

OUR ASTRONOMICAL COLUMN.

STONYHURST DRAWINGS OF SUN-SPOTS AND FACULÆ.—A little more light on the relation of faculæ to spots is contained in a paper communicated by the Rev. Walter Sidgreaves to the Royal Astronomical Society in December 1891. None of the drawings of solar phenomena made at Stonyhurst under the late Father Perry's direction afforded a clear instance of faculæ preceding the birth of a spot. Neither was there any positive evidence of the birth of a spot before the appearance of faculæ; while every spot of importance was attended from the beginning with at least a small surrounding of faculæ. No absolute priority of one or the other could therefore be regarded as proved. During the minimum of 1889, however, Father Sidgreaves observed two cases in which faculæ undoubtedly appeared before any trace of a spot could be detected. "On June 29, a small patch of faculæ was sketched near the eastern limb, in latitude $-40^{\circ}5$, and in longitude 252° . There was no trace of a spot in the neighbourhood, and neither spot nor faculæ had been seen near the position for years. On the following day a small round spot appeared in latitude $-40^{\circ}3$, and longitude $252^{\circ}2$ —that is, in the midst of the faculæ, the faculæ on this day being visible only just close round the spot." A similar development was recorded at the end of July, in latitude -22° , and longitude 155° . Both the faculæ and spots were new, and clearly distinguished; hence, so far as these observations are concerned, their evidence clearly indicates that the birth of some spots is preceded by the appearance of faculæ.

SOME APPARENTLY VARIABLE NEBULÆ.—Mr. Lewis Swift, in his ninth catalogue of new nebulæ discovered at the Warner Observatory (*Astr. Nach.*, 3004), noted his inability to re-find a nebula previously seen in R.A. 3h. 36m. os., Decl. $95^{\circ}2'1$. A further examination of the region led this observer to suspect that the object formerly located in the position given must have been a comet (*Astr. Nach.*, 3014). Dr. Dreyer has looked up the observations of nebulæ in the region in question, and the information thus obtained leads him to conclude that the object is most probably a variable nebula (*Monthly Notices*, December 1891). The nebula appears to have been visible in 1827, 1848, 1850, 1851, 1856, and 1889, while it was not seen in 1785, 1855, 1864, 1865, 1872, 1875, 1877, and 1890, although it was specially looked for on two or three of these occasions. The two nebulæ h 229 and h 882, which Prof. Winnecke found were periodically variable (and his observations were supported by later ones made by other observers), are believed by Dr. Dreyer to owe their apparent fluctuations of light to disturbing atmospheric influences. h 1452 is a similar diffused nebula with slight condensation, which Sir John Herschel suspected to be variable. But in this case, also, conclusive evidence of variability is wanting.

THE CRYSTAL PALACE ELECTRICAL EXHIBITION.

THE Electrical Exhibition at the Crystal Palace was opened on Saturday last. It is an Exhibition of great interest, not only to electricians but to the public, and should do much to enlighten ordinary visitors as to the methods and results of electrical science. At the present stage we need refer only to some parts of the display. When the Exhibition is complete, we shall give a fuller account of the principal exhibits.

Much attention will, of course, be devoted to the section containing the generating machinery. Every important type of generating apparatus is shown in this department. Among the large exhibits is a 350 horse-power Davey, Paxman engine, capable of driving a powerful Kapp dynamo; and Messrs. Crompton and Co. exhibit a dynamo combined with a Willans engine of 200 horse-power—the dynamo being capable of running nearly 4000 8 candle-power glow lamps. There are many gas-engines, some of which are shown by Messrs. Crossley Brothers, the original proprietors of the Otto gas-engine. Other exhibitors are the British Gas Engine Company, with cycle engines; Messrs. Dick Kerr and Co., with the Griffin gas-engine; Messrs. J. E. H. Andrew and Co., with the Stockport gas-engine; and Messrs. Day and Co., with a new form of gas-engine. All of these engines are used to drive dynamos of various makers.

A most interesting exhibit is sent by the Postmaster-General, who displays a complete set of telegraphic apparatus. A large

projector or search-light is shown by Messrs. Crompton and Co., who also exhibit, among other things, an electric crane capable of hoisting about a ton. No fewer than 10,000 glow lamps in one group are shown on a wire screen by the Edison-Swan Company, and arc lights, poles, regulators, and samples of submarine cables are displayed by Messrs. Siemens Brothers. A model of an electric launch built for use on the Thames is included among the exhibits of Messrs. Woodhouse and Rawson; and a full-sized electric tram-car is shown by the Brush Electrical Engineering Company, who have also in the Exhibition various dynamos, arc lamps, and other objects.

The exhibits in connection with telephony cannot fail to attract notice, and will do more than any amount of verbal explanation to make its principles intelligible. The National Telephone Company are arranging rooms where London operatic and other performances may be heard by visitors on payment of a small fee; and two stands belonging to the Consolidated Telephone Company, one in the nave, and another in the gallery, are connected by telephone.

Messrs. Croggon and Co. show lightning conductors of the latest type applied to a model church, in connection with which a peal of bells are rung by electricity from a keyboard. Various styles of fittings for domestic electric lighting are displayed in a series of rooms in the galleries; and these will no doubt attract very general attention. The Medical Battery Company show well how electricity is applied in various departments of medical practice.

The Exhibition has been organized with so much care, and on so great a scale, that it is sure to be widely appreciated.

THE SMITHSONIAN INSTITUTION.

PROF. S. P. LANGLEY, Secretary of the Smithsonian Institution, has submitted to the Board of Regents his Report for the year ended June 30, 1891. It includes, among other things, an account of the work placed by Congress under the charge of the Institution in the National Museum, the Bureau of Ethnology, and the National Zoological Park.

As in a previous Report, Prof. Langley refers to the fact that owing to the changing value of money the purchasing power of the Smithsonian Fund, in the language of a Committee of the Regents, "while nominally fixed, is growing actually less year by year, and of less and less importance in the work it accomplishes with reference to the immense extension of the country since the Government accepted the trust"; and he urges that the fund should be enlarged, "if only to represent the original position of its finances relatively to those of the country and institutions of learning." If we may judge from the general tone of the Report, the required increase is more likely to be obtained from private benefactors than from the Government. Quite lately, as we recorded at the time, the Institution obtained from Mr. Thomas G. Hodgkins, of Setauket, Long Island, a handsome donation of 200,000 dollars.

By reducing expenses in other directions, the Institution has been able to revert to its early practice of aiding investigators carrying on original research. Among the special grants may be named that of 500 dollars to Prof. A. A. Michelson, of Clark University, for continuing his important work upon a universal standard of measure founded on the wave-length of light; also a sum of 600 dollars placed at the disposal of Prof. E. W. Morley, to procure a special apparatus for determinations of the density of oxygen and hydrogen, an investigation requiring extreme precision and delicacy of manipulation, and promising results of wide application; while a sum of 200 dollars was placed at the disposal of Dr. Wolcott Gibbs, for investigations at his laboratory in Newport upon chemical compounds.

To Prof. E. S. Holden, Director of the Lick Observatory, California, a grant of 200 dollars was made, to assist in perfecting his apparatus for securing photographs of the moon. The results of his studies in this field Prof. Holden has offered to place at the disposal of the Smithsonian Institution for publication at some future day, should it seem desirable.

Prof. Pickering, Director of the Harvard Observatory, has also placed at the disposal of the Institution for publication a very valuable series of photographs of the moon, which have been secured at the Harvard Observatory, and which will be supplemented by photographs to be taken at the Harvard Observatory high-altitude station in the mountains of Peru.

The Director of the Paris Observatory, Admiral Mouchez,