

was summarised in our issue of March 28 (p. 98). In addition to the above papers, the volume contains a report of the proceedings of the Birmingham Branch of the institute, and a valuable series of abstracts of papers.

A SECOND article dealing with Messrs. Whiteley's new premises appears in *The Builder* for June 21. In accordance with modern ideas, old-fashioned methods of sweeping and dusting have been abandoned in favour of vacuum cleaning apparatus, constructed by the Vacuum Engineering Company, Ltd., of London. There are three powerful vacuum machines, each consisting of a turbine vacuum cleaner having a normal capacity of 800 and a maximum capacity of 1800 cubic feet of air per minute. A centrifugal separator collects the dust in a tank, and the air passes away through an exhaust outlet 18 in. in diameter. The main risers are 4 in. in diameter, and have an aggregate length of about 1000 ft.; the horizontal pipes are 5 in. in diameter with an aggregate length of 1200 ft.; all these pipes are of mild steel, of specially smooth interior. There are 104 inlets, to which hose-pipes may be attached; these are distributed at convenient points on the walls of the building. The hose-pipes are of 2-in. internal diameter, and from twelve to twenty-four of them may be in use simultaneously.

MR. JOHN MURRAY now publishes in this country, at 6s. net, Dr. L. O. Howard's book, "The House Fly—Disease Carrier: an Account of its Dangerous Activities and of the Means of Destroying it," which was published by the Frederick A. Stokes Co. of New York in 1911. The book was reviewed at length in these columns on January 11 last (vol. lxxxviii., p. 345).

MR. W. H. HARLING, Finsbury Pavement, London, has issued No. III. of his sectional catalogue of mathematical, drawing, and surveying instruments. This section gives exhaustive particulars and the prices of numerous forms of scales, pantographs, planimeters, and other instruments in constant use by draughtsmen, surveyors and others.

MR. S. A. McDOWALL'S "Laboratory Notebook of Physics," which was reviewed in the issue of NATURE of May 30 (vol. lxxxix., p. 317), can now be obtained from Messrs. J. M. Dent and Sons, Ltd., in four separate parts. The parts deal respectively with measurement and hydrostatics, heat, light, and magnetism and electricity. The price of part i. is ninepence net, and of each of the others one shilling net.

MESSRS. J. M. DENT AND SONS, LTD., have added to their "Educational Journey" series, a pamphlet of sixty-four pages, by Mr. G. H. Green, entitled a "Nature-study Note-book," the price of which is 6d. The booklet is profusely illustrated, and is intended to be of service to young pupils who are fortunate enough to be taken by their teachers for school journeys—an educational expedient which is fortunately becoming increasingly common in this country.

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OUR ASTRONOMICAL COLUMN.

THE SPECTRUM OF NOVA GEMINORUM No. 2.—Further particulars of the reported discovery of radium, uranium, and emanation radiations in the spectrum of Nova Geminorum are communicated to No. 4582 of the *Astronomische Nachrichten* by Prof. Küstner.

The plates were taken and reduced by Dr. H. Giebler, who discusses the peculiar variations of the structure of the several emission and absorption bands of hydrogen, &c., and gives three curves showing the relative intensities of the bands and the continuous spectrum on March 19, 26, and 27 respectively.

It is among the numerous fine, so-called absorption lines, to which so many origins and so many different radial-velocity shifts have been ascribed, that Dr. Giebler finds the coincidences with lines due to the radium group of elements. Taking all the known radium spark lines, from a table given in the manuscript for the sixth volume of Prof. Kayser's "Handbuch," twelve in all, he finds a line approximately coincident with each of them in the nova spectrum; the differences range from -1.66 to $+1.32$ Å. Although eight negatives were measured, four of these nova lines were found to occur once only, and each of them on a different negative taken on another date; two others, also occurring once only, are found on a fifth negative. Only three lines were found to occur on as many as three negatives, and, while the intensities of the laboratory lines range from 50 to 2, the intensities of these three lines are 2, 4, and 2 respectively. The mean wave-length of the nova line attributed to the strongest radium line ($\lambda = 4340.83$) is 4341.65 , a position very near to the dark reversal of H γ .

Of six arc lines of uranium four are represented in the spark and four in the nova spectrum, but of the four spark lines only two appear in the nova, and the only line, $\lambda 4472.50$, which, from the laboratory data, may be an enhanced line, is not represented in the nova at all, unless one accepts the line shown on one negative at $\lambda 4471.88$; but Dr. Giebler assigns this to helium. The four lines attributed to uranium occur on four different negatives, the only one to occur twice being the 4341 line already attributed to radium.

Of the ten lines shown in the Giessler-tube spectrum of the emanation, six are represented in the nova spectrum with differences varying between $+0.64$ and -0.51 Å, the intensities in the laboratory spectrum being 20, 5, 10, 10, 4, and 4 respectively; the corresponding intensities of the lines not represented are 6, 15, 10, and 7 respectively. Of the six lines approximating to coincidence, only two are shown on any one negative (April 2); each of the other four appears once only, on four different dates ranging from March 16–19.

From the above brief summary it will be seen that the presence of these radio-active elements in the nova should be accepted with great reserve until more conclusive evidence is forthcoming.

A CHANGEABLE RED STAR, WX CYGNI.—In October, 1903, Prof. Wolf announced the discovery of a probable new star, which subsequently proved to be BD+37° 3876, and Prof. Barnard examined it with the 40-in. Yerkes refractor. He re-observed it last summer, and now communicates the results of his measures in No. 4581 of the *Astronomische Nachrichten*. The object shows marked fluctuations in colour, at times appearing a very deep red, and varies in magnitude. It is evidently of special interest, and Prof. Barnard gives a scaled chart showing the neighbouring reference stars used by him; the position, for 1911.0, is $\alpha = 20^h. 15^m. 14.65^s.$, $\delta = +37^\circ 10' 15.3''$

THE BRAZILIAN ECLIPSE ON OCTOBER 10.—In two letters to Mr. Chambers, published in the May number of the *Journal of the British Astronomical Association*, Mr. Harold Thomson gives some particulars concerning the October weather (1910), the local conditions, &c., in the neighbourhood of Rio. Observers who intend to go to Brazil in October next will probably find some useful hints concerning the journey, &c., in these letters.

THE ASTRONOMICAL AND ASTROPHYSICAL SOCIETY OF AMERICA.—The papers read at the meeting of this society held at Washington in December last are reported in abstract in No. 905 of *Science*. A comparison of Dr. Peters's celestial charts with four of the photographic charts of the sky taken at Bordeaux and Algiers led Mr. J. G. Porter to the conclusion that they contain, on the average, 50 per cent. more stars than the photographic charts, which are, therefore, by no means complete to the twelfth magnitude. Dealing with the moon's parallax, Dr. F. E. Ross finds the mean distance to be $238,857.9 \pm 1.1$ U.S. miles and the semi-diameter to be $1,079.93 \pm 1.04$ miles; the density, in terms of that of the earth, is 0.6043 ± 0.0003 . The subjects of many of the other papers have already been dealt with in these columns.

THE OPTICAL CONVENTION, 1912.

THE Optical Convention of 1912, which was yesterday brought to a successful conclusion, has rightly awakened widely extended interest in scientific circles. The use of optical methods of investigation is so universal and it so nearly affects research in all directions, that there is no body of scientific men who can afford to be indifferent to the successes of the makers of optical instruments and to the researches of those who are occupied with designing them. Hence the widespread interest which has been manifested in the proceedings of the Optical Convention, and the large measure of success with which its meetings and other proceedings have been conducted.

The convention was opened on Wednesday, June 19, by an inaugural address delivered by the president, Prof S. P. Thompson. A graceful preliminary ceremony was performed by Mr. C. P. Trevelyan, M.P., who, speaking in behalf of the President of the Board of Education, welcomed the president and members of the convention to the Science Museum and the Imperial College, expressing in felicitous phrases the interest which his Majesty's Government has been taking in the realisation of the plan for holding an Optical Convention. The official welcome was repeated on the following day, when the Director of the Science Museum, addressing the members of the convention assembled to meet him, explained that the idea of providing suitable accommodation for the proceedings of such a gathering formed part of the settled policy of the department in connection with the rebuilding of the museum.

It will be matter of satisfaction to all who have the interests of science at heart to know that the Board of Education has adopted so enlightened a policy, and it is perhaps to be counted a very fortunate circumstance that at this particular time, when the plans for rebuilding the museum are under consideration, the experiment of holding a congress of scientific men within the walls of the museum should be carried through. It has been made abundantly evident by that experiment that great advantages can be secured in that way. The educational purposes of the museum are never better served than when its resources are placed at the service of those

who are actively engaged in prosecuting the studies to which the collection itself is subservient. The convenience of being able to supplement their own resources by drawing upon the resources of the museum has been very evident to the committee engaged in organising and carrying through the work of the convention. It can scarcely have been less satisfactory to the Board of Education and to its officers to see their collection of scientific objects turned to the best account by the assembly within the walls of their building of so large a number of expert persons to whom those objects are objects of scientific interest. We are glad to see that the experiment of providing such accommodation for the meeting of the convention has been carried through with so large a measure of success as to justify the hope that it may be repeated hereafter in various forms and on many occasions.

Turning now to the proceedings of the convention, one naturally inquires first of all as to the steps of progress which are registered in connection with this meeting. Accepting the lead of Prof. Thompson's very able inaugural address, one is led to think of the subject of illumination as that in which the most rapid advances are being made at the present time. These advances are well illustrated in the exhibition, where the illuminating engineers are very much in evidence, while in the lecture-rooms, although they have been perhaps not quite so much to the fore, they have very distinctly made their influence felt. It may indeed, be said that with respect to general illumination, the lighting, for instance, of streets and rooms, whether artificially or from natural sources of light, theory is at present in its cradle and even experiment in its initial stages. Much, however, has been already done, and still more may be expected to be accomplished within the next few years, if the present activity of investigators and inventors along this line should be maintained. The illumination suitable for optical instruments, and particularly the problem of illumination of objects under microscopic examination, has long been a subject of study. But here also we seem to be upon the crest of a wave. New methods of controlling the illumination of the stage of the microscope and new rules for interpreting the appearances presented in an illuminated field are occupying the earnest attention of investigators and with results which appear to be full of the promise of future achievement.

While the problems presented by illumination appear to be the direction in which research along optical lines is just now most conspicuously successful, the problems relating to the imagery of movement appear, on the other hand, to be those in which invention has made its most sensational advances. Prof. Thompson, who gave his audience some very interesting statistics concerning the astonishing popularity which kaleidoscopes and stereoscopes obtained when they were first introduced to the public, was able to add that since the date of the last Optical Convention, now seven years ago, the developments of the cinematograph had drawn from the public a thousand times as much money as either of those inventions. The inventors in this department would seem indeed to be too busy making their fortunes to have any time or interest to spare for the Optical Convention, and we observe that nothing in the nature of modern cinematography was on view in the exhibition.

Perhaps the time has scarcely come yet for the reduction into the terms of exact science of the theory of moving images. The elements of such a theory have been available, although in an unconnected form, to visitors to the Optical Convention. But the principles of image combination, the effects