

interest, as it is the only purely insular and tropical station at which anemographic data are recorded in India. The position of the station is well described, and the records are said to represent correctly the winds of the surrounding portion of the Bay of Bengal. At Port Blair winds from north-easterly directions predominate from November to March, or for five months of the year, and winds from south-westerly directions predominate during the five months from May to September. In the transition months of April and October, between the monsoons, winds are very variable. The discussion of the anemograph observations recorded at Dhubri is for seven years to May, 1896. The situation of the station is given in detail, and the anemograph was mounted on a tower, 45 ft. above the ground; its exposure is said to have been excellent. The height of the instrument above the tower is not given. The predominant winds at Dhubri are said to be those up and down the Assam Valley. During November, December, and May down valley winds very largely prevail, but up valley winds are more numerous than down valley winds in February, March, July, and August. Seasonal and diurnal movements of the air are given in tabular form for both stations.

A COPY of the annual report of the Board of Regents of the Smithsonian Institution, "showing the operations, expenditures, and condition of the Institution" for the year ending June 30, 1913, has been received from Washington. The volume runs to 804 pages, of which 140 are concerned with reports and proceedings. The bulk of the book consists of the general appendix which furnishes a miscellaneous selection of scientific papers, some of them original, embracing a considerable range of scientific investigation and discussion. Many of the papers are translations of contributions by distinguished foreign men of science. Among these translations may be mentioned: The reaction of the planets upon the sun, by M. P. Puiseux, astronomer at the Paris Observatory; modern ideas on the end of the world, by Prof. G. Jaumann, professor of physics at the Technical High School at Brünn; recent developments in electromagnetism, by Prof. Eugene Bloch, of the Lycée Saint Louis; oil films on water and on mercury, by Prof. H. Devaux, of Bordeaux; ripple marks, by M. Ch. Epry; the development of orchid cultivation and its bearing upon evolutionary theories, by M. J. Costantin; the problems of heredity, by Dr. E. Apert, principal at Andral Hospital, Paris; the whale fisheries of the world, by M. Charles Rabot; the earliest forms of human habitation and their relation to the general development of civilisation, by Prof. M. Hoernes; feudalism in Persia: its origin, development, and present condition, by M. J. de Morgan, of Paris; shintoism and its significance, by Mr. K. Kanokogi, of Tokyo, in *Zeitschrift für Religionspsychologie*; the economic and social rôle of fashion, by M. Pierre Clerget, of Lyons; and the work of J. H. Van't Hoff, by Prof. G. Bruni, of the University of Padua. As has been the case in former years, many of the articles in the appendix are illustrated by numerous beautifully executed plates.

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MESSRS. JOHN WHELDON AND Co., 38 Great Queen Street, Kingsway, London, W.C., have issued a catalogue of books and papers on economic botany which they have for sale. The list, which is conveniently classified, contains particulars of books on commercial plants, tropical agriculture, food plants, and many other branches of economic botany.

THE following forthcoming books of science are announced by Messrs. Constable and Co., Ltd.:—"Textbook on Motor-car Engineering," by A. G. Clarke, vol. ii., Design; "Telegraph Engineering," by Dr. E. Hausmann; a new edition of "Wood Pulp," by C. F. Cross, E. J. Bevan, and R. W. Sindall. Mr. John Murray will shortly publish "Evolution and the War," by Dr. P. Chalmers Mitchell.

OUR ASTRONOMICAL COLUMN.

COMET NOTES.—The Ephemeris Circular of the *Astronomische Nachrichten* (No. 482) contains the elements and ephemeris of comet Mellish (1915a), communicated by Dr. Fischer-Petersen. As this ephemeris differs somewhat from that given last week the new positions for the current week are as follows:—

		R. A. (true)		Decl. (true)		Mag.
		<small>h. m. s.</small>				
April 22	...	18 32 24	...	-6 58.7	...	7.6
24	...	35 9	...	7 47.2		
26	...	37 57	...	8 40.6	...	7.4
28	...	40 50	...	9 39.5		
30	...	18 43 48	...	-10 44.0	...	7.1

The comet lies towards the southern portion of the constellation of Aquila, in the neighbourhood of the stars 1, 2, and 3 Aquilæ.

The only information to hand regarding the observed return of Winnecke's comet is that mentioned in the *Morning Post* of April 15. It is stated that Dr. Thiele, of the Bergedorf Observatory, Hamburg, recorded its position on a photograph, the object being of the 16th magnitude. This comet has a period of about 5.8 years, and was first discovered in 1858. At the present return perihelion will not be reached until September, so that later the comet may be a good telescopic object.

Prof. E. C. Pickering, in *Harvard Circular*, No. 187, gives some early positions of comet 1914e (Campbell). This comet, as the circular states, appears to have been first seen on Thursday, September 17 (astronomical date), at one o'clock in the morning, by Mr. Leon Campbell, at the Arequipa Station of the Harvard Observatory. The comet was then visible to the naked eye. It was discovered independently a few hours later by Dr. Lunt, at the Cape Observatory, and by Mr. Westland, in New Zealand. Six photographs taken by Mr. Campbell were sent to Cambridge, and the positions have been measured and are here recorded.

THE ROTATION OF THE SOLAR CORONA.—M. J. Bosler, in the *Comptes rendus* for April 6 (vol. cx., No. 14, p. 434), describes the result he has obtained in an investigation on the velocity of rotation of the solar corona. The experiment was made during the solar eclipse of last August, and the apparatus provided the means of photographing the whole spectrum of the corona. It was thought that the green radiation at $\lambda 5303$ would prove the most satisfactory line for measurement, but its absence rendered this impossible. However, the new red ray ($\lambda 6374.3$) provided the oppor-

tunity for the determination, and the result obtained is here described. The photograph secured showed two strips of spectra of the corona at the east and west limbs, and, as comparison spectra, three other strips of spectra of diffused sky light were secured symmetrically on the same plate ten minutes after the eclipse. The resulting wave-lengths of the coronal line for the east and west limbs were found to be as follows, each wave-length being the mean of five complete series of measures entirely distinct:—

East λ 6374.43 (Rowland)
West λ 6374.59 „

Diff. 0.16

This difference corresponds to a velocity of 3.7 kilometres, and, making a correction for the inclination of the slit to the solar equator, gives an equatorial velocity of about 3.9 kilometres per second, a value correct to about 25 to 30 per cent. In the eclipse of 1898 Prof. Campbell, using the green radiation, deduced a tangential velocity of 3.1 kilometres a second (± 2 km. nearly), the diffuse nature of the radiation preventing further accuracy. M. Bosler points out that the corona moves in the same direction as the surface of the sun, and appears to rotate more quickly. The higher levels of the chromosphere show a similar tendency only to a less degree. An apparent increase in velocity with the elevation is thus proved.

THE ANNUAL OF THE BUREAU DES LONGITUDES, 1915.—The very useful annual for the current year published by the Bureau des Longitudes is as compact as ever, and contains a mine of valuable information very handy for reference. Besides the usual numerous tables useful to the astronomer, several new communications are included. Thus M. G. Bigourdan writes on the subject of the constellations, and after a brief historical sketch gives the co-ordinates of the principal stars and star charts down to 50° S. latitude. Quite a long article, devoted to stellar spectra and their classification, is written by M. A. de Gramont. The author describes Secchi's classification with illustrations of the type spectra, and then refers to more recent classifications, giving a table showing the correspondence with each other. Sir Norman Lockyer's classification is dealt with in a separate section of the article, and is compared with the Harvard College Observatory classification. A very valuable article, covering 162 pages, is that on "Methods of Examination of Mirrors and Objectives," contributed by M. Bigourdan. The article is illustrated by a large number of very useful figures, which will considerably help the reader. The preliminary chapter includes numerous historical references, and this is followed by chapters on general methods of examination, their application to all reflecting surfaces, the examination of mirrors mounted in telescopes, and, finally, a very complete account of the examination and testing of objectives.

CHINESE RECORDS OF ECLIPSES.—In the Proceedings of the Tōkyō Mathemático-Physical Society (January, 1915, vol. viii., No. 1) Messrs. Kiyotugu Hirayama and Sinkiti Ogura discuss the interesting records of early Chinese eclipses. Their working list extends from the earliest solar eclipses to those recorded in the Ch'un Ch'iu. In the case of the latter, the calculations are in progress, and are expected to be soon finished. In the present communication the general plan of the calculations consists in determining the central line and the limiting lines for each eclipse. The eclipses of Shu Ching and Shih Ching are dealt with, and diagrams are given showing some of the limits of visibility.

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TEACHING OF ENGINEERING IN EVENING TECHNICAL SCHOOLS.

THE "Memorandum on the Teaching of Engineering in Evening Technical Schools" (Circular 894), recently issued by the Board of Education, is a very welcome manual of suggestions to teachers and organisers of schools which provide evening classes in mechanical and electrical engineering.

This Memorandum fills nearly sixty foolscap pages, and is divided into nine sections. An introductory section points out the limitations of part-time courses—courses intended for students whose ordinary employment occupies the greater part of their time—when compared with full-time day courses. The second section, after referring to the fact that some of the serious disadvantages which characterise part-time courses conducted in the evening may be avoided by the growing practice of holding such courses during the day (the junior employees being allowed "time off" in order to attend them), proposes to classify "a complete curriculum of evening instruction" into three stages: the junior course (fourteen to sixteen); the senior course (sixteen to eighteen or nineteen), and the advanced course (eighteen or nineteen to twenty, twenty-one, or twenty-two). Senior courses are to be of two kinds: a minor course, complete in itself, for apprentices to engineering trades; and a major course, incomplete unless it also includes an advanced course, for technical men. The third section of the Memorandum gives outlines of typical major (senior and advanced) courses in mechanical and electrical engineering, and of minor (senior only) courses in some engineering trades. After making, in the next section, some valuable suggestions upon laboratory and class instruction for adolescent evening students, the Memorandum proceeds, in the following four sections, to consider in more detail the teaching of the various subjects which constitute these outline courses. The accommodation and equipment required for the various classes of work already discussed are considered in the ninth and final section.

The Memorandum is thus concerned with all kinds of evening classes intended for persons employed in engineering work, from the apprentice who is beginning to learn a trade to the designer or manager who attends a course of evening lectures delivered by a university professor. By concentrating attention upon evening classes as such, and especially upon those classes which are primarily intended for boys and young men between sixteen and twenty-two years of age, the Board's inspectors have succeeded in producing a document which cannot fail "to assist teachers and organisers to mark out for themselves the schemes of instruction best suited to the conditions of their classes." But this very concentration, to which the Memorandum owes much of its usefulness, will disapprove education committees or directors of education who look to find in it some treatment of the wider educational and economic problems of engineering training, such as the following:—The selection, on democratic lines, of the most suitable boys for each different type of training which should be provided for the different positions in engineering industry; the respective parts to be played, in the preparatory (full-time) training of engineers, by the elementary school and the junior technical school, the lower secondary school and the senior technical school, and the higher secondary school and the university or technical college; the point at which works training should begin; the co-ordination of practical experience in the shops with instruction in classes inside the works and with outside schools and colleges; and, more generally, the effective co-operation between engineering firms and