and others have been published in the *Transactions* of British scientific societies. Among the reprinted articles we notice—to name a few—Prof. Dewar's British Association presidential address on the history of cold and the absolute zero; Prof. J. G. McKendrick's contribution to the study of experimental phonetics; Dr. J. J. H. Teall's address on the evolution of petrological ideas; and Mr. H. G. Wells's Royal Institution lecture on the discovery of the future. There are several translations from French and German of important papers also included, such as Prof. A. Dastre's article in the *Revue des deux Mondes* on the life of matter; Dr. Georg Jacob's "Oriental Elements of Culture in the Occident" from the German; and Herr Oscar Israel's appreciation of Virchow from the *Deutsche Rundschau*. Like all similar publications from the Smithsonian Institution, the volume is provided with many excellent illustrations.

OUR ASTRONOMICAL COLUMN.

ASTRONOMICAL OCCURRENCES IN JANUARY, 1904:—

Jan. 3-4. Epoch of the January meteors (Radiant 230° +53°).
5. 10h. 13m. to 11h. 9m. Moon occults *o* Leonis (mag. 3·8).
12. 10h. 11m. Minimum of Algol (*β* Persei).
,, 15h. 0m. Ceres in conjunction with moon. Ceres 0° 58′ N.
15. Venus. Illuminated portion of disc =0·707.
,, 6h. 58m. Minimum of Algol (*β* Persei).
27. 0h. 0m. Vesta in conjunction with moon. Vesta 0° 21′ N.
28. 4h. 55m. to 8h. 8m. Transit of Jupiter's Sat. III. (Ganymede).
,, 8h. 0m. Venus in conjunction with Uranus. Venus 1° 47′ N.

EPHEMERIS FOR WINNECKE'S COMET.—A second part of the ephemeris for the 1903-4 appearance of Winnecke's comet is published by Herr C. Hillebrand in No. 3916 of the *Astronomische Nachrichten*, from which the following has been taken:—

Ephemeris 12h. (*M.T. Berlin*).

1904	α app. h. m. s.	δ app. ° ′ ″	log. *r*	log. Δ
Jan. 0	17 30 51	−17 46 46	9·988836	0·272241
,, 4	17 50 44	−18 39 19	9·981012	0·270012
,, 8	18 10 59	−19 24 20	9·974601	0·268606
,, 12	18 31 32	−20 1 5	9·969782	0·268027
,, 16	18 52 16	−20 28 58	9·966685	0·268248
,, 20	19 13 4	−20 47 33	9·965417	0·269255
,, 24	19 33 50	−20 56 41	9·966004	0·271006
,, 28	19 54 27	−20 56 24	9·968430	0·273468
Feb. 1	20 14 47	−20 46 57	9·972633	0·276601
,, 5	20 34 46	−20 28 49	9·978474	0·280344
,, 9	20 54 18	−20 2 38	9·985794	0·284645
,, 13	21 13 19	−19 29 13	9·994414	0·289439
,, 17	21 31 45	−18 49 25	0·004129	0·294662
,, 21	21 49 35	−18 4 11	0·014739	0·300253
,, 25	22 6 47	−17 14 26	0·026059	0·306155
,, 29	22 23 20	−16 21 3	0·037913	0·312312

SPECTRUM OF MIRA CETI.—In No. 5, vol. xviii., of the *Astrophysical Journal*, Mr. Joel Stebbins, of the Lick Observatory, gives the results of a study of the spectrum of *o* Ceti made with the 36-inch refractor during the period June, 1902, to January, 1903, in which period the magnitude of the star decreased from 3·8 to 9·0. The spectra were obtained with spectrograph i.—which is the Mills spectrograph converted into a one-prism instrument—attached to the 36-inch, and a spark between iron poles was always used as the light source of the comparison spectrum.

The absorption spectrum obtained is not very like the solar spectrum, but the calcium lines *g*, H and K are all present, *g* being comparatively much more intense than in the solar spectrum; the iron lines are not prominent, and even the strongest do not appear when a small dispersion is employed. The *g* line undoubtedly becomes broader as the star grows fainter, for on June 27 (mag. = 3·8) its width was 2 t.m., whilst on September 6 (mag. = 7·0) it was 9 t.m. The lines at λλ 3990·64, 4045·16, 4093·55 and 4097·08 respectively, which are apparently not coincident with solar lines, appeared at successive intervals during the diminution of magnitude.

A comparison of the several spectra shows that with the decrease in the star's magnitude the continuous spectrum from λ 4300 to λ 5000 becomes relatively fainter than that between λ 4000 and λ 4300.

The bright hydrogen lines are very prominent, and Hβ and Hε, which have been reported as absent by other observers, appear on all the dense negatives, and they appear to grow relatively stronger than the other hydrogen lines, and the continuous spectrum, as the star's magnitude decreases. In addition to the hydrogen lines, bright lines of Si, Mg and Fe are probably present, and numerous changes took place in their relative intensities during the interval covered by the spectrograms. For example, the line at λ 4007 undoubtedly disappeared altogether, whilst the line at λ 4571—possibly due to magnesium—developed in a remarkable manner. The latter did not appear at all until the star's magnitude had fallen to 5·4, and afterwards it became the most prominent feature of the whole spectrum. The evidence obtained supports the conclusion that the bright hydrogen lines disappear at minimum.

Determinations of the star's radial velocity showed that it remains constant at about +66 km., and this is held to be a strong argument against the theory that the light-changes are due to the existence of a companion. The abnormal changes in the relative intensities of the hydrogen lines—which are displaced from their normal positions towards the violet, apparently by other causes than radial velocity and pressure—lead Mr. Stebbins to the conclusion that the light changes are due to internal causes which produce effects that are, as yet, unfamiliar to us.

THE "COMPANION TO THE OBSERVATORY," 1904.—The 1904 edition of the well-known annual compendium of astronomical data, the "Companion to the Observatory," is very similar to that of 1903. It contains, amongst other information, the usual tables for solar, lunar and planetary observations, ephemerides for the various satellites, and minute data regarding a large number of variable stars.

Mr. Denning has contributed a set of notes regarding the principal meteor showers, and Mr. Maw has supplied a list of double-star observations, whilst the numerous variable star ephemerides have been taken from advance proofs supplied by M. Loewy.

OXFORD AND SCIENCE.[1]

WHEN I am tired I sometimes go by train to Reading and cycle over here swiftly in the afternoon, and then I dress and dine comfortably at the *Mitre* and go out for a stroll. Perfect rest is not possible unless there is moonlight, but Oxford is always wonderful and satisfying and restful to an engineer like me. It is not because of its age, of the great men who have studied and worked in its colleges, of its almost unique character and high rank among universities, of the sacred beauty of its colleges and streets. It is because that to me it represents what is most persistent in the constitution of the British Empire. The Houses of Parliament, Westminster Abbey, the Temple and City of London, Windsor, the great mansions of our English nobles, each of these suggests much to any man who is fond of reading, but each suggests only a small part of what Oxford represents.

Now the thing that pervades all my thoughts of Oxford is that more than half of the most distinguished Englishmen during four hundred years have been educated here. And if, as I sometimes do, I include Cambridge when I say Oxford, all the most distinguished Englishmen during four hundred years have been educated here.

Whether we like it or not, it is a fact that England is an aristocratic republic with the King at the head of the

[1] An address delivered by Prof. John Perry, F.R.S., at a public meeting in Oxford, arranged jointly by the Ashmolean Natural History Society of Oxfordshire and the Oxford Mathematical Society.

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