of different diameters and strengths the limit of perception was found in all cases such that if there were no absorption of light by the atmosphere a candle would be visible at a distance of 27 kilometres. This is equivalent to a star of the eighth magnitude, and it is probably the light of the sky which prevents stars of higher magnitude than the sixth being visible.

Engineering for August 9 has an illustrated article descriptive of an electrically welded barge, which has been built at a yard on the south-east coast under Government control. This barge is 120 ft. long and 16 ft. beam, and has a displacement of 275 tons. The vessel, with full cargo, has been at sea during exceptionally rough weather, and answered satisfactorily in every way to the test imposed. No rivets were used in the construction, the whole of the structure being put together by electric welding. The adoption of this system was a direct consequence of experience in welding by means of the flux-coated metal electrode process at the Admiralty dockyards. There are seventy-one transverse frames in the barge, with three bulkheads; plates of thicknesses $\frac{1}{4}$ in. and $\frac{5}{16}$ in. were used for the shell plating. It is estimated that future vessels of this size should be built with a saving of 25 to 40 per cent. of time and about 10 per cent. of material as compared with ordinary riveted barges. The United States Shipping Board is making arrangements for the building of a number of 10,000-ton standard ships in which the use of rivets will be reduced to about 2·5 per cent. of the normal number.

THE problem of ascertaining the distribution and magnitudes of the stresses in a revolving disc by means of mathematical formulæ is tedious and complicated. With the exception of the cases of discs of constant thickness and constant strength, for which definite integrals can be found, the analytical solution involves highly complex equations, and the ultimate result is doubtful. In the course of an article in *Engineering* for August 9, Mr. H. Haerle describes a method which can be applied to any sectional profile and reduces the mathematical work to a minimum, while at the same time results are obtained which are sufficiently accurate for all practical purposes. The general formulæ are given by Dr. Stodola in his book on steam turbines, and from these other expressions are deduced for the sum and difference of the principal stresses. Mr. Haerle has prepared a chart showing the relation of these sums and differences with tangential velocities, and shows how the chart may be applied to the solution of discs of uniform thickness with and without a central hole, discs of hyperbolic profile, and turbine discs having the tapered sides usually employed in practice. An example of an impeller disc for a turbo-compressor is also worked out. Mr. Haerle's method gives remarkable agreement with the mathematical method, and certainly simplifies greatly an exceedingly complicated problem.

MRS. M. T. ELLIS contributes to the June issue of the *Biochemical Journal* three interesting papers on the plant sterols. In the first is recorded the failure to isolate a typical phytosterol from the vegetative organs of the cabbage plant or from the fæces of rabbits fed on a cabbage diet, although from the latter source a small quantity of a substance giving the cholesterol colour reactions was separated. On the other hand, cabbage-seeds contain a relatively large amount of crystalline matter apparently similar to the mixture of phytosterols present in rape-oil, which is interesting in view of the fact that both rape and cabbage belong to the genus Brassica. Grass-fruits also contain phytosterol, but a larger amount of chortosterol. The second paper deals with the sterol content of wheat, and it was found that the chief phytosterol present both in the grain and in the embryo is sitosterol. The bran contains a phytosterol, but one different from sitosterol. A method of estimating phytosterol was devised based on the insolubility of the compound of this substance with digitonin. The quantity of phytosterol in the etiolated wheat-plant is approximately the same as in the grain, but it is higher in the adult plant. In the embryo the percentage of phytosterol is much higher than in the plant, thus suggesting an essential function in germination and growth. In the third paper ("The Occurrence of Phytosterol in some of the Lower Plants") it is shown that a mixture of ergosterol and fongisterol, previously known to occur in fungi, is present in *Polyporus nigricans*, and probably also in *P. betulinus*. From the alga Laminaria, the Musci Sphagnum, and the fungi *Agaricus rubescens* and *Lactarius subdulcis* oils were obtained which gave the cholesterol colour reactions.

MESSRS. BUTTERWORTH AND CO. (INDIA), LTD. (Calcutta), have sent us a copy of their Medical Catalogue for 1918. It is a very comprehensive list of works published in Great Britain, India, and America on medicine, surgery, dentistry, obstetrics, pharmacy, ophthalmology, and the allied sciences. As it is carefully arranged according to subjects, and the prices are given in Indian currency, it should be very useful to medical men resident in India and the Far East, to whom it will be sent free by the publishers upon application.

MESSRS. T. C. AND E. C. JACK, LTD., announce two forthcoming books by F. Martin Duncan, viz. "Wonders of the Seashore" and "How Animals Work." They also promise "Water in Nature," by W. Coles Finch and Ellison Hawks.

THE Oxford University Press is about to begin the publication of "Neurological Studies," from the Seale Hayne Military Hospital, Newton Abbot. It will be edited by Major A. F. Hurst, with assistance.

OUR ASTRONOMICAL COLUMN.

WOLF'S PERIODIC COMET.—Mr. M. Kamensky has further revised his orbit of this comet, applying perturbations by the earth, Mars, Jupiter, and Saturn. His elements are given in *Ast. Journ.*, No. 738:—

$T = 1918$ Dec. $13{\cdot}3909$ G.M.T.
$\omega = 172^\circ\ 54'\ 41{\cdot}83''$
$\Omega = 206^\circ\ 41'\ 31{\cdot}71''$ } 1918·0
$i = 25^\circ\ 17'\ 31{\cdot}54''$
$\phi = 33^\circ\ 58'\ 31{\cdot}85''$
$\mu = 522{\cdot}42893''$

The Greenwich observations in July indicate the very small correction +0·0046d. to the value of T.

Ephemeris for Greenwich Midnight

		R.A. h. m. s.	N. Decl. ° ′
Sept.	3 ...	20 0 38 ...	22 20
	7 ...	20 0 17 ...	21 13
	11 ...	20 0 36 ...	20 0
	15 ...	20 1 36 ...	18 43
	19 ...	20 3 17 ...	17 23
	23 ...	20 5 39 ...	16 1
	27 ...	20 8 44 ...	14 37
Oct.	1 ...	20 12 31 ...	13 12

Values of $\log r$, $\log \Delta$: September 3, 0·2726, 0·0274; October 1, 0·2415, 0·0242 respectively.

The comet is nearest to the earth on September 20, and the theoretical brightness is greatest on October 12.

FAINT STARS WITH LARGE PROPER MOTIONS.—Mr. Furuhjelm's investigation of the proper motions of the stars in the Helsingfors astrographic zone (39° to 46° N. decl.), between R.A. 9h. and 12h., has already been noticed in NATURE. He has now published a smaller list (*Öfversigt af Finska Vetenskaps-Societetens Förhandlingar*, Bd. lix., Afd. A., No. 22), which extends from R.A. oh. to 24h., but includes only stars the annual proper motion of which is 0·5″ or more. They are sixty-three in number, but the proper motions of more than half of these had already been published. However, more than twenty are new, being faint stars of the 10th or 11th photographic magnitude. They have been derived by the aid of the blink microscope from pairs of plates taken at intervals of several years. The author believes that the list contains all the stars in the zone down to the 11th magnitude, whose P.M. amounts to 0·5″. In a separate publication he gives a detailed study of the faint star which he found in 1914 to have the same P.M. as Capella. His final result for its P.M. is +0·0071s. in R.A., −0·434″ in decl., Boss's values for Capella being +0·0082s., −0·429″. The place of the small star (the photographic magnitude of which is 10·6) for 1900·0 was 5h. 10m. 1·20s., +45° 44′ 21·5″, that of Capella being 5h. 9m. 18·04s., +45° 53′ 47·0″. The distance between them is 12′ 4″. Making allowance for the greater distance of Capella from the sun, the system shows a close analogy to that of α Centauri and its distant companion, which Mr. Innes has named Proxima.

PERIODICITY OF SOLAR RADIATION.—In continuation of the preliminary work of Clayton (NATURE, vol. c., p. 14), Dr. C. G. Abbot has made a further investigation of possible periodicities in the short-interval variations of the "solar constant" (Smithsonian Miscell. Collections, vol. lxix., No. 6). The method adopted was to calculate the coefficients of correlation between the solar constants of given days and those of one to forty days later, as observed from 1908 to 1916. There appears to be no well-marked periodicity which persists through the whole period of observation, but some of the results for individual years are of interest. Thus, in 1915, a period of about twenty-seven days, doubtless associated with the solar rotation, was strongly shown, the observations suggesting that one side of the sun was hotter than the other during several rotations. This result is of considerable importance as furnishing additional evidence that the short-period variations are of truly solar origin. The year 1916 was unique in giving indications of a period of about 3½ days.

THE SPECTRUM OF MIRA.—The bright lines recorded in the spectrum of Mira by Stebbins in 1903 have been further investigated by W. S. Adams and A. H. Joy (Pub. Ast. Soc. Pac., vol. xxx., p. 193). Some additional lines are shown in a photograph taken on March 2, but the principal interest attaches to the suggested identifications of the lines. Apart from the well-known lines of hydrogen, the bright lines appear to be mainly due to iron and magnesium, and in each case the lines involved are those which have their greatest intensity at low temperatures. The brightest line, next to the lines of hydrogen, is the magnesium line λ 4571, which is the most characteristic line of the flame spectrum. Similarly, the iron lines which occur are those of the low-temperature groups *a* and *b* of the classification of Gale and Adams. The lines in question make their appearance, or at least become more intense, as the star approaches its minimum of light, and it would seem that the radiating gases undergo a reduction of temperature as the star becomes fainter.

THE NEW STAR IN AQUILA.

THE following estimates of brightness of Nova Aquilæ made by M. Paul Blanc at Fourcalquier are included in Circular No. 27 of the Marseilles Observatory :—

Date	h.	m.	Mag.	Date	h.	m.	Mag.
June 8	21	10	1·0	June 21	22	20	2·8
9	21	55	0	22	21		2·8
9	22	40	0·2	23	21	40	2·9
10	22	15	>1·0	24	21		3·0
13	22	15	1·0	25	21	15	3·3
14	21	45	1·2	27	22		3·9
15	22	15	1·5	28	22	50	3·9
18	21		2·3	29	21	20	3·6
19	21	30	2·3	30	22	50	3·6?
20	22		2·5				

Details are also given of determinations of the brightness of the nova in the wave-lengths 645, 558, and 412 made at Florence by M. Maggini. The observations indicate that the nova did not radiate as a black body.

The following collection of references to the history of the nova prior to the outburst in June has been communicated by Dr. C. Easton, of Amsterdam :—1892, August 14, Algiers Astrogr. Chart No. 341 (Zwiers), mag. 8·8; 1894, September 21, Barnard's Photographs of the Milky Way, Publ. of Lick Obs., vol. xi., plate 59 (Easton), mag. 10·5; 1895, June 26, Algiers No. 141 (Jonckheere), mag. 8·8; *id.*, 1909, August 20, mag. <8·8 (*vide* NATURE, No. 2537); 1909, June 20, M. Wolf, *Ast. Nach.*, No. 4949, mag. 10·5; 1910, Franklin Adams Chart, mag. <8·8; 1912, July, Bailey's N. Milky Way, Harvard Annals, vol. lxxx., No. 4 (Nijland). In Barnard's photograph of 1894 the nova is 20 mm. from the left, and 5·5 mm. from the bottom of the plate. Dr. Easton remarks that there seems to be sufficient evidence of the variability of the nova.

Messrs. I. Yamamoto and Y. Ueta, of the Kyoto University, inform us that they independently discovered the new star on June 11, during an expedition to observe the recent total eclipse of the sun. Owing to the rainy season very few observations were secured, but it was observed that the star became fainter and redder until June 29, when there was a slight recovery.

The star is still easily visible to the naked eye, being now between the 4th and 5th magnitudes. On August 10 Prof. Fowler noted that the green nebular line was the most conspicuous feature of the visible spectrum.

Father Cortie sends the following records of observations on August 13 and 15. On the former date the star, according to Mr. Butterworth, was of magnitude 4·3 visually and 4·7 photographically. The maximum of brilliancy has shifted from the red to the green, and the image in the telescope has lost its ruddy hue, and is of a blue tint. In a McClean spectroscope H_α was very much reduced in brightness; a yellow line, presumably D, was seen, and vivid bright lines at 5007, H_β, 4640, and about H_γ. The following wave-lengths of the principal bright bands were determined from a photograph: 3867, H_ζ, H_η, H_δ, H_γ, 4363, 4640, 4680, 4713, H_β, 4958, and 5007. The bands about H_γ and 4640 were the brightest. On August 15 H_γ and 4363 were the brightest. The mean width of the hydrogen bands is about 50 Ångström units. While the bands at H_γ and 4640 are triple in character, H_δ is composed of a double band. The spectrum on the dates named was almost exactly like that of Nova Persei in August and September, 1901, when its magnitude was between 6 and 7.