

air through which an electric current is passing, and measurements of the change of refractive index of air with temperature are further applications. Finally the author deals with the measurement of the deflection of an electrometer needle by interference, and shows that such an instrument will measure a few millionths of a volt.

IN connection with the development of the Langley Aerodynamical Laboratory of the Smithsonian Institution, the purpose of which, it will be remembered, is primarily to plan and conduct such theoretical and experimental investigations, tests, and reports as may serve to increase the safety and efficiency of aerial locomotion for commercial advance, national defence, and the welfare of man, a visit was paid a short time ago to various kindred institutions in Europe by Dr. A. F. Zahm, the recorder of the Langley Laboratory, accompanied by Mr. J. C. Hunsaker, of the U.S. Navy. The tour of inspection included the British, French, and German laboratories; also many of the aerodromes, aircraft factories, and aeronautical libraries, the object being the study of the latest developments in instruments, methods, and resources used and contemplated for the prosecution of scientific aeronautical investigations. The results of their observations are embodied in No. 2273 of the Smithsonian Miscellaneous Collections.

BULLETIN No. 8 of the Mellon Institute of Industrial Research deals with some engineering phases of Pittsburg's smoke problem. In this district more bituminous coal is used than in any other district of like size in the world. The coal found in the neighbourhood of Pittsburg is very plentiful, cheap, and rich in volatile matter. Further, the many hills and valleys and the frequent fogs hold the smoke long after it would have been carried away in another locality having a more regular topography. The soot-fall for the twelve months ending April, 1913, at the various observation stations in Pittsburg ranges from 595 to 1950 tons per square mile. Pittsburg learned the appearance of a clean city during the brief period in which natural gas was largely employed; since 1895 the use of coal has been general again. The local authorities have made attempts since 1893 to get rid of smoke production at the pumping stations, but with little success; the Mayor reported in 1913 that one of the worst offenders against the smoke ordinance is the city of Pittsburg at the Northside light plant and the Brilliant pumping station. Of special interest is a series of photographs showing two views of each locality, one on a clear day and the other on a smoky day.

WE have received from the Cambridge University Press a copy of the second edition of Dr. G. S. Graham-Smith's "Flies in Relation to Disease: Non-Bloodsucking Flies," the first edition of which work was reviewed in NATURE of December 11, 1913. In the work as first issued an attempt was made to collect, tabulate, and examine critically the various facts and hypotheses relating to the life-histories, habits, and disease-carrying potentialities of non-blood-sucking flies, which had been published up to

the end of 1912. In the present edition the work published during 1913 is dealt with in the same manner, and in addition an account of some recent unpublished observations made by the author has been added. The volume is published at 12s. 6d. net.

OUR ASTRONOMICAL COLUMN.

THE PERSEID METEORIC SHOWER.—The weather has been very favourable for tracing the progress of this shower. On August 10 there were not many meteors, though a few fine ones appeared. On August 11 there was a great increase in numbers, but the moon rose soon after 9 p.m. At Bristol Mr. Denning estimated that the total number of meteors visible to one observer between 9 p.m. and 3 a.m. on the following day must have been about 150. On August 12 the rate of meteoric apparitions had declined and the number visible in the same time was estimated at 110, but there were many detached clouds over the sky. On August 13 there were clouds at Bristol and few meteors were seen, but the Perseid shower had evidently decreased in a marked degree since the previous night. On the whole the display may be regarded as having exhibited moderate numbers with a large proportion of brilliant meteors. The radiant point showed the usual displacement to the eastward as observed on successive nights.

On August 16 meteors were abundant, and there were two active showers, one of late Perseids from $56^{\circ}+59^{\circ}$ and another of Lyrids from $279^{\circ}+45^{\circ}$.

The observations generally have been ample this year, according to reports from many stations. Mrs. Fiammetta Wilson, at Bexley Heath, recorded the paths of no fewer than 152 meteors on the four nights from August 10-13. Two magnificent fireballs were seen by her and by Miss Grace Cook at Stowmarket on August 14, viz., a Perseid at 9.34 and a slow meteor three or four times as bright as Venus directed from a radiant in the southern sky at 9.50. The latter was also recorded by the Rev. Ivo Gregg at Walthamstow, and the following deductions have been made regarding this and a few other brilliant meteors of the recent display:—

Date	G.M.T.	Mag.	Height at first	Height at end	Path	Velocity per sec.	Radiant
	h. m.		m.	m.	m.	m.	
Aug. 11	11 25	> 1	72	48	38	38	47+61
12	10 22	Sirius	78	45	59	45	48+58
"	10 33½	♀	80	54	48	40	48+57
"	10 52½	> 1	82	53	31	80	280+44
"	11 10	1	64	49	28	14	320-4
14	9 34	♀	85	54	61	61	44+59
14	9 50	> ♀	67	44	31	16	296+10

The great velocity of the Lyrid of August 12, 10 52½, is remarkably in contrast with the rate of motion of the last two meteors in the table.

THE SPECTRUM OF COMET 1914b (ZLATINSKY).—Dr. Slipher publishes in the Lowell Observatory Bulletin, No. 63, a description with wave-lengths of the spectrum of Zlatinsky's comet. Three spectrograms of this comet were secured at Flagstaff on the evenings of May 25, 26, and 27, using a one-prism spectrograph employed in nebular work attached to the 24-in. refractor. Vanadium and iron were used as comparison spectra, and it was possible to expose for about one and one-third hours. The wave-lengths were reduced independently from the three negatives, and all three reductions are printed in tabular form in the paper. In order to differentiate between the spectrum of the head and nucleus of the comet a long

slit was used, and he is able to divide the cometary bands into two classes—long and short. The long bands comprise the carbon bands at $\lambda 5165$, 4737 , and 4381 , and the cyanogen bands at $\lambda 4216$ and 3883 , these last extending even further from the nucleus. Comparing this spectrum with those of other comets, he finds that comet 1912a (Gale) and comet 1911c (Brooks) are closely of the same spectral type as Zlatinsky's: this type he considers the more usual. Halley-Daniel (1907) is a type less common, and Morehouse (1908) a truly exceptional type.

THE SPECTRUM OF SILICON.—Those engaged in astrophysical researches will welcome the important paper communicated to the Royal Society (*R. S. Proc.*, Series A., vol. xc., p. 512, August) by Sir William Crookes on the spectrum of elementary silicon. Silicon plays an important part in the classification of stellar spectra, and the wave-lengths of lines attributed to this substance by different workers are by no means similar, and the number of lines recorded in the spectrum also vary for different observers. The discrepancies have chiefly arisen owing to the difficulty of obtaining pure silicon for laboratory purposes, but Sir William Crookes has recently been able to secure specimens of considerable purity, and so is able to record the results of his labours over eleven years on this one element in this communication. The specimens worked upon were obtained from the Carborundum Company at Niagara Falls, and gave on analysis 99.56, 99.86, and 99.98 per cent. of silicon, the impurities being titanium, iron, and aluminium. The use of these specimens has allowed the author to correct the lines given by other less pure samples, and to clear up other doubtful points. The paper gives a sketch of the procedure of treatment and the method of measurement of the lines, with, finally, a list of the lines attributed to silicon, with comparison tables of the wave-length determinations of other workers; it is to be noted that no intensities of the lines are given. The following is a list of the lines recorded:—

λ 3853.812	...	6346.962	...	2516.131
3856.193	...	6371.032	...	2519.276
3862.743	2524.110
3905.726	...	2124.163	...	2528.585
4089.016	...	2208.048	...	2541.970
4097.021	...	2210.987	...	2631.370
4128.189	...	2211.839	...	2881.690
4131.192	...	2216.882	...	2987.750
4552.841	...	2218.227	...	3086.479
4568.123	...	2435.212	...	3093.694
4574.823	...	2438.911	...	3247.684
5042.715	...	2443.484	...	3438.444
5057.832	...	2452.219	...	3796.364
5961.0	...	2507.055	...	3806.802
5982.0	...	2514.406	...	

THE TOTAL SOLAR ECLIPSE.—Attention is directed to the article in NATURE of July 16 on the eclipse of the sun which is to take place to-morrow. In the communication in question particulars are given of the various observing parties and the positions and duties assigned to them. The outbreak of hostilities must necessarily interfere with the programme therein sketched, e.g. the expedition which was to have been stationed near Kief has had to abandon its proposed work. According to the *Times*, Major Hills, president of the Royal Astronomical Society, has arrived in London from Russia, and Prof. Fowler and Mr. Curtis may be expected shortly. The party had considerable difficulty in getting away from Russia, having to travel from Riga to Copenhagen as deck passengers on a cargo steamer.

NO. 2338, VOL. 93]

RECENT JAPANESE BIOLOGICAL PUBLICATIONS.¹

THE papers here noted are reprints from the Journal of the College of Science, Imperial University of Tokyo, covering a period of five months, and do not by any means fully represent the output of the Japanese botanists and zoologists during this period, various other papers in natural history by Japanese workers having appeared in other journals—chiefly American. However, they form a fair sample of the large quantity and high quality of the biological work which is being done in Japan, and one is grateful to the authors and the publishing committee for refraining from publishing any part of this important journal—except a small part of the outer covers—in Japanese, which is, unfortunately, from the point of view of readers in other lands, still used in some other scientific journals published in Japan and usually without a summary in another language. The articles mentioned here are taken in order of numbering of the volumes to which they belong. The method of publication of the Tokyo science journal is to keep on starting fresh volumes before the preceding three or even four have been completed, instead of finishing off each volume as the various consecutive papers are published; the latter would certainly appear to be the better plan.

(1) Kinoshita gives a very detailed and beautifully illustrated description of the alcyonarian family Chrysogorgiidae, as represented in Japanese waters, twenty species being dealt with, of which eight are new. He criticises the view put forward by Neumann and others that the stems and branches of the Gorgonid colony are mouthless vegetative polyps, and discusses in some detail the morphology of the canal system and the coenenchyma in Alcyonaria generally.

(2) Koidzumi contributes a valuable monograph of the family Rosaceae as represented in the Japanese Empire, with Latin diagnoses of the forty genera and nearly two hundred species now known, and interesting notes in English, with tables, showing the distribution of these plants. These tables are most useful, since they display the distribution of the sub-families, genera, and species of Japanese Rosaceae, not only in Japan itself, but in various parts of the world, statistics of endemic and introduced as compared with indigenous species, etc.

(3, 4) Liebowhl gives in these two papers a monographic account of the Tetraxonid sponges of Japan, illustrated by very fine plates. The material was collected by Prof. Ijima (who had already worked up the Hexactinellid sponges of Japan), and sent to Prof. von Lendenfeld, by whom the preparation of this monograph was entrusted to the author.

(5) Koketsu's paper on the latex-containing tissues of Japanese plants contains much that is of general interest, for not only is the structure of the laticiferous vessels full worked out and illustrated, but interesting micro-chemical and physiological experiments are described. After a useful summary of the various views that have been put forward regarding the functions

¹ (1) K. Kinoshita: "Studien über einige Chrysogorgiiden Japans." Journ. Coll. Sci., Imp. Univ. of Tokyo, vol. xxxiii., Art. 2 (November 30, 1913). Pp. 47+3 plates+34 text-figures.

(2) G. Koidzumi: "Conspectus Rosacearum Japonicarum." *Ibid.*, vol. xxxiv., Art. 2 (October 28, 1913). Pp. 312+12 text-figures+8 tables.

(3) F. Liebowhl: "Japanische Tetraxonida. i. Sigmaphora; ii. Astro-phora melastrosa." *Ibid.*, vol. xxxv., Art. 2 (March 15, 1914). Pp. 116+9 plates.

(4) F. Liebowhl: "Japanische Tetraxonida. iii. Fuastrosa; iv. Sterra-strosa." *Ibid.*, vol. xxxv., Art. 5 (March 20, 1914). Pp. 70+2 plates.

(5) R. Koketsu: "Studien über die Milchröhren und Milchzellen einiger einheimischer Pflanzen." *Ibid.*, vol. xxxv., Art. 6 (December 25, 1913). Pp. 57+3 plates+12 text-figures.

(6) K. Koriba: "Mechanisch-physiologische Studien über die Drehung der Spiranthus-Aehre." *Ibid.*, vol. xxxvi., Art. 3 (March 30, 1914). Pp. 179+7 plates+14 text-figures.