

**NEW TURKISH IRONCLAD.**

Our engraving represents one of the two largest ironclads now possessed by Turkey, the vessels being sister ships in every particular. The present craft was originally called the Memdonhiyeh, but has recently been re-named as above in honor of the present Sultan Abdul Hamid. The Hamidieh was designed by Ahmed Pasha, chief naval constructor of the Turkish Government, and was built at the Thames Iron Works, London, England. Her dimensions are: Length, 332 feet; breadth, 59 feet; depth, 19 feet; displacement, nearly 9,000 tons. The hull is divided into 71 watertight compartments. A belt of armor plating 12 inches thick, backed by the same thickness of teak, surrounds the vessel. The maindeck battery has plates of similar thickness, and is 148 feet in length, containing twelve 18 ton guns. Four corner ports are so placed at an angle that their guns may be fired astern or ahead. The upper deck armament consists in two 6½ ton guns.

The engines, built by Maudslay, Sons, & Field, are of the usual type peculiar to that firm. There are two piston rods to each cylinder connected by an inclined crosshead, one rod passing over, the other below, the crank shaft. The two steam cylinders are each 116 inches in diameter, with strokes of 4 feet. The screw is 23 feet in diameter, with 19½ feet pitch. There are eight boilers, with 22,500 feet of heating surface. Tests of this vessel on the measured mile gave: Revolutions, 66.3; vacuum, 26½; boiler pressure, 28½ lbs.; speed, 13.74 knots. The ship at last accounts was in England, but is expected to go into active service on the Black Sea.

**Investigations on the Gastric Juice.**

M. Richet, according to the *Répertoire de Pharmacie*, has been enabled to institute a series of experiments on this subject under singularly favorable circumstances. A young man came before him on whom, in consequence of incurable stricture of the œsophagus, gastrotomy had been performed, and a permanent gastric fistula had been established. The œsophageal stricture being complete, swallowing was of course impossible, so M. Richet was enabled to procure the gastric juice without any admixture of saliva. He finds the average proportion of hydrochloric acid to amount to 0.17 per cent, the proportion being increased by wine and alcohol, but diminished by sugar. The ingestion of acids or alkalis made little difference, as the normal proportion was soon restored. The acidity of the gastric juice is increased during the process of digestion, especially towards its close. The sensations of hunger and thirst are in no way associated either with gastric acidity or with the state of the stomach as to emptiness or repletion. Ordinary kinds of food occupy three to four hours in digestion; but milk takes only half this time, while all traces of water or alcohol disappear from the stomach in about three quarters of an hour. M. Richet has availed himself of this favorable opportunity for the purpose of investigating the nature of the free acid in the stomach, and hopes shortly to publish his researches on this subject.

**The Nebulæ—What are They?**

Mr. E. J. Stone, M. A., F. R. S., Her Majesty's Astronomer, Cape of Good Hope, says, in a paper recently read before the Royal Society:

"Before the announcement of Mr. Huggins' discovery of the presence of bright lines in the spectra of nebulæ, it was generally, if not universally, accepted as a fact that nebulæ were merely stellar clusters irresolvable on account of their great distances from us. This view had become impressed on the minds of many of our greatest observing astronomers in the progress of their work, and is one therefore which

should not lightly be abandoned. It appears to me that Mr. Huggins' observations instead of being inconsistent with the view formerly held by astronomers, are rather confirmatory of the correctness of that view.

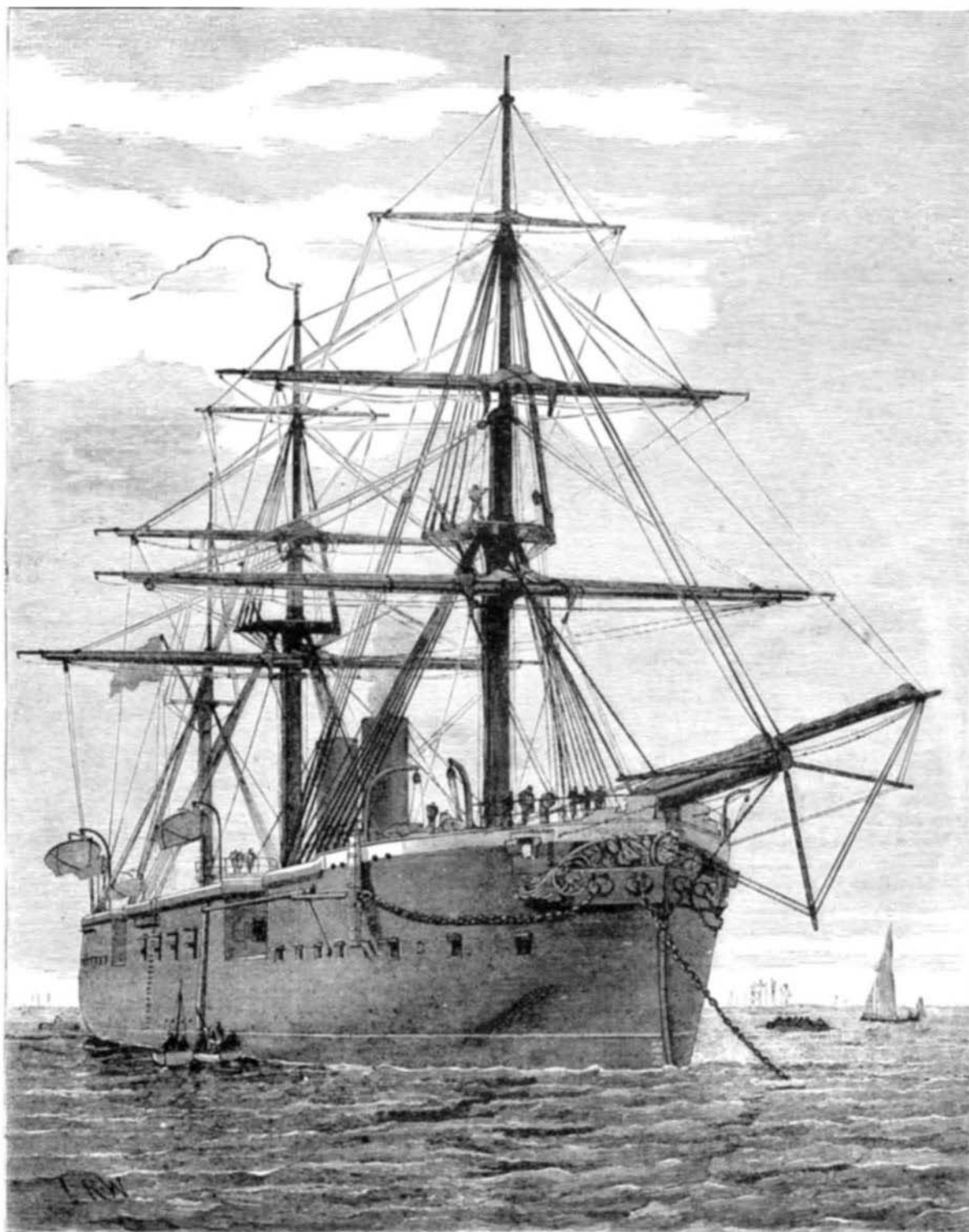
"The sun is known to be surrounded by a gaseous envelope of very considerable extent. Similar envelopes must surround the stars generally. Conceive a close stellar cluster. Each star, if isolated, would be surrounded by its own gaseous envelope. These gaseous envelopes might, in the case of a cluster, form over the whole, or a part of the cluster, a continuous mass of gas. So long as such a cluster was within a certain distance from us the light from the stellar masses would predominate over that of the gaseous envelopes. The spectrum would therefore be an ordinary stellar spectrum. Suppose such a cluster to be removed further and further from us, the light from each star would be diminished in the proportion of the inverse square of the distance; but such would not be the case with the light from the enveloping sur-

such a nebula might be expected to be small. These changes would depend chiefly upon changes in the distribution of the stellar masses constituting the cluster. It has always appeared to me difficult to realize the conditions under which isolated irregular masses of gas, presenting to us sharp angular points, could exist uncontrolled by any central gravitational mass without showing larger changes in form than appear to have been the case with many of the nebulæ. In my view of the nature of nebulæ this difficulty no longer exists."—*Nature*.

**Cutting Down Trees by Electricity.**

A few years ago, a Dr. Robinson, of New York city, took out a patent through the Agency of the SCIENTIFIC AMERICAN, for felling trees by means of a platinum wire, in place of the axe or saw, using an electric battery for the severing power, by keeping the wire at a white heat and drawing it back and forth, and keeping it taut to the tree as it penetrated the trunk. We

published an account of the invention at the time the patent issued, which elicited considerable attention from all parts of the world. According to the *Lumberman*, an experiment with the same invention has recently been tried in the East Indies, from which our contemporary quotes from a local paper, published in that country. The paper states that the patentees of the process are Mr. H. H. S. Parkinson and Mr. W. H. Martin, both of Bombay; and the experiment was superintended by Dr. Lyons. The plan is simple. The two ends of the copper wires of a galvanic battery are connected with platinum wire, which of course instantly becomes red hot, and while in that state it is gently seesawed across the trunk of the tree to be felled. When arrangements were made for the experiment, it was never for a moment doubted that the enterprising merchants of Bombay were possessed of all its made thicknesses of platinum wire, but it turned out that the thickness of the thickest that could be got was only that of crochet cotton. It was at once seen that a wire of such thinness would be consumed before the tree was half severed from its trunk. However, the attempt was made. The burning wire performed its task very well so long as it lasted, but, as anticipated, the wire continually broke, and at length there was none left. There can be little doubt that with a stronger battery—the one used was only a twelve-chambered one—and a thicker wire, the experiment would have been entirely successful. As it was, the tree was

**THE TURKISH IRONCLAD HAMIDIEH.**

face formed by the gaseous envelopes. The light from this envelope received on a slit in the focus of an object glass would be sensibly constant because the contributing area would be increased in the same proportion that the light received from each part is diminished. The result would be that at some definite distance, and all greater distances, the preponderating light received from such a cluster would be derived from the gaseous envelopes and not from the isolated stellar masses. The spectrum of the cluster would therefore become a linear one, like that from the gaseous surroundings of our own sun. The linear spectrum might, of course, under certain circumstances, be seen mixed up with a feeble continuous spectrum from the light of the stars themselves.

It should be noticed that, in this view of the subject, the linear spectrum can only appear when the resolvability of the cluster is at least injuriously affected by the light of the gaseous envelopes, becoming sensibly proportional to that from the stellar masses, and that in the great majority of such cases it would only be in the light from the irresolvable portions of the cluster that bright lines could be seen in the spectrum.

"The changes in form which would be presented to us by

sawed one fifth through. It is calculated that, under proper conditions, a tree, which at present takes two hours to fell, will come to the ground by this process in fifteen minutes. It is almost needless to add that there is no waste of wood and no sawdust.

**Propagation of Heat.**

We learn from the *Répertoire de Pharmacie* that M. Olivier has found that under certain circumstances heat is not propagated by direct proximity. His experiment was thus conducted: A bar of steel of certain dimensions being selected, the operator places one hand over the center of the bar and the other over one of the extremities. The other extremity is then heated by rapid friction with energy. At the end of a few minutes the further extremity of the bar becomes so hot as to compel the operator to remove his hand, while his other hand, which had been placed over the middle of the bar (and, consequently, nearer to the extremity warmed by friction), perceives no heat whatever.

To BORE a hole easily through a hemlock knot, wet your auger in turpentine.