, the author gave an extremely valuable *résumé* of his own work in this field of mechanical science. He described the different types he has built since 1896, and the chief changes in the mechanical details which experience has convinced him to be necessary. He has built vehicles both for heavy goods traffic and for passenger traffic, and has adopted a method of chainless transmission in his most recent type. The author in conclusion pointed out that, after all, in motor work a good deal depended upon the care and intelligence of the driver employed.

A paper by Mr. Edward Case, who, we regret to say, died only a few days after the paper had been read, descriptive of the Dymchurch sea-wall and the reclamation of the Romney marshes, was next taken. These reclamation works are of great antiquity; in modern times the erection of high groynes for the protection of the wall brought about that which they were expected to prevent, namely, the undermining of the wall. Mr. Case decided, when he took over control in 1890, to adopt an entirely different system, and since 1894 a number of low groynes have been run out; the result of which has been to raise the level of the fore-shore as much as 8 feet at the east end of the wall. These groynes have been constructed in such a way that they can be gradually raised as the level of the beach gets higher, at a very trivial expense and with very little difficulty.

The Section meeting was, as has been stated before, an extremely successful one: the quality of the papers being high, the discussions good, and the attendance throughout thoroughly satisfactory. There can be no doubt that a great deal of this was due to the energy and the interest taken by the President in the work of the proceedings. It is too often forgotten by Presidents of Sections that the success of any particular Section is almost entirely in the hands of its President.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

OXFORD.—The 204th meeting of the Junior Scientific Club was held in the University Museum on Friday, October 20. Mr. Hartley (Balliol) read an interesting paper on the history of the discovery of the law of isomorphism.—Owing to the length of important private business Mr. Gibson (Ch. Ch.) was unable to read his paper on the retention of food by plant soils, as announced. The following are the officers for the ensuing term:—J. T. Mance (Balliol), pres. H. E. Stapleton (St. John's), chem. sec. C. H. Barber (non-coll.), biol. sec. F. W. A. Fleischmann (Magd.), treasurer. F. W. Charlton (Merton), editor.

The examiners have notified to the Vice-Chancellor that they recommend for election to the Burdett Coutts scholarship, which is of the annual value of about 115*l*. and tenable for two years, Mr. J. B. Scrivenor, Commoner of Hertford College. They also recommend that Rev. E. C. Spicer, Commoner of New College, be appointed an extra scholar, to retain his scholarship for one year.

CAMBRIDGE.—St. John's College has once more shown its appreciation of scientific merit by electing to fellowships Mr. J. J. Lister, University Demonstrator of Comparative Anatomy, and Mr. A. C. Seward, University Lecturer in Botany. Mr. Lister, who has done important work on the *Foraminifera* and other groups, is a nephew of the President of the Royal Society, and son of Mr. Arthur Lister, who was last year elected a Fellow of the Society. Mr. Seward is a Fellow of the Royal and Geological Societies, and has attained a high position as an authority on fossil plants. The first volume of his treatise on this subject was reviewed in NATURE (December 15, 1898). He has held the Harkness Studentship in Palæontology, and gained the Sedgwick Geological Prize in 1892. Both gentlemen are Masters of Arts of the College of some years' standing, and have been elected out of the ordinary course.

Mr. J. L. Tuckett, Fellow of Trinity College, has been appointed an additional Demonstrator of Physiology by Sir M. Foster.

Prof. G. Sims Woodhead has been elected to a Fellowship at Trinity Hall.

THE details of the reorganisation of the Education Department and the transference of its duties to the new Board of Education are under consideration by a departmental committee; and the committee of the City and Guilds of London Institute have signified their willingness to give any help which may be needed to secure the proper recognition of technological teaching in the arrangements about to be made. Reference to this matter is made in the report of the examinations department of the Institute issued a few days ago. It is remarked that, having regard to the Institute's close connection with technical teaching in all parts of the country, no organisation of education can meet existing requirements which does not take into consideration the educational work now under the immediate direction of the Institute. The report further states that the committee fully recognise how desirable it is to avoid, as far as possible, any overlapping in the organisation of the classes and examinations directed respectively by the Science and Art Department and by the Institute; and they are of opinion that, with the view to the due encouragement of practical instruction in the technology of the different trades in which artizans are employed, the teaching of technology should be placed on the same basis, with respect to State aid, as that of science or art.

MR. A. E. BRISCOE, the principal of the West Ham Municipal Institute, sends a few particulars of the loss caused by the disastrous fire which occurred a few days ago. The whole of the upper floor of the building, including the chemical, art and women's departments, the engineering and physical lecture theatres, the drawing office and the engineering laboratories have been completely gutted. The chemical and art departments are the greatest sufferers, but there is not much to choose between them and what has happened to the others. The electrical and physical laboratories were flooded by the water, and a great many expensive instruments have been damaged by water; but the galvanometers and some of the other expensive things were on shelves covered by dust-covers, so that they have escaped damage. The expensive machinery in the engine and dynamo laboratories and in the engineer's workshop has not suffered by fire, but, of course, tons of water have fallen upon it, and a very great amount of damage has been done. The institute was covered by insurance to the extent of 47,000*l*., and it is believed the total damage will not reach this amount. Of course, nothing can compensate for the large amount of work that has been done by the staff in the equipment of the institute, and will now have to be done all over again. Though the borough is not a rich one, it is satisfactory to know that the institute will be rebuilt and probably enlarged, as the classes were already too great for the accommodation. The fire commenced in the advanced chemical laboratory, but the origin is absolutely unknown. The building had not been used for thirty-six hours prior to the outbreak.

SCIENTIFIC SERIALS.

Symons's Monthly Meteorological Magazine, October.—Meteorological extremes. II. Temperature. Mr. Symons has collected a large amount of useful information upon this subject from all trustworthy sources. For yearly mean temperatures preference is naturally given to Dr. Buchan's isothermic charts published in the *Challenger* volume, "The Circulation of the Atmosphere." The highest yearly isotherms are 85°, and these occur only in three localities, the largest covering a portion of Central Africa, bounded on the north by latitude 18° N. Two smaller areas exist, one in Central India and the other in the northern portion of South Australia, respectively in latitude 15° N. and 15° S. The absolute range of the shade temperature in the northern hemisphere, and probably in the world, is 217°·8, depending on the absolute maximum of 127°·4 in Algeria, July 17, 1879, and the absolute minimum of −90°·4 at Verchoiansk, Siberia, January 15, 1885. The hottest region is on the south-western coast of Persia, where the thermometer has been known not to fall lower than 100°, night or day, for orty consecutive days during July and August, and often to reach 128° in the afternoon. Among the highest shade temperatures we may mention one at night during the Italian occupation of Massowah, when the thermometer is said to have recorded 122°. Temperatures above 120° are occasionally met with in India; 121°·5 was recorded at Dera-Ishmail-Khan (lat. 32° N.) in 1882, and 126°·0 at Bhag (lat. 29° N.) in 1859. At Wilcannia on the Darling River, New South Wales, shade temperatures varying from 107° to 129° were recorded on each day from January 1 to 24 in 1896. Among the low temperatures (in addition to the extremes mentioned above) we may quote −63°·1 at Poplar River, North America, in January 1885. During the intense frost in Scotland on December 4, 1879, −16° was reported from Kelso and −23° from Blackadder, in Berwickshire. The extremes in or near London for 104 years were 97°·1 in July 1881, and 4° in December 1796 and January 1841.

THE *Journal of the Royal Microscopical Society* for October contains a short paper (with plate) by Mr. James Yate Johnson on some sponges belonging to the Clionidæ obtained at Madeira, in which three new genera are established, named *Acca*, *Nisella* and *Scantilla*. In the section on microscopy is a description of an old compass microscope taken from a German work on the microscope by Martin Frobenius Ledermüller (1763), called Russwurm's "Universal Microscope," which appears to have been a combination of compass and tube microscope in an unusual number of forms; also a description of "Adams' Compendious Pocket Microscope" (1771), which more nearly conforms to the microscopes of the present day than any of those which preceded it. In the section on technique several new pigments are described, also two new methods for orienting small objects.

Bollettino della Società Sismologica Italiana, vol. v., Nos. 2, 3, 1899-1900.—Vertical component microseismograph, description and results, by G. Vicentini and G. Pacher. A reprint of a paper already noticed in NATURE.—Supplementary considerations with regard to the Umbria-Marches earthquake of December 18, 1897, by A. Issel.—The earthquake in the Parma-Reggio district of the Appennines during the night of March 4-5, 1898, by C. Agamennone. The shock was felt over an acre of about 70,000 sq. km., and was also recorded by horizontal pendulums at Strassburg and Shide; the velocity of the earth-waves will be considered in another paper.—The Hereford earthquake of December 17, 1896, by C. Davison. A summary (in English) of the writer's report on this earthquake.—Notices of the earthquakes recorded in Italy, February 5 to April 23, 1898; the most important being those of Asia Minor on February 5, Cividade (Udine) on February 20 and April 12, Reggio and Parma on March 4, Ferrara on March 9, and distant earthquakes on February 18 and April 15 and 23.

SOCIETIES AND ACADEMIES.

Physical Society, October 27.—Prof. W. E. Ayrton, F.R.S., Vice-President, in the chair.—Dr. S. W. Richardson read a paper on the magnetic properties of the alloys of iron and aluminium. Observations were made upon four alloys containing respectively 3·64, 5·44, 9·89 and 18·47 per cent. of aluminium. The alloys were used in the form of anchor rings, and were wound with primary and secondary coils separated by asbestos paper. The temperatures used ranged from −83° C. to 900° C. The low temperatures were produced by the rapid evaporation of ether surrounded either by ice and salt or by carbon dioxide snow. The high temperatures were obtained either electrically or by gas muffles. In both cases the actual temperatures were deduced from the resistance of the secondary, which was made of platinum wire and wound next the metal. The author employed Maxwell's null method of measuring mutual induction, increasing the sensitiveness by the introduction of a secohmmeter making about three revolutions per second. In order to test the accuracy of the method some of the experiments were repeated with a ballistic galvanometer in the ordinary way, and the agreement obtained between the results in the two cases was well within the limits of experimental error. The chief conclusions to be drawn from the experiments may be summed up as follows: (1) The alloys behave magnetically as though they consisted of two distinct media superposed. (2) The general roundness of the curves and their lack of abruptness near the critical point seems to indicate that the alloys are heterogeneous in structure. (3) The permeability decreases with rise of temperature near the critical point until a minimum value is reached, when further rise of temperature produces very slight diminution, if any, in the permeability. (4) The experiments suggest that the maximum value of the permeability for an alloy containing 10 per cent. of aluminium is reached at about −90° C. (5) An alloy containing 18·47 per cent. of aluminium has a critical point at about 25° C., and gives no indication of temperature hysteresis. This alloy probably has a maximum permeability much below −90° C. The author has found that at high temperatures there is a second maximum on the induction curve. This maximum becomes less and less noticeable as the field is increased.—The Secretary read a note from Prof. Barrett on the electric and magnetic properties of aluminium and other steels. The first part of the note dealt with the electrical conductivity of various alloys, and discussed the effect of composition and annealing upon the value of the conductivity. The second part of the note referred to magnetic effects. The most remarkable effect produced by aluminium on iron is the reduction of the hysteresis loss. The permeability of nickel steels is shown to be very much influenced by annealing. It is found that the addition of a small quantity of tungsten to iron hardly affects the maximum induction, yet increases the retentivity and coercive force. The experiments show that the best steel for making permanent magnets is one containing 7½ per cent. of tungsten. The magnetometric method was employed throughout. Prof. S. P. Thompson drew attention to the wide range of temperature over which the author had conducted his experiments, and also to the small number of alloys used. He said a very much finer connection between the properties could be obtained from the examination of more alloys, and expressed his interest in the existence of the second maximum on the induction curve. He would like to know how the percentage composition of the alloys had been determined. Turning to Prof. Barrett's note, Prof. Thompson referred to the difference in the breadths of the hysteresis curves for aluminium and chromium alloys. Mr. Appleyard asked for information upon the permanence of the curves. Dr. Richardson, in replying, said the compositions were determined by analyses made after the experiments had been performed. It was proposed to carry on the research upon a series of aluminium alloys which he had obtained. The Chairman expressed his special interest in the agreement which the author had obtained between the ballistic method and the null method of Maxwell increased in sensitiveness by the secohmmeter.—Mr. Addenbrooke exhibited a model illustrating a number of the actions in the flow of an electric current. The model consisted of a spiral of steel wire in the form of a closed circuit. Inside the spiral was placed a wire which was supposed to be carrying the current, and which directed the motion of the spiral. A rotational movement given to one part of the spiral was transmitted by the wire, and produced a rotational movement at another part of the spiral. The resiliency of the spring represents capacity, and the torque electromotive force. Self-induction can be represented by weighting the spring. Prof. Everett expressed his interest in the way that the correspondence between the propagation and rotation agreed with that between the direction of a current and the direction of the magnetic force. Prof. S. P. Thompson agreed that many analogies could be worked out by the model, but gave one or two examples to show that erroneous conclusions might be drawn by pushing the analogy too far.—Mr. W. Watson repeated some experiments with the Wehnelt interrupter devised by Prof. Lecher. The experiments showed in a clear and striking manner the fact that subsequent sparks tend to pass through the portion of air heated by the first one. In the first experiments motion of the heated air was caused by differences in density, and in the later experiments by allowing the sparks to take place in a strong electromagnetic field. The continuous rotation of the spark in a given field proved the unidirectional nature of the discharge. In reply to Mr. Blakesley, Mr. Watson said he used the word "ionised" in his explanations to express simply the fact that the air had been rendered a conductor by the passage of the spark. The Chairman referred to one of the first experiments performed. In this experiment the electrodes consisted of two copper wires in a vertical plane, slightly inclined to one another and nearest together at their lowest points. On switching on the current