

IN the *Journal de Physique* for August, M. A. Henry, physics master at the Reims Lycée, describes how he has applied a well known form of micromanometer to make measurements in a number of directions in which a manometer is not often utilised. The manometer consists of a U tube with wide limbs joined by a horizontal capillary tube. The limbs are about half-filled with carbon tetrachloride, and the capillary contains a small bubble of air. Any slight difference of pressure at the ends of the capillary produces a considerable motion of the bubble. The instrument is calibrated by tilting the tube support by means of a screw at one end. M. Henry shows how the instrument may be used to measure the excess of pressure in a soap-bubble and the effect of charging the bubble electrically, a small volume, a mass of a few grams, the density of a gas or of a solid, small amounts of heat, specific inductive capacity, difference of potential, a flow of gas, and the pressure exerted by a sound-wave.

THE determination of sulphur in illuminating gas is the subject of Technologic Paper No. 20 of the Bureau of Standards, by R. S. McBride and E. R. Weaver, issued by the Department of Commerce, Washington. Experiments were made with the gas referees' apparatus and the apparatus designed by Elliot, Hinman-Jenkins, Drehschmidt and Somerville. The results of a series of comparisons are given, in which many variations were made to determine the best conditions of operation and the sources of error. The referees' apparatus appears to be most used in America as well as here, and possesses the advantages of simplicity and convenience; the accuracy obtainable with this, as with other forms, has been often over-estimated. The concluding portion of the pamphlet deals with the estimation of the sulphate in the liquid condensate, and details are given of the gravimetric determination, a rapid turbidimetric method, and a volumetric method based on that due to Holliger. Although most gas companies in this country are now free from any restriction as to the amount of sulphur present in their gas other than sulphuretted hydrogen, the pamphlet will be very useful to any chemists having to deal with this problem.

IN the *Bulletin de la Société d'Encouragement* (No. 6, p. 805) Prof. Camille Matignon discusses in an interesting paper some of the less known recent processes for the industrial fixation of atmospheric nitrogen. The well known methods utilising an electric flame are only briefly touched upon, but especial reference is made to Schloesing's process of absorbing the nitrous gas so obtained with lime at a temperature of 300°. The principal processes dealt with are those of Haber, in which nitrogen and hydrogen are made to combine directly under the influence of a catalytic agent, and that of Serpek based on the formation of aluminium nitride by heating a mixture of alumina and carbon in a current of pure nitrogen at a temperature of 1800°. The latter method has a particularly bright industrial outlook owing to the fact that by decomposing the nitride with dilute alkali not only is ammonia obtained, but it is possible by means of it to transform bauxite into

alumina suitable for the aluminium industry at a much reduced cost. The action between the alumina and carbon is effected in revolving cylinders, which are lined with aluminium nitride itself, as being the only sufficiently refractory material which will withstand the high temperatures employed.

RED Book No. 182 of the British Fire Prevention Committee contains an account of tests on three window openings filled in with Luxfer electro-glazing. The record gives the effect of a fire of ninety minutes' duration, the temperature reaching 1500° F. and not exceeding 1650° F., followed by the application of water for two minutes on the fire side. This test again indicates that forms of special glazing are being produced commercially that can serve most efficiently to stop the spread of a fire of considerable severity. It is the second occasion upon which "lights" presented for test by the British Luxfer Prism Syndicate, Ltd., have met the strain of a ninety minutes' test at temperatures exceeding 1500° F. Red Book No. 183 contains records of tests on two steel-cased reinforced concrete doors by Messrs. Chubb and Sons, one hung on runners and made to slide, the other hung on hinges, fixed in a reveal. The latter door secured "full protection" (Class B). The partially successful efforts to produce a single door able to do the work of two iron doors required under the London Building Act are of considerable technical importance. The radiation through the doors was very small. Doubtless the problem of making a sliding door flame-proof around the edges will be overcome.

OUR ASTRONOMICAL COLUMN.

A NEW COMET.—A Reuter message from Perth, W.A., dated October 7, reports that a faint new comet has been observed in the position R.A. 2h. 31m.; Dec. 3° 48' N.

THE RETURN OF WESTPHAL'S COMET.—The identification of Mr. Delaran's comet with Westphal's comet of 1852 is now complete, its positions being in accord with those predicted on the assumption of the object being the return of the comet of Westphal.

The following ephemeris for the current week is given by Prof. H. Kobold in a Supplement to the *Astronomische Nachrichten*, No. 4684:—

		12h. M.T. Berlin.						
		R.A.			Dec.	Mag.		
		h.	m.	s.				
Oct.	9	...	21	16 24	...	+ 8 18'2	...	8.4
	10	...		13 52	...	9 7'9		
	11	...		11 25	...	9 57'1		
	12	...		9 2	...	10 45'6	...	8.4
	13	...		6 44	...	11 33'8		
	14	...		4 32	...	12 21'3		
	15	...		2 25	...	13 8'3		
	16	...	21	0 24	...	+ 13 54'8	...	8.4

After observations on September 28, the corrections to the above ephemeris are as follows:—R.A. -34s., Dec. +9'9'.

As this comet does not reach perihelion until November 26, and as it is slowly approaching the earth, its brightness will be increased. In appearance the nucleus is described as well defined but elongated, and surrounded by a nebulosity 20' in diameter. The tail has been observed to be 1'2" in length, while a

photograph taken of it at Bothkamp on September 28 records a tail $3^{\circ}5'$ long.

The comet is in a good position for observation in the evening, and its movement northwards will make the conditions more favourable. It is at present passing through the constellations of Equuleus and Delphinus, but later will reach Vulpecula and Cygnus.

In *The Times* of October 2 we read that Westphal's comet is the fourth member of the Neptune group of comets that has been observed at a second apparition, the others being those of Halley, Olbers, and Pons. Two other members of the group appeared in 1846 and 1847, and are expected back about 1921 and 1927. Westphal's comet has much the shortest period (61.118 years) of any member of the group, its aphelion being at almost exactly the same distance from the sun as the orbit of Neptune.

PHOTOGRAPHIC STUDY OF THE SOLAR PHOTOSPHERE.—

In an abstract from the *Annals of the Observatory of Zô-sé* (Tome iii., 1912), M. S. Chevalier, S.J., describes the results of his research on the solar photosphere as studied photographically. He first of all describes the early observations of the solar surface by Sir W. Herschel, and rapidly surveys those who followed him, concluding with the photographic researches of M. Janssen at Meudon. M. Chevalier points out that on these latter photographs the famous granules observed by Secchi, Dawes, &c., were recorded.

He then directs attention to the possibility of errors creeping in when photography is employed. Is the image recorded on the photographic plate necessarily a faithful representation of the object photographed? M. Chevalier says it is not, and in the present investigation he attempts to show that the *réseau photosphérique* discovered on Janssen's clichés is not solar. The phenomenon, he says, is chiefly due to deviations undergone by the luminous rays refracted in an abnormal manner. This abnormal refraction takes place in the interior of the telescope, and more especially in the neighbourhood of the secondary magnifier. M. Chevalier accompanies his memoir with a series of fine reproductions from photographs of the solar surface which he has taken to demonstrate his views, and it is by an examination of these that his conclusions must be studied.

STATISTICS OF NEBULÆ AND CLUSTERS.—In the *Arkiv för Matematik, Astronomi och Fysik* (Band 9, No. 15), Prof. C. V. L. Charlier has published a preliminary paper on the statistics of nebulae and clusters. This contribution is part of the work of the Lund Observatory, which has undertaken a discussion of the position of the nebulous stars in space, and these statistics form a preliminary part of the investigation. In this publication Prof. Charlier represents both in statistical and graphical form, the information collected on card catalogues of the co-ordinates, brightness, size, and form of nebulae, as well as other observations of interest. The base of the card catalogues was the three great catalogues of Dreyer. In these pages the results are given purposely without any discussion regarding their bearing upon the question of the distribution of the nebulae in space. He remarks, however, that while in many respects they speak for themselves, in others conclusions must be drawn with great caution. The main interest here are the relations between the Milky Way and the positions and numbers of the nebulae.

When it is remembered that distinction is made between five different classes of nebulous objects, namely, clusters, globular clusters, planetary nebulae, annular nebulae, and nebulae, and that the objects number 13,223, some idea of the work involved in the investigation will be gathered.

SPECTROHELIOGRAPHIC RESULTS FROM MEUDON.—A memoir by MM. H. Deslandres and L. d'Azambuja, appearing in No. 9 of the *Comptes rendus* of the Paris Academy of Sciences, contains an interesting historical survey of the spectroheliographic work carried out at Meudon. The paper is more especially concerned with the *qualitative* results obtained by examination of the spectroheliograms secured since 1908, when the spectroheliograph of high dispersion was erected. Whilst careful to point out that the evidence does not permit the formulation of general laws, the authors are content to state that during the period in question the "filaments" (dark and definite stream-like markings seen in hydrogen and calcium light) have followed, but with a distinct lag, more pronounced in the case of the polar disturbances, the sun-spot variations. In this regard the polar disturbances recall the secondary maximum of high-latitude prominences. On the other hand, the "alignments" (markings somewhat less dark and sharp seen only in calcium light) have been without noticeable variations.

AN EXHIBITION OF PROGRESS IN LIGHTING AND HEATING BY COAL GAS.

THE National Gas Exhibition at Shepherd's Bush, which will be open during the whole of October, affords the best object lesson in gas lighting that the public has ever had the opportunity of studying, and the fascination is greatly increased by the absence of competing stalls, the exhibits being shown in model rooms, shops, studios, &c., under all the conditions in which they are likely to be used in practice.

It is something of an achievement to have induced the leading gas undertakings, municipal and private, and the leading manufacturers of gas appliances in the United Kingdom, to sink their individuality and rivalry and to cooperate in a coherent exhibition of the varied uses to which gas can be efficiently and profitably applied. The result should be of benefit both to the industry and to the public generally.

The exhibition impresses one with the enormous strides that have been made during the last few years in the application of gas for manufacturing, domestic, and public purposes. The introduction of vertical retorts, improved methods of purification, and the resulting greater yield of gas, coke, and by-products obtained from the coal carbonised, have resulted in its price being kept down in spite of the gradual rise in the cost of coal, whilst the enormous progress that has been made in the methods employed in its combustion has popularised it to an extent that could hardly have been foreseen a few years ago.

There is not the least doubt but that the introduction of the atmospheric burner and the incandescent mantle has been the real factor which has made gas the most important fuel for both heating and lighting, and in the present exhibition the progress that has been made from the inception of the union jet by Nielson in 1820, which gave less than one candle per cubic foot of gas consumed, to the modern high-pressure incandescent burner, with its sixty candles per cubic foot of gas, is demonstrated in a striking manner.

Various apparatus for raising gas to the pressure of several pounds per square inch, necessary in high-pressure lighting, is to be seen at work in the Industrial Hall, and the bearing which the high-pressure distribution has upon commercial applications is shown by the exhibition of a number of furnaces for a multiplicity of purposes, such as melting metals and hardening steel. In these cases it is necessary to concentrate the temperature over a defined area, and