## THE KRUPP TWELVE HUNDRED POUNDER GUN.

In a recent issue we published an engraving showing the most important types of the armored vessels which have been built during late years. These floating forts represent the theories of one party, of the two which are contesting the question whether the victories in future naval conflicts will be gained by the thickest armor or the heaviest guns. The result of this competition is a constant transition in the prevalent system of warfare; and hence upon what strength, whether of shield or of gun, combatants will rely in conflicts yet to come, neither opinion nor prophecy can be predicated. The naval engineers construct vessels with solid iron walls, some 24 inches thick; but hardly are the ships launched before a gun is produced by the artillerists, capable of penetrating the armor at long range; then follows a new vessel, succeeded by a yet more powerful gun; and so the duel continues, each side gaining the advantage in turn until one can see no definite end unless he venture into the realms of theory, and vainly endeavor to imagine the impossible conditions of that time-honored mechanical puzzle, "the irresistible force meeting the immovable body."

The majority of the experiments, and very costly ones they are, are carried on in England. New ironclads are almost entirely of English construction, the exceptions being a few built by Russia. In the making of heavy guns, however, England is not alone, as Germany, through the great steel works of Krupp, enters the field as a rival—the German policy apparently being first to allow England to vanquish the armor of her own engineers, by the heavy guns of her own artillerists, and then to produce German cannon superior to the English gun. A very recent instance of this has occurred in the construction of the 81-tun gun by England, the tests of which are hardly concluded before Krupp announces the undertaking of a 124-tun cannon, capable of throwing bolts which will pierce 23·8 inch armor at seven and a half miles range. The distinctive features of the English guns we have already described. In the present article we give an excellent engraving of one of the large Krupp guns (which we take from the pages of Knight's "New Mechanical Dictionary"*), from which the general characteristics of the German breech-loading system will be understood.

The gun itself is made of crucible cast steel, of a quality especially adapted for the purpose, and is constructed on the built-up system. It consists of an inner tube weighing 20 tuns, upon which are shrunk cast steel rings, forming at the breech a three-fold, and at the muzzle a two-fold, layer of metal. Both tube and rings are formed from massive ingots without welding. The caliber of the gun is 14 inches, weight 50 tuns, total length 17½ feet; weight of solid shot 1,212 lbs.; weight of shell 1,080 lbs.; charge of powder from 110 to 130 lbs. The breech-loading is on Krupp's patent plan. The shot or shell is raised by a tackle and is rolled into the side of the breech through an aperture closed by a slide. The gun is mounted on a steel carriage weighing some 15 tuns, supported on a center pintle chassis weighing 25 tuns.

### Postal and Telegraph Service.

The twenty-first annual report of the British Post Office has just been issued, giving the postal and telegraphic statistics for 1874. It appears that the estimated number of letters sent through the post during the year was 967,000,000, besides about 79,000,000 post cards, and 259,000,000 newspapers and book packets. On an average there were 30 letters to each head of the population in the United Kingdom, but the national average was 33 per head for England, 25 for Scotland, and 14 for Ireland, showing some interesting facts in regard to the comparative educational, social, and commercial relationship of each division. The return letters amounted to about 4½ millions, giving an average of about one on each 220.

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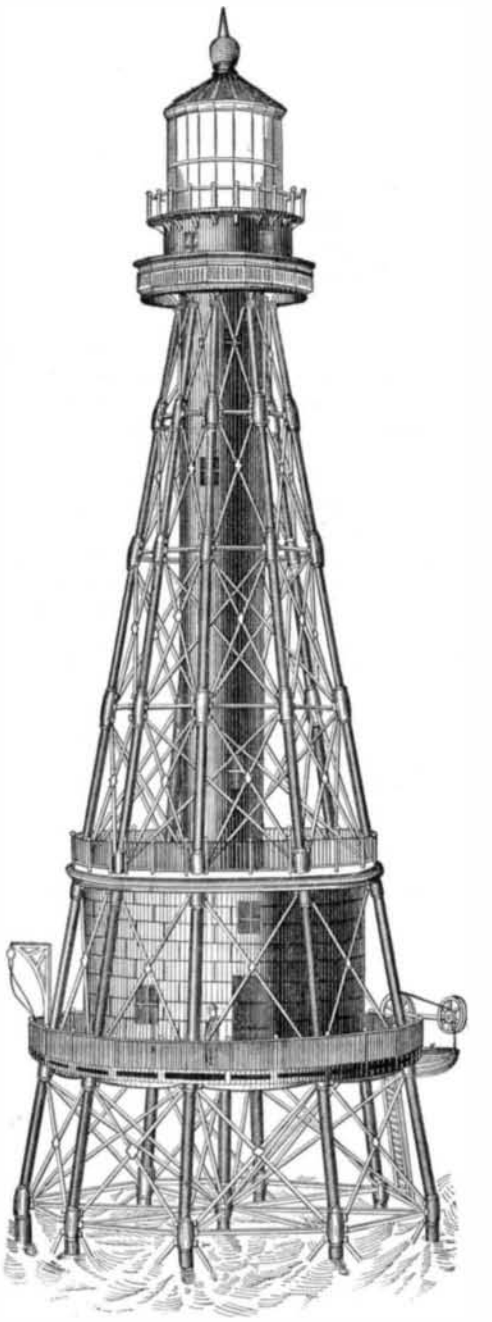
## THE TRINITY SHOALS LIGHTHOUSE.

An interesting application of iron to the construction of



a building requiring exceptional strength and stability is represented in the annexed engraving of one of the two similar lighthouses erected at Trinity Shoals and at Timbalier, in the Gulf of Mexico. The structure is supported upon nine screw piles—a central one surrounded by eight others, at distances of somewhat less than fifteen feet four inches each being twenty feet distant from the central one and secured together at the ground by adjustable wrought iron links, and above by diagonal braces and by radial struts to the central pile. The summit of each pile is incased in a cast iron socket for receiving the column and the radial and diagonal braces. The jointed columns which support the lantern have a similar provision for their diagonal braces, the arrangement for which will be understood from the illustration, which we take from Knight's "New Mechanical Dictionary." The different series of columns are joined together by sleeves. The first series above the foundation is 20 feet long, the second 15 feet, the next two 18 feet. The fourth, fifth, and sixth are respectively 15 feet 6 inches, 14 feet, and 12 feet 6 inches. The columns of the first series are of wrought iron, forged tapering; those above are of hollow cast iron, each series successively decreasing in diameter. The lantern is supported on a cylinder of boiler iron, resting on a platform at the top of the columns.

### Anthracite Coke.

The high calorific power of anthracite, consisting as it does of nearly pure carbon, and the low percentage of sulphur and ash contained in most varieties, naturally render it of great value as a fuel in the cupola and the blast furnace; while from its abundance in many districts, and the cheapness with which it may generally be worked, it should at once be the best and the cheapest fuel that could be used. The practical drawbacks to its use, which diminish its value and to a great extent restrict its employment, are the difficulty of utilizing the slack or small anthracite, of which a good deal is made in mining and handling, and in breaking the large pieces, and the tendency of many anthracites to split up into small particles if suddenly heated. In the blast furnace this decrepitation is especially injurious, as the fine dust is apt to form, together with the cinder, pasty masses that can neither be melted nor burnt away, and may choke the furnace up or seriously derange its working.

These difficulties in the way of using anthracite generally in its natural or raw state, have led to many attempts to make it into a serviceable coke, by coking it in admixture with a greater or less proportion of binding coal, pitch, or other bituminous substances. None of these attempts, until very recently, appear however to have been commercially successfully; none, at least of those made in South Wales, have been carried out largely or continuously; as, though coherent coke was made, it was friable and of inferior quality.

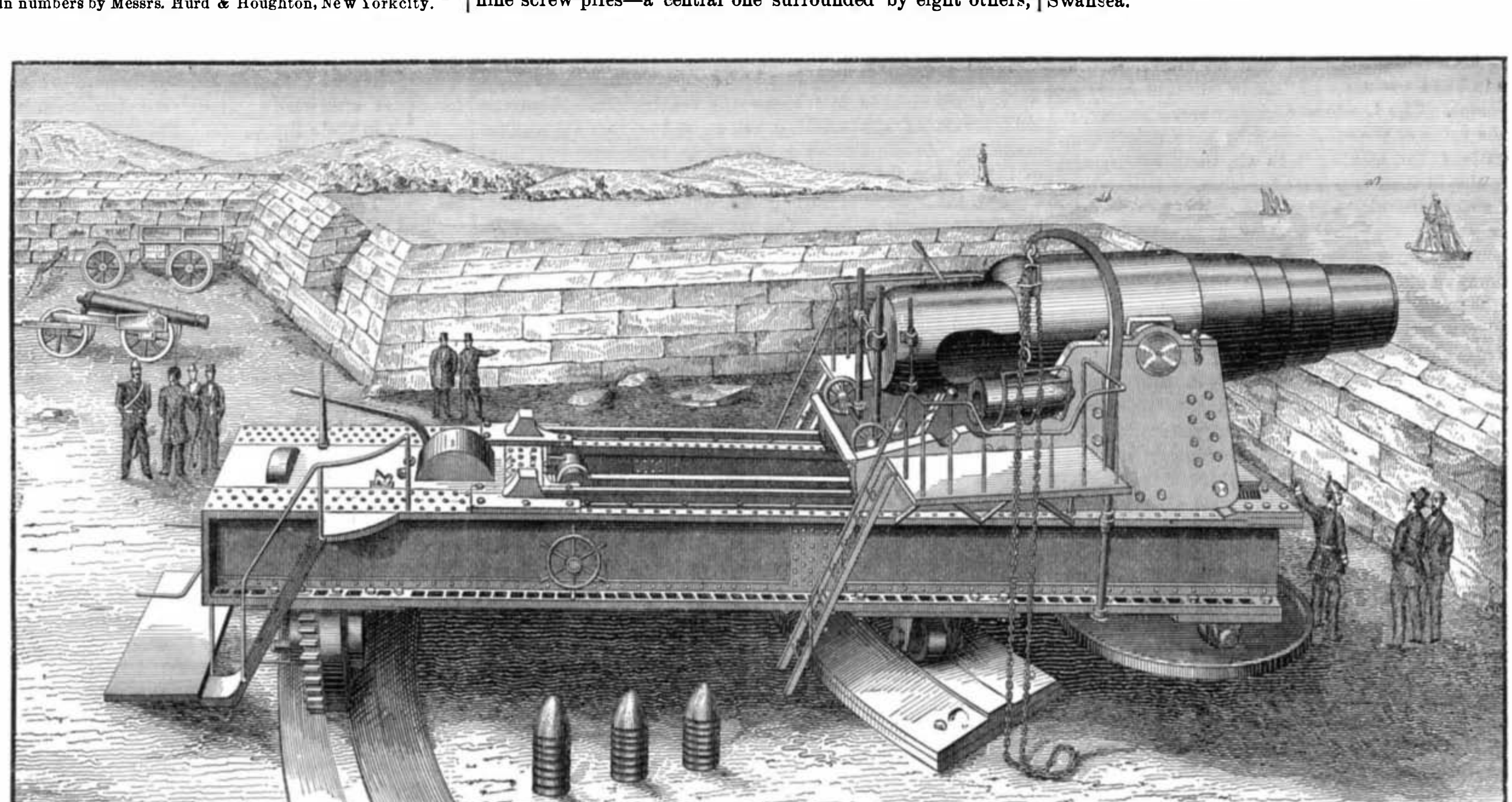
Some samples exhibited would appear, however, to show that the production, on a working scale, of a hard and sound anthracite coke is not at all impossible.

They are fair specimens of the coke now being made by the process of Messrs. Penrose and Richards, of Swansea. to whom the writer is indebted for them, as well as for the information as to the mode of manufacture, and the characters of the coke obtained, on which the present note is based.

The materials used are any quality of anthracite or semi-anthracite, if free from shale or stones, good bituminous or binding coal, and pitch, in the following proportions:

Anthracite, 60; bituminous coal, 35; pitch, 5.

Specimens have been shown of coke made of Messrs. Brock and Sons' anthracite, from Cwmllynfell Colliery, near Cwm Amman; of a mixture of this with Yniscedwyn anthracite; and of culm or semi-anthracite from Birch Rock Colliery, near Pontardylais. The bituminous coal used in making all the samples exhibited was that from Tyrissa Colliery, near Swansea.



KRUPP'S MONSTER FIELD GUN.