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THE KRUPP EXHIBIT AT THE GREAT FAIR.

Of all the foreign nations that are taking part in the World's Columbian Exposition at Chicago, Germany takes the lead, in extent, variety, cost and superiority in almost every characteristic. Of the private exhibitors, whether foreign or American, Krupp, the great metal manufacturer of Germany, stands at the head. His exhibit is wonderful, and by its greatness almost dwarfs all other exhibits in the same lines. The expenses and value of this exhibit are said to have reached \$1,500,000. So large is the Krupp display that a special building became necessary, of which we here present a photographic view, specially taken for the SCIENTIFIC AMERICAN. The Krupp building is located just south of the great landing pier. The building is 200 ft. long, 82 ft. wide, 43 ft. high. It fronts on the lake and stands near the terminal loop of the intra-mural railway.

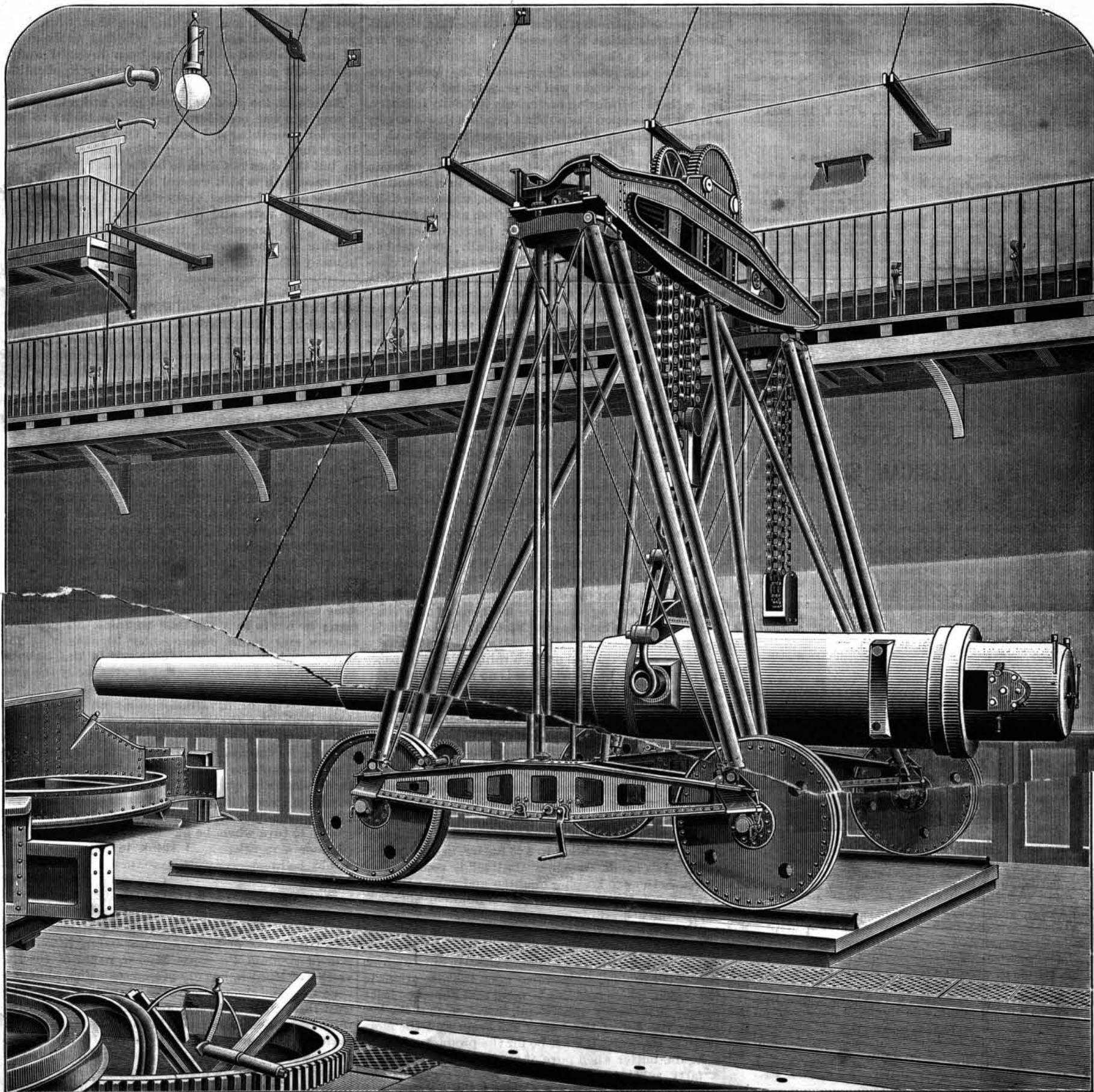
On this page we give a view of one of the many great things to be seen in the Krupp building, namely, one of the Krupp traveling cranes, used for slinging and moving the great Krupp guns. The massive proportions and great strength of this machine, as well as its graceful proportions and useful finish, will be evident at a glance at our engraving.

A very comprehensive description was recently given in *Engineering* of some of the principal Krupp exhibits, and we cannot do better than present extracts therefrom, which follow. First, as relating to the great guns for which the Krupp establishment is now so famous. One of them is shown in our engravings.

The largest weapon shown, and it is the heaviest piece of ordnance ever brought to an exhibition, is a 16.24 in. coast defense gun; the total length is 33.5 calibers, or 45 ft. 11 in., the length of bore being 41 ft. 8 in.; the total weight is nearly 122 tons.

This gun has fired sixteen rounds at the Krupp testing grounds at Meppen. During these trials the following results were obtained: The projectile weighed 2,200 lb., and the charge was 902 lb. of brown prismatic powder; an initial velocity of 1,981 ft. per second was recorded, and the striking energy was 18,594 metric tons. We give a photographic view of the firing of this extraordinary weapon.

The cost and trouble involved in the transport of this gun from Essen to Chicago must have been enormous. The gun was landed at the Sparrow Point works of the Maryland Steel Works near Baltimore. For the long journey from Baltimore to Chicago a railway truck was specially prepared by the Pennsylvania Railway Company. This truck forms one of the exhibits of the railway. The total weight of the car, which is carried on thirty-two wheels, is 175,000 lb., or
(Continued on page 40.)



THE WORLD'S COLUMBIAN EXPOSITION—THE KRUPP TRAVELING CRANE.

THE KRUPP EXHIBIT AT THE GREAT FAIR.

(Continued from first page.)

about 80 tons, and the total load on the rails was, therefore, nearly 230 tons. It was illustrated and described in the SCIENTIFIC AMERICAN of April 22, 1893.

The next gun that attracts attention is of smaller caliber, and though less monumental, is a far more serious weapon than the 122 ton gun. This is the 12.01 in. caliber; it is not a new gun, but is far more interesting on that account, for it has already withstood the severe test of 98 rounds, and is still in service as a naval gun. This is a specially interesting exhibit, because it is mounted complete on its turret carriage, and the hydraulic arrangements for working and loading are very well illustrated.

The 28 cent. (11.02 in.) gun is the next that attracts attention; this, as exhibited, is mounted on a coast defense hydraulic carriage, but the same type is also used for naval purposes. The length of bore is 40 calibers, or 36 ft. 6 in., and the total weight is 43 tons. This gun is mounted on a carriage which permits it to have a maximum elevation of 45 deg., at which angle the range is 20 kilometers (12½ miles); the weight of projectile fired is 759 lb., and the charge is 352 lb. of brown prismatic powder. With this charge an initial velocity of 2,066 ft. has been obtained. This gives a striking energy at the muzzle of 6,979 metric tons, reduced at a distance of 2 kilometers to 5,300 metric tons. This exhibit is made all the more attractive because it is inclosed within a shell-proof case-mate, and it may be mentioned that as the gun was constructed last year, it may be considered to represent the latest Krupp type of heavy artillery.

A similar range of 12½ miles is that assigned to the next gun of the series shown in the Krupp pavilion; this is the 24 cent. (9.45 in.), intended for coast defense, and mounted on a coast defense carriage; the bore is 40 calibers in length, and the total weight of the gun is 31 tons; the maximum elevation that can be given is 44½ deg. A special interest attaches itself to this particular gun, because it was tested in the presence of the German Emperor at Meppen on April 28, 1892. On this occasion a range of 20,226 meters, or nearly 13 miles, was attained.

Various other guns and their mountings are shown.

The second part of the exhibit consists of armor plates manufactured at the Krupp works. Of these, perhaps, the most interesting are some compound and nickel steel plates. There is a compound plate, 15.75 in. thick, a nickel steel plate, 11.8 in., and a third of the same character, but of different quality, 10.23 in. thick.

Passing from the exhibits coming from the armor

axes. This part of the exhibit at least is of particular commercial value, because the Essen works have a large trade with America in this branch of their industry.

Of cast steel there are some notable examples. The largest is the bow frame for a new German ironclad; the part shown weighs 24 tons, and is 42 ft. high; this is made in three parts. There is also a portion of a stern frame for the same ship, in two pieces, weighing respectively 12.8 and 11.3 tons. It may be mentioned with regard to these castings that they could not be conveniently transported by rail, and were brought all the way from Essen to Chicago by water. There is also an engine bedplate of 6.3 tons; there are some examples of steel locomotive side frames, and a number of other objects, the most important of which is a reproduction of the screw of the German Lloyd steamers Spree and Revel.

There is also quite a collection of mining machinery, which has always been a specialty of Essen. The walls of the pavilion are hung with a number of views illustrating the Krupp works. At the end of the main hall are seven large drawings, three of them—the largest—being of the works, and the others plans of the Meppen testing grounds and diagrams of the progress and development of the Krupp industry. Beneath are two very interesting memorials, the first contributed by the workmen and employees in honor of the

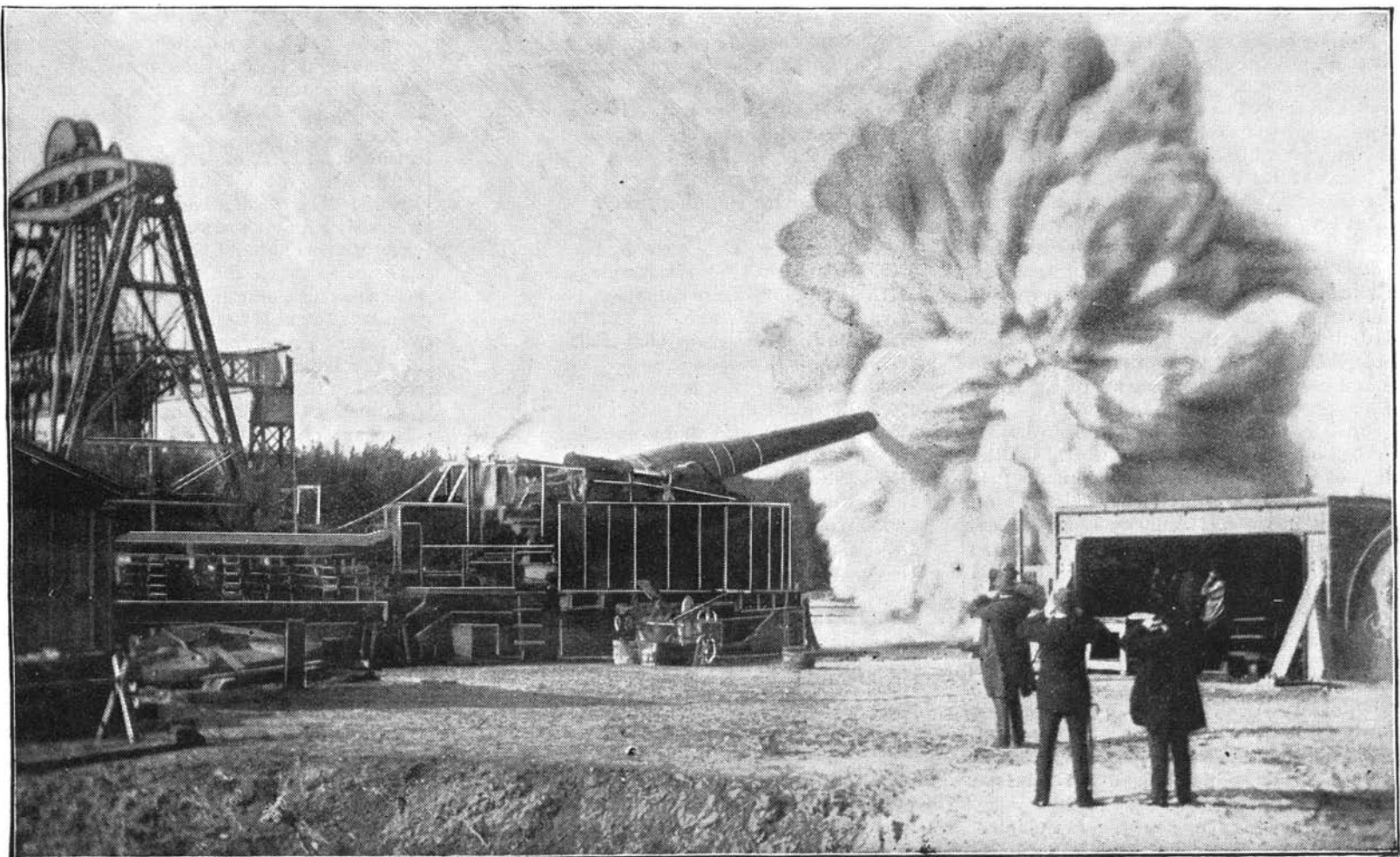
founder, the late Alfred Krupp, and the other a representation of the old dwelling place of the founder, a modest house that speaks eloquently of the developed fortunes of the family, thanks to the energy, talent, and opportunities of the founder. This house has been preserved intact as a memento, and is highly prized by all those associated with the works. A number of portraits of the more prominent directors and photographs of the more famous guns built at Essen complete this very remarkable exhibit. We have said enough, says *Engineering*, to show that not only has Mr. Krupp fully maintained the reputation of his firm by this remarkable exhibit, but he has added additional glory to the German section, and has contributed more than any other single exhibitor to the success of the World's Fair.



THE KRUPP BUILDING AT THE WORLD'S FAIR.

plate section of the Krupp works, we come to those sent out of the plate mills of a lighter type. Probably this part of the exhibit will illustrate more clearly to a greater number of visitors the magnitude and resources of Essen. First comes a section of a boiler, weighing nearly 3½ tons; it is 12 ft. 10 in. in diameter, and the thickness of the plate is 1.5 in. The next heaviest plate weighs 16 tons; it is made of Siemens-Martin steel, and is 65 ft. 9 in. long and 1.26 in. thick. There are also some fine specimens of stamped and flanged steel plates for boiler work. The largest casting shown is to form part of a 5,000 ton stamping press; it weighs 62.4 tons, and is 12.2 in. thick; the length is 27 ft., and the diameter 44 in.

In railway material there is shown a group of 54 steel tires, a number of complete wheels, and a collection of



FIRING THE GREAT KRUPP GUN.