

The new photography has hitherto, so far as generally known, been performed only by light obtained from electric action in vacuum; but that vacuum is not essential for the generation of the Röntgen light might seem to be demonstrated by an experiment by Lord Blythswood, which he described at a meeting of the Glasgow Philosophical Society on Wednesday, February 5. As a result he exhibited a glass photographic dry plate with splendidly clear marking which had been produced on it when placed inside its dark slide, wrapped round many times in black velvet cloth, and held in front of the space between the main electrodes of his powerful Wimshurst electrical machine, but not in the direct line of the discharge. He also exhibited photographic results obtained from the same arrangement with only the difference that the dark slide, wrapped in black velvet, was held in the direct line of the discharge. In this case the photographic result was due, perhaps wholly, and certainly in part, to electric sparks or brushes inside the enclosing box, which was, as usual, made of mahogany with metal hinges and interior metal mountings. It is not improbable that the results of the first experiment described by Lord Blythswood may also be wholly due to sparking within the wooden case. I have suggested to him to repeat his experiments with a thoroughly well closed aluminium box, instead of the ordinary photographic dark slide which he used, and without any black cloth wrapped round outside. The complete metallic enclosure will be a perfect guarantee against any sparks or brushes inside.

If the arrangement which I now suggest, with no sparks or brushes between AA and the roof, gives a satisfactory photographic result, or if it shows a visible glow on phosphorescent material placed anywhere in the space between AA and the roof above it, or above the aluminium roof, it would prove the truth of Röntgen's hypothesis. But failure to obtain any such results would not disprove this hypothesis. The electric action, even with the place of the spark so close to the field of the action sought for as it is at D, in the suggested arrangement, may not be sudden enough or violent enough to produce enough of longitudinal waves, or of condensational-rarefactional vibrations, to act sensibly on a photographic plate, or to produce a physical glow on a phosphorescent substance.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

OXFORD.—At a Congregation held on Tuesday, the series of resolutions relating to the claims of women, the consideration of which was adjourned last week after the rejection of the proposal for admitting women to the B.A. degree, were discussed and rejected.

CAMBRIDGE.—Mr. Charles Davison, well-known for his researches on earthquakes and other seismic phenomena, has been approved by the General Board of Studies for the degree of Doctor of Science.

The Isaac Newton Studentship in Astronomy and Physical Optics has been conferred on Mr. John Gaston Leatham, Scholar of St. John's College.

Dr. Joseph Griffiths has been appointed an additional Examiner in Surgery.

The Panjab University has, like the University of Calcutta and Allahabad, become affiliated to the University of Cambridge. Graduates in Arts of the Panjab are thereby exempted from the previous examinations, and may proceed to their degree by means of a Tripos Examination after two years' residence in Cambridge.

The Syndicate for the consideration of the question of degrees for women has been nominated, and consists of the Vice-Chancellor, Dr. Butler, Master of Trinity, Dr. Peile, Master of Christ's, Mr. Austen Leigh, Provost of King's, Prof. E. C. Clark, Prof. Clifford Allbutt, F.R.S., Prof. Sidgwick, Dr. Jackson, Prof. Forsyth, F.R.S., Dr. Keynes, Prof. Armitage Robinson, Prof. Foster, F.R.S., Mr. R. T. Wright, Mr. W. L. Mollison, and Mr. R. A. Neil. Its appointment will be opposed on the ground that an excessive proportion of its members have already committed themselves to definite views on the questions at issue, and that only two members of less than twenty years' standing are included.

The Examination in Sanitary Science for the diploma in Public Health will begin on April 7, and will extend over ten days.

A conversazione will be held to-night in the Cavendish Laboratory, in commemoration of the opening of the new

buildings. The President of the Cambridge Philosophical Society (Prof. J. J. Thomson) and Mrs. Thomson are the hosts.

THE hall which Mr. McEwan has added to the Edinburgh University buildings, at a cost of between £60,000 and £70,000, will be opened early in the ensuing summer.

THE University of Indianapolis has just been organised by representatives of Butler College, the Medical College of Indiana, the Indiana Dental College, and the Indiana Law School.

PRESIDENT JOHN M. COULTER, of Lake Forest University, has resigned in order to accept the head Professorship of Botany in the University of Chicago, which has been endowed with 1,000,000 dollars in its Botanical Department.

THE following are among recent appointments:—Dr. Christopher Childs to be Assistant in the Hygienic Department at University College, London, under the direction of Prof. Corfield; Dr. Allan MacFadyen to act as hon. secretary of the British Institute of Preventive Medicine; M. Salih Zéky to be Director of the Observatoire Impérial Météorologique et Sismique at Constantinople, in succession to the late M. A. Coumbary; Dr. W. Kurchinski, of Kieff, to be appointed Extraordinary Professor of Physiology at Turieff (Dorpat).

THE Executive Committee of the City and Guilds of London Institute have awarded the second Salters' Company's Research Fellowship, for the encouragement of higher research in chemistry in its relation to manufactures, to Dr. Sidney Williamson, who was for two years a student at the City and Guilds Technical College, Finsbury, and subsequently for three years at the City and Guilds Central Technical College. The Fellowship is tenable at the latter, and Dr. Williamson proposes to work on some questions bearing on food-stuffs generally, more particularly the examination of some definite albumenoids, with the ultimate object of ascertaining the influence of various manures on the growth of crops in so far as *quality* of produce is concerned.

THE Middlesex County Council have voted the sum of £10,785 for the purpose of technical education classes in the county during the current year. This is a slight increase on the amount appropriated during 1895, but since the available amount exceeds twenty-two thousand pounds, there still remains a large surplus which ought to be devoted to its proper purpose. The explanation of the unwillingness of the Council to benefit education in their midst to the fullest possible extent may be found, perhaps, in the falling off in the number of candidates for county scholarships. This diminution is most marked. For the fifteen scholarships of £20 each for three years for boys, there were 100 candidates fewer than in 1893, in which year the scholarships were first offered. The decrease in the number of competitors has been gradual. In 1894 the number was 220, in 1895 it had fallen to 184, and it is less again this year. As there are at least 80,000 children in elementary schools in Middlesex, the number of candidates ought certainly to be much larger.

The Report of the Director of Technical Instruction to the County Council for the County Palatine of Lancaster for the year ending August 31, 1895, which was presented to the Council at a meeting held on the 6th ultimo, contains many interesting statistics of the work which is being accomplished in Lancashire. The work in many departments is pre-eminently satisfactory. We are glad to notice that the Committee have made a grant of £250 to each of the University Colleges of Liverpool and Manchester, for we believe that one of the surest ways of improving the education of any county is to strengthen the centres of higher instruction within its borders. It is certainly one of the weaknesses of the Lancashire scheme for technical education that they give no assistance to secondary schools in their county. The middle classes are as much in need of all kinds of education as any section of the community, and though in Lancashire the following annual grants can be afforded—viz. horology, £500; plumbing and sanitary science, £750; horticulture and bee-keeping, £500; practical agriculture (including veterinary science, poultry-keeping, and allied subjects), £1000; as well as grants to encourage the study of music, yet for the development of the modern side of their secondary schools nothing is allowed. It is interesting to compare the decision of the Lancashire Committee with the recommendation of the recent Commission, "that this grant . . . ought to be all of it paid in future to the local authorities for secondary education . . . not merely to technical education,

but to secondary education generally." The work completed during the past year on the County Council Farm at Hutton has been very successful, both as regards the instruction given and the amount of research work carried out. It seems rather anomalous that while Preston devotes no part of its share of the Customs and Excise Fund to the purposes of education, yet, as the report shows, the County Committee make a grant of £650 a year to the Harris Institute in that town. Surely the borough authority will not abstain much longer from following so good an example.

We learn from the February number of the *London Technical Education Gazette*, that seventeen secondary schools in different parts of the metropolis have been aided by grants from the Technical Education Board of the London County Council. These grants have been very useful in encouraging the establishment of laboratories and science lecture-rooms in schools which have hitherto been without these advantages, and in improving the equipment and teaching in schools in which practical science has been taught. We notice with much satisfaction that in a large number of these schools physical laboratories have been provided, and that every facility is being given for the study of practical physics as well as chemistry. Too much stress cannot be laid upon the incompleteness of that practical science teaching which confines the student's attention to elementary qualitative analysis, and we note that it has been already found that "the influence of the Board's grants is as much apparent in the character of the teaching given in the several schools as in the appliances available for such teaching." The old method of teaching practical chemistry is giving place "to a more rational system, in which the laboratory and the lecture-room are brought into close relation, and in which the importance of measurement is insisted upon as the basis of all scientific work." Two at least of the schools receiving aid are for girls. A laboratory and lecture-room in James Allen's Girls' School, Dulwich, and a laboratory for practical science and school of domestic economy at the Camden School for Girls, have been equipped at the cost of the Board. The London Committee are, in this matter, as in so many others, setting the country local authorities an example which we hope soon to see emulated. The development following upon these grants can be seen at a glance from the statistics collected by the Board's science inspector, and published in these columns on February 13 (p. 357).

The cost of the new technical school at Salford, which is to be shortly opened by the Duke and Duchess of York, is likely to amount to £70,000. This amount is in excess of the anticipated cost, and the original loan of £55,000, sanctioned by the Local Government Board, is to be augmented by a further one of £13,500. Even then the difficulty of the expenses of maintenance will have to be faced. The experiences of the Salford Committee show only too plainly the necessity for legislation to prevent the appropriation of accumulated funds from the technical education grants of former years for ordinary purposes in the district. The Technical Instruction Committee of Salford had up to March 1894, been holding in reserve moneys received under the Local Taxation (Customs and Excise) Act of 1890, but the corporation becoming involved in financial difficulties, laid hands on these moneys, which amounted to £12,000. It is now left to the Committee to meet a heavy annual expenditure out of their revenue from the rate of a penny in the pound, the fees, grants, and other sources of income.

As a supplement to last week's account of what has been done for the support of education by some of the London Livery Companies, it is interesting to note the efforts in the direction of (probably) the only surviving provincial Company of the same type—the Master, Wardens, and Commonalty of Merchant Venturers of the City of Bristol. The supreme importance, for a commercial and manufacturing people, of what is now known as "technical instruction" seems to have been realised in Bristol earlier than in most other parts of England; for as long ago as 1856 there was founded in that city the Bristol Diocesan Trade School (afterwards called the Bristol Trade and Mining School), for the express purpose of providing sound and systematic education for the industrial classes. The school, being appreciated by those for whom it was intended, soon acquired a more than local reputation, and steadily grew in numbers, up to the limit which its buildings and its finances imposed. In 1880, when this limit had been reached, it happened that the Merchant Venturers—whose work of creating,

and governing for centuries, the port of Bristol was then accomplished—resolved to devote their energies for the future to the furtherance of education; and, seeing the position of the Trade and Mining School, and the great value of the kind of teaching which it supplied, agreed to adopt it. Accordingly, at an outlay of some £45,000, they provided it with new buildings, upon a larger site, and with a more complete equipment; they also undertook to maintain it and develop it upon existing lines; and they gave it their own name. The Merchant Venturers' Technical College, as it is now called, has a junior department, a senior department, and a multitude of evening continuation classes; so that any boy, or young woman, destined for an industrial occupation of whatever kind—whether as architect, engineer, designer, chemist, dress-maker, or the like—may both begin and finish his or her entire education within its walls. The total number of students now exceeds 2000. In keeping with the special object of the institution, its curriculum is limited to comparatively few of the main branches of knowledge, and necessarily leaves out many of the most important. It hardly touches, for instance, the fascinating realm of literature, ancient and modern, or the subjects of music, medicine and law; and it ignores altogether the whole range of the mental and moral sciences. But ample provision for the teaching of all these exists, or can be made, in the other schools and colleges which Bristol is so fortunate as to possess, and thus the Merchant Venturers are enabled to occupy, with undivided attention, their own restricted field of operations, and to carry out, with ever-increasing thoroughness, their scheme of industrial or technical education sketched out forty years ago. Not a term passes without some addition to the apparatus with which their College is equipped, and hardly a session without provision for some newly-recruited trade or class; and it is an open secret that, as soon as the necessary land can be acquired, the extent of the buildings, and the convenience and efficiency of every department, will be very largely increased. It may well be supposed that no effort will be spared to enable the College to keep the lead, which it has hitherto held, in matters pertaining to technical instruction, or to ensure that, in this respect, it shall remain without a successful rival in the West of England. The Merchant Venturers, like their brethren in London, have a position to justify, a character to maintain, a distinguished past which they must not disgrace; and it is likely that, in the new work to which they have set their hands, they will evince the same activity and perseverance, and the same prudent liberality in furnishing means for the attainment of their ends, as characterised them in older times, when their ventures were mostly for their own private gain, rather than, as now, for that of the community.

SCIENTIFIC SERIALS.

American Journal of Science, February.—Researches in acoustics, by A. M. Mayer. This paper, dealing with the variation of the modulus of elasticity with change of temperature, and the acoustic properties of aluminium, was read before the British Association at the Oxford meeting.—On the improbability of finding isolated shoals in the open sea by sailing over the geographical positions in which they are charted, by G. W. Littlehales. Suppose that A discovers, in the open ocean, a shoal r miles in radius, and determines the geographical position of its centre subject to extreme errors of m miles in longitude and n miles in latitude; and that B, who is able to establish his geographical position within the same limits of extreme error as A, attempts to find the shoal again by proceeding to the geographical position assigned to it by A, what is the probability that he will find it? The author works out this probability mathematically, and finds a general formula for it. If $r = 1$ mile, and m and $n = 10$ miles, B would stand one chance in 6173 of coming within two miles of the shoal. This shows that the reported non-existence of a charted shoal must be accepted with great care.—The counter-twisted curl aneroid, by Carl Barus. A curl aneroid, less than a metre long, provided with a mirror for registry, will indicate variations of atmospheric pressure of a thousandth of a millimetre of mercury, provided the mounting is sufficiently free from tremor, and the temperature is kept constant to a few thousandths of a degree during the interval of observation. The conditions are made much less severe if the coiled tube, after being twisted, is kept untwisted by a spiral spring. Effects of viscosity and rigidity may be thus compensated.