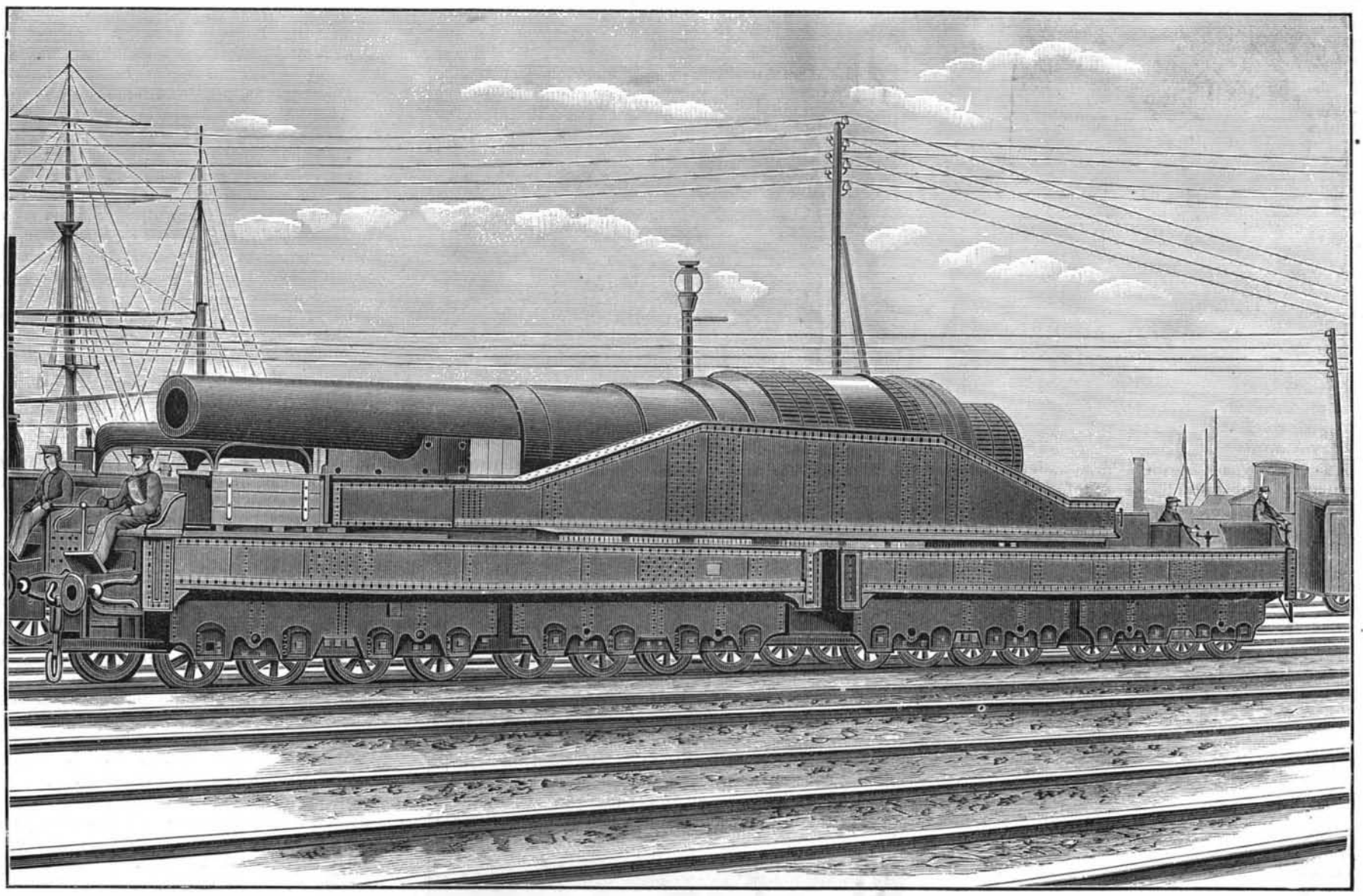
KRUPP'S GREAT GUN FOR THE ITALIAN NAVY.

The great German manufacturer of steel and of the most powerful artillery, Herr Alfred Krupp, who died on July 14, had in hand at Essen, for two years past, a gun constructed for the Italian Navy which is the largest hitherto produced. We give an illustration of this huge piece of ordnance, as it appeared when placed on a special railway wagon for conveyance to Antwerp, where it was put on board ship to be carried round into the Mediterranean, consigned to the Italian naval arsenal at Spezia.

The railway truck, built expressly for this purpose, was 75 ft. long, with thirty-two wheels and sixteen axles; but its length could form bendings, at six points, to pass round curves on the line of rails; this carriage, without its load, weighed ninety-six tons. The gun, which weighs a hundred and eighteen tons, is 45 ft. long, and its internal caliber is nearly sixteen inches, rifled with ninety-two spiral turns. It throws a steel projectile weighing nearly one ton, with a charge of six cwt. of brown prismatic powder, having an initial velocity of 614 yards in a second and a range of nearly eight miles. The shot can penetrate a steel armor plate thirty-six inches thick immediately at the mouth of the gun, and a plate twenty-nine inches thick, it is estimated, at the distance of a mile or more. It is believed that no armor-plated ship in the world can endure the fire of such powerful guns. Krupp's factory, however, is now engaged in making two of still larger dimensions.—*Illustrated London News.*



KRUPP'S LATEST GREAT GUN, PLACED ON THE RAILWAY FOR CONVEYANCE TO THE ITALIAN NAVAL ARSENAL AT SPEZIA

Brotherhood of Locomotive Engineers.

A public meeting of the brotherhood was held at Boston, Sept. 18, at which there were 3,500 people present. This organization meets the approval of the railway officials, and is conducted in a sensible, business-like manner, conducive of benefit to its members and harmony and good will between the employer and employed. The State and Boston city governments were represented, and interesting addresses were made by Lieutenant-Governor Brackett, Grand Chief Engineer Arthur, Railroad Commissioner Kinsley, Congressman P. A. Collins, and others. During the course of his remarks Mr. Arthur stated that since the benefit association was established $2,159,000 had been paid to the widows and orphans of deceased members of the brotherhood.

The Railroad Gazette gives the following extracts from Chief Engineer Arthur's address:

"It has been my privilege to meet nearly all the railway managers on this continent, and I want to say here that I have not met one within the past ten years who has not indorsed our brotherhood and approved of our course. . . . It takes time to acquire friends. . . . I want to speak of the policy of the brotherhood in dealing with disputes for the benefit of other labor organizations, some of whose members may be here to-day. I want to speak of our policy, and let them judge if it is not the best one. On all well regulated roads we have what we call a grievance committee. My advice is to select as members of that committee men of judgment, cool heads and clear brains, men who have been in the service of the company for years, and who are known to the officers of the road. I am sorry to say that my advice is not always followed. To that committee are referred the grievances of the men. After they have exhausted their own efforts to effect an adjustment with the company, the committee waits upon the officials of the road in rotation, beginning at the lowest grade. . . . By this policy we have settled every case except that of the Brooklyn Elevated.

"The officer of the brotherhood second in authority exhausted every honorable effort, but General Manager Martin refused to meet the men, and discharged the grievance committee. I hold, notwithstanding his legal right to do that, he insulted the entire brotherhood. All that was left for the men to do was to quietly submit or leave the service of the company, or, in other words, 'strike,' if that suits you better. The men struck and were whipped. These are the facts. When a general manager refuses to treat with his men and recognize their rights, he takes a position which is untenable, and he ought not to be sustained or retained in any position of authority upon a railroad. The solution of difficulties between employer and employed is in bringing the two parties together and having them sit down and talk the matter over."

Lightning Rods.

Many accidents are upon the record which have been due to the bad construction of lightning conductors, churches being the most notable sufferers from this cause. The history of St. Bride's Church, in Fleet Street, London, affords a curiously complete illustration of the need of lightning conductors for lofty buildings and of the need also that those conductors shall be good ones. On a Sunday afternoon in June, 1764, fourteen years after Franklin's discovery of the identity of lightning with electricity, but several years before St. Paul's Cathedral, the first public building in England to be so protected, was surmounted by a pointed lightning conductor, an intensely vivid flash of lightning struck St. Bride's beautiful steeple. The metallic weather vane and the iron bars by which it was supported safely conducted the current some distance down the steeple, but at the spot where the bars terminated a number of huge stones were shattered into fragments. Other metal work afforded a broken path for the current, but the intervening stonework suffered great havoc. Ninety feet of the steeple had to be taken down entirely, while great and expensive repairs were required for the rest. Many years afterward the steeple was again struck, and although a lightning conductor had in the interval been erected, it was so faulty in construction that at various points the church was once more damaged. In the storm which occurred at midday on July 15 last, St. Bride's a third time proved an irresistible attraction to the electricity of the heavens. Fortunately, upon this occasion the church itself was uninjured. The conductor conveyed the current to earth, but the contact was insufficient. There was a bad joint just below the spot where the rod entered the ground, and, as the dissipation could not take place with sufficient rapidity, a number of flagstones and a portion of the earth was torn up and sent flying to some distance. At least three churches in the metropolitan district—Christ Church, Endell Street, Long Acre; St. John's, Walham Green; and Holy Trinity, Tulse Hill—were struck and damaged recently, and a large number of buildings of various kinds, in London and the provinces, were set on fire by the lightning.

From the circumstances related it will be seen that even in this age of advanced acquaintance with physical forces, knowledge is singularly confined and its practical application in a most beneficent direction limited to a degree that is lamentable. In the face of the rate at which our great buildings, of private as well as of public character, are multiplying, the apathy which prevails in regard to their safety from lightning is remarkable, but possibly it is accounted for by the fact that thunderstorms are of short duration and occur only at long intervals.—*Elec. Review.*

The Ship Canal between Manchester and Liverpool.

The Manchester Ship Canal Company lately held their fourth half yearly meeting at Manchester. The directors reported that the contract for the work had been allotted to Mr. T. Walker, for 5,750,000*l.*, and that the purchase of the Bridgewater Canal and Mersey and Irwell navigations had been completed. It was stated that the works would very shortly be commenced, and it is hoped that either the Queen or Prince of Wales will lay the stone of one of the docks.

Sulphate of Iron for Moss.

Dr. A. B. Griffiths, F.R.S., has shown that iron sulphate completely destroys moss in grass lands without destroying the grass. According to M. Marguerite-Delacharlonny, of Paris, 250 to 350 kilogrammes of $FeSo_4$ for every hectare suffices. Dr. Griffiths also finds that the ferrous sulphate will also destroy parasitic fungi; and experiments are in progress to test its value as a manure for vines.

A Furnace Patent Decision.

Judge Blatchford, of the United States Circuit Court for the Northern District of New York, has recently rendered a decision in a suit involving a certain construction of hot air furnaces which is of much importance to the trade. From a report in the Utica *Observer*, we learn that it was a test case, and would, had the decision been the other way, involve several of the largest furnace manufacturing concerns in the country.

The Palace King furnace is manufactured under what is known as the Goodenow & Owen patent by Russell Wheeler, Son & Co., of Utica. In October last this company brought an action in the United States Circuit Court for the Northern District of New York against the firm of H. Gilbert Hart & Co , which firm is composed of H. Gilbert Hart, Frank T. Budlong, and Milton K. Merwin, manufacturers of a furnace known as the Royal hot air furnace. The complaint in the action alleged that the Royal hot air furnace was an infringement on the Palace furnace, and an injunction was asked restraining its manufacture and sale. The action also involved a demand that the manufacturers of the Royal furnace pay over to the complainants all profits derived from its manufacture and sale.

The action was thoroughly prosecuted, over four weeks being consumed in taking proofs, covering 500 pages of printed matter, or about 2,000 folios. The case came on for argument at the June term of the United States Circuit Court, held in Canandaigua before Judge Blatchford, of the United States Court. August 22, he filed his decision in the United States clerk's office in Utica, holding that defendants' furnace was not an infringement upon the Palace furnace manufactured by Wheeler & Co., and dismissing the complaint with costs.

The claim in the Goodenow & Owen patent upon which the suit was brought was as follows:

"A furnace having secured thereto a detachable radiator, which is provided with one or more horizontal flues opening from a dome leading from the furnace, and a circular or elliptical hot air chamber, having air passages leading from the horizontal flues to the smoke nozzle or exit pipes, substantially as and for the purpose set forth."

The text of Justice Blatchford's decision is as follows:

"The words of claim one of the Goodenow & Owen patent, 'a furnace having secured thereto a detachable radiator,' 'substantially as and for the purpose set forth,' requires, by reference to the description part of the specification, that the radiator shall not only be detachable, but shall be secured by the flange, N, the slots, N, and the lugs, O, which, as the specification says, securely lock it in position, it being made detachable by bringing the lugs opposite to the slots. The state of the art also requires this interpretation of the claim. As the defendants' furnace contains no such means of securing the radiator in position, there is no infringement, and the bill must be dismissed with costs."

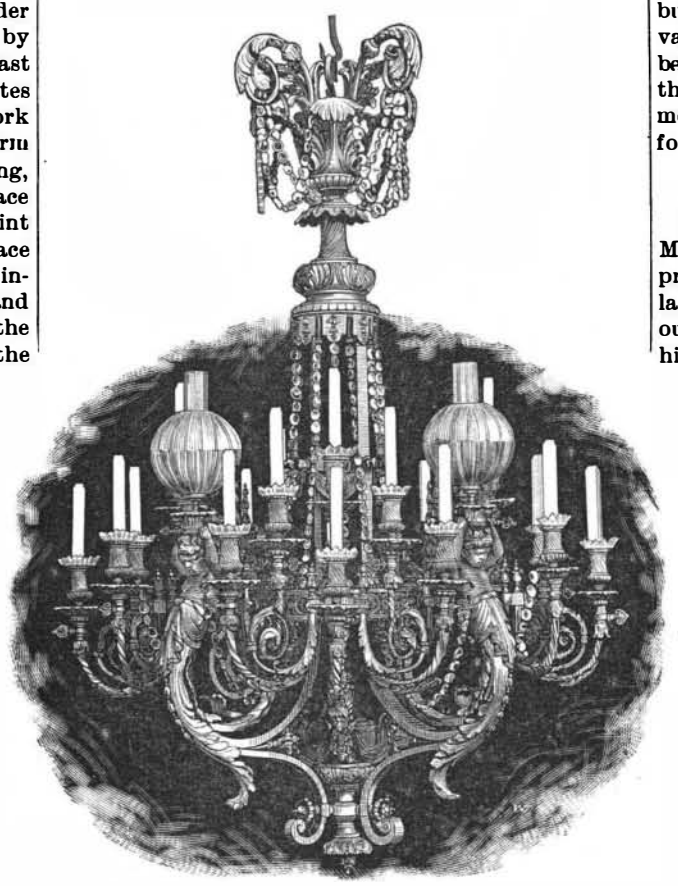
The Hop Louse.

Professor Riley, the entomologist of the Department of Agriculture, has made public the result of an exhaustive personal investigation into the habits of the *Phorodon humili*, or hop louse. His discoveries are expected to prove of great value to hop growers, as he has succeeded in learning the habitation of this plant pest during the winter months, and tracing it through the varying stages of insect life. Before the investigation, it was not known how or where the insect survived the winter. As a result of his inquiries, Professor Riley has satisfied himself that the eggs laid by the female at the close of the summer are deposited in plum trees, where the insect hatches in the spring, and resides until the third generation. This third brood, unlike its predecessors, is winged, and immediately after development abandons the plum tree and attacks the hop vine. In the autumn a counter migration from the hop vine to the plum tree occurs, the winter eggs are deposited, and the cycle of life goes on in the same way.

It is a notable fact that in regions where the cultivation of hop vines is a new industry, the growers have had complete immunity for a while from the pest. In California to-day they are not troubled by it. Professor Riley believes that the *Phorodon humili* has been brought to this country from Europe on plum stock; and there is reason to believe that the *Phylloxera*, the dreaded grape pest, was carried from this country to Europe on grape vine cuttings. Therefore California hop growers are warned to beware of importing plum stock from eastern hop regions. These discoveries render it possible to check the ravage of the hop louse either by the use of insecticides in the spring time, before the insect has reached the winged state, or by the destruction of the sheltering plum trees. The experiments will be continued with a view to protecting the hop vines after they have become infected.—*Science.*

FINE BELGIAN METAL WORK.

In the accompanying illustration is represented a specimen of beautiful work in bronze gilt, executed in Liege, Belgium. Its rich and elaborate ornamentation and brilliant gilding make it a most conspicuous feature even in such gorgeous salons as are to be found in French and Belgian palaces. Unlike our practice in the use of gas, this has been designed to be provided with



A BRONZE-GILT LOUIS XVI. CHANDELIER.

candles and the French mechanical lamps so much in use in Europe. This practice of illuminating salons being the almost universal custom in foreign countries, owing to the belief that the yellow light emitted is more becoming to the complexion than the more dazzling glare of gas or the electric light.

ARTISTIC WORK IN SILVER AND BRONZE.

The excellence of much of the work now executed by the leading American silversmiths is such that their productions unquestionably compare favorably with the best samples of foreign workmanship, while in all lines of plated goods our decided superiority over the manufactures of other countries will be readily admitted. Although every device is adopted whereby hand labor may be abbreviated, in the production of staple goods, expense is lavishly incurred in the getting out of new designs, and in the making of the most perfect steel dies for stamping, when the goods are thus formed, while in such articles as are cast such care is taken with the mould that they generally come out sharp and clean, and with an almost perfect finish.

LAMP IN SILVER AND BRONZE—ADAPTATION OF ORIENTAL DESIGN.

An ornamental lamp after a somewhat Oriental design, which presents no small difficulties in its execution, is shown in the accompanying illustration, and is the work of one of the best known of our manufacturing silversmiths. The dragon which forms the stand is of bronze, its serpentine body being wound around the horn, which forms the reservoir, and its crested head and wings, coming under the portion of the lamp bearing the greatest weight, give a proper sense of solidity, its claws furnishing the feet. The horn is of hammered silver, or of copper plated, oxidizing the silver making a most effective contrast and affording an article which will be very serviceable while needing but little care. The finish of this piece, and of a great variety of work of similar character, leaves nothing to be desired. In all such work the American public has the opportunity of obtaining goods of real artistic merit in a wider variety of design than they can be found anywhere abroad, and at a moderate cost.

Albuquerque, New Mexico.

The geographical location of this region of the Rocky Mountains is such as to exclude the possibility of the presence of moisture from either ocean or any other large body of water. The air is so pure and clear that our perception of distance seems to be almost annihilated, the mountains, some twenty miles to the east, appearing only two or three miles distant. The bodies of animals dying on the plains dry up, becoming mummified. May we not have here the ideal long sought for by every surgeon—a pure *aseptic* atmosphere, entirely free from germs? Bright, sunny skies, some portion of the day, is the rule even during the rainy season; two or three pleasant days often intervening between the showers. The winters are extremely mild. The ground was not covered with snow a single day during the past winter. During the past seven months there were only *four* entirely cloudy days—a land of almost perpetual sunshine, it even being extremely comfortable, throughout the winter months, to sit outdoors many hours of the day and enjoy the luxury of a mid-winter sun bath.—*Dr. T. J. Cummins, in Medical Record.*

The New United States Steamer Boston.

The new war cruiser Boston made a successful trial trip on the first instant, over the waters of Long Island Sound. 4,264 h. p. was developed and a speed of about 16 miles an hour attained. This is one of the ships built by the late John Roach. The substantial construction of the vessel and the superior character of her machinery were conspicuously shown on this trial, and do credit to the memory of her builder.

Alum for Bad Water.

The use of alum to clear muddy water has long been known, but Professor Leeds, in the course of an investigation on an outbreak of typhoid fever at Mount Holly, discovered another value in the use of alum, which, if his observation proves correct, may be very important. He found that the water which was supplied to the inhabitants of Mount Holly was swarming with bacteria, about fifteen drops being capable of forming 8,100 colonies of these microscopic vegetal germs when spread upon a suitable surface. He tried the experiment of adding a minute amount of alum to this water in the proportion of only half a grain to a gallon, and found that not only was the dirt and coloring matter precipitated, but that instead of the same quantity of water containing 8,100 colonies of bacteria, it contained only 80, and these were all of a large form.

On filtering the water through two thicknesses of filtering paper, he found that the filtered water contained no bacteria, but was "as sterile as if it had been subject to prolonged boiling." This amount of alum is too small to be evident to the taste, and is not harmful to health. If his observations shall remain unrefuted, they may form a valuable method of purifying polluted drinking water. Of course it does not follow that, because bacteria are removed, therefore the obscure cause of diseases due to impure drinking water is also removed; but bacteria and these diseases appear to be coincident, even if not linked almost as cause and effect, according to modern theories, and it is not too much to hope that, if the bacteria are removed, the virus of these diseases will be removed with them.—*Public Ledger.*

Adulterated Flour.

Adulteration of flour by means of potato flour may be detected by means of acids. Take a spoonful and pour upon it a little nitric acid; if the flour be of wheat, it will be changed to an orange yellow; if wholly of potato flour, the color would not be altered, but the flour formed into a tenacious jelly; if therefore the flour be adulterated with potato flour, it will not be difficult to decide. Again, take a spoonful of the flour, and pour upon it a little muriatic acid; if the flour be of pure wheat, it will be changed to a deep violet color, without odor; but if potato flour be mixed in it, it will then have an odor like that of rushes.