

Jeffree, considers the strength of the pile to resist the various handling processes it has to undergo before being finally driven. From the diagrams given, the pile is subjected to a maximum bending moment of $W(L-8)^2/8$ in.-lb., where W is the weight of the pile in lb. per inch run, and L is its length in inches. Expressions are given for the moment of resistance for the pile lying on the flat and also for one diagonal of the section vertical. As reliance is placed on the continuity of the concrete to protect the steel from corrosion, the author proposes to limit the stress on the steel to 20,000 lb. per square inch before driving the pile. Hair cracks in the concrete will thus be avoided. The article closes with a useful table giving the section moduli and limits of safe length for piles from 10 to 16 in. square with various amounts of reinforcement in which the above-mentioned conditions are fulfilled.

THE interest taken in the development of the Diesel engine was evidenced by the very large attendance at the Institution of Mechanical Engineers on Friday, March 15, when a paper was read by Dr. Rudolph Diesel. The author considers that England has the greatest interest in replacing the coal-wasting steam engine by the Diesel engine, as enormous savings can be thus effected in her most valuable treasure—coal. As tar and tar oils are from three to five times better utilised in the Diesel engine than coal in the steam engine, a more economical way of using coal is obtained if, instead of being burnt in boiler furnaces, it is first converted into coke and tar by distillation. Coke is useful for metallurgical and other general heating purposes; from a part of the tar the valuable by-products are first extracted, and undergo further processes in the chemical industry, whilst the tar-oils and combustible by-products, together with a great part of the tar itself, are burned in the Diesel engine under extraordinarily favourable conditions. For river vessels in the colonies, the Diesel engine is very suitable. Questions regarding the limiting dimensions of cylinders, influenced by the strength of the metal and by the heat produced, were raised in the discussion.

A LIST of the publications of the Carnegie Institution of Washington has been received. Copies of each publication, except the "Index Medicus," are sent gratuitously to a limited list of the greater libraries of the world, while the remainder of the edition is on sale at a price sufficient only to cover the cost of publication and carriage to purchasers. Brief descriptions of the contents of the more important volumes add greatly to the value of the catalogue.

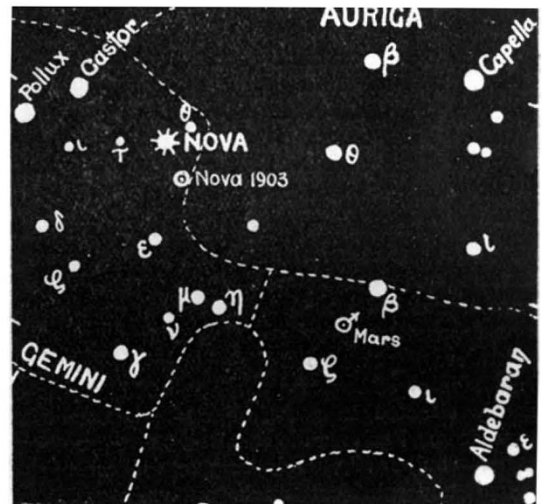
OUR ASTRONOMICAL COLUMN.

NOVA GEMINORUM NO. 2.—A second telegram, which arrived from Kiel too late for us to publish the correction last week, announces that Herr Enebo's new star is near θ , not η , Geminorum. The new position, being at a greater altitude, is better for observation than the earlier one, and on March 15 the nova was quite easily found a little to the south and east of θ Geminorum; the accompanying chart shows,

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approximately, the position, and also that of Nova Geminorum No. 1, discovered photographically by Prof. Turner in 1903.

Greenwich measures made on March 15 give the position as 6h. 49m. 14s., $+32^{\circ} 15'$. Photographs of the spectrum show the hydrogen lines, both dark and bright, with other bright lines, and the magnitude was estimated as about 4.0; observations made independently at Chichester and Birmingham show that the star, later on March 15, was fainter than the fourth magnitude. Later observations, by several



observers, show that by Monday night the star was certainly fainter than magnitude 5.

We learn from Prof. Fowler that a spectrum secured during a short, clear interval on Friday night, at the Imperial College of Science, shows the spectrum to be similar to those of Novæ Persei and Aurigæ in the earlier stages. Although the dispersion is small, the bright and dark hydrogen series are easily seen.

OBSERVATIONS OF MARS.—With the 10-in. refractor of the Urania Observatory, Herren Janssen and Andersen made a number of observations of Mars during the months September to December, 1911. An eosin-red glass was at times employed to accentuate the contrast between the different parts of the planet's surface. While the "coastlines" generally were very well defined, the islands in the "Südmeere" were very pale; the details of the observations are shown on a chart accompanying the paper in No. 4561 of the *Astronomische Nachrichten*. Twenty-nine "canals" were seen, but none was seen doubled.

THE CONSTITUTION OF THE RING NEBULA IN LYRA.—In a paper recently communicated to the Heidelberg Academy, Prof. Max Wolf finds that certain radiations are emitted only by well-defined portions of the Ring Nebula, the line $\lambda 4686$ arising solely from the central dark space, while the line $\lambda 3729$ occurs chiefly towards the outer edge of the bright ring; this differentiates these two radiations from the others in the nebular spectrum, and, according to Prof. Wolf, probably denotes different substances with widely differing atomic weights. Dr. Nicholson's failure to account for these two lines in his recent theoretical discussions of the spectrum of the hypothetical substance "nebulium" consequently affords no indication that his theory is untenable.