

SCIENTIFIC AMERICAN

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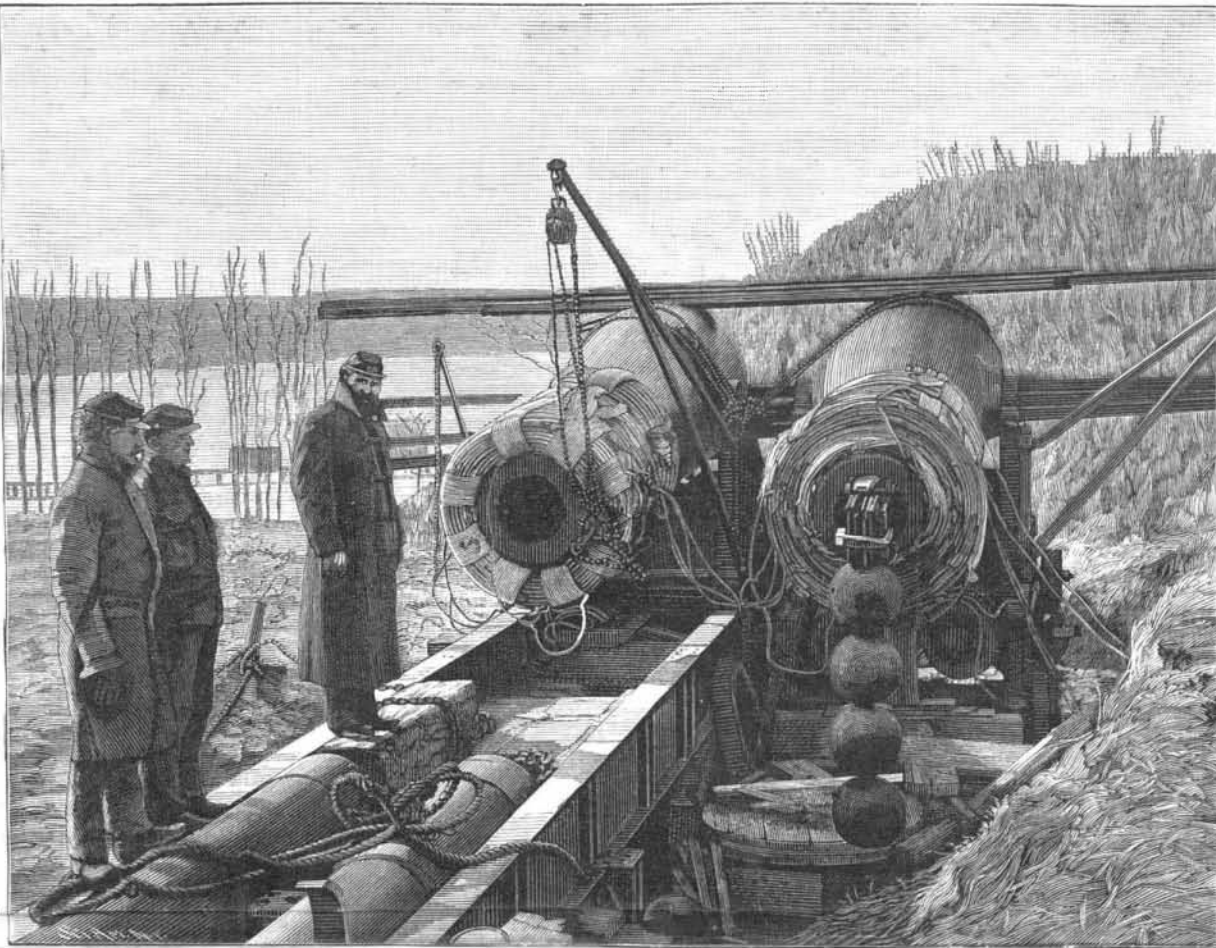
MAJOR KING'S GREAT MAGNET.

An interesting magnetic experiment on a large scale has lately been made at Willets Point, N. Y., by Major W. R. King, of the Engineer Corps, U. S. A., consisting in the conversion of a pair of great cannons, each weighing over twenty tons, into an electro-magnet.

We are indebted to Major King for some excellent photographs of his remarkable apparatus, from which we have prepared the accompanying engravings. In one of the illustrations is shown a string of 15 inch shells, each weighing 320 lb., suspended by the magnetic force.

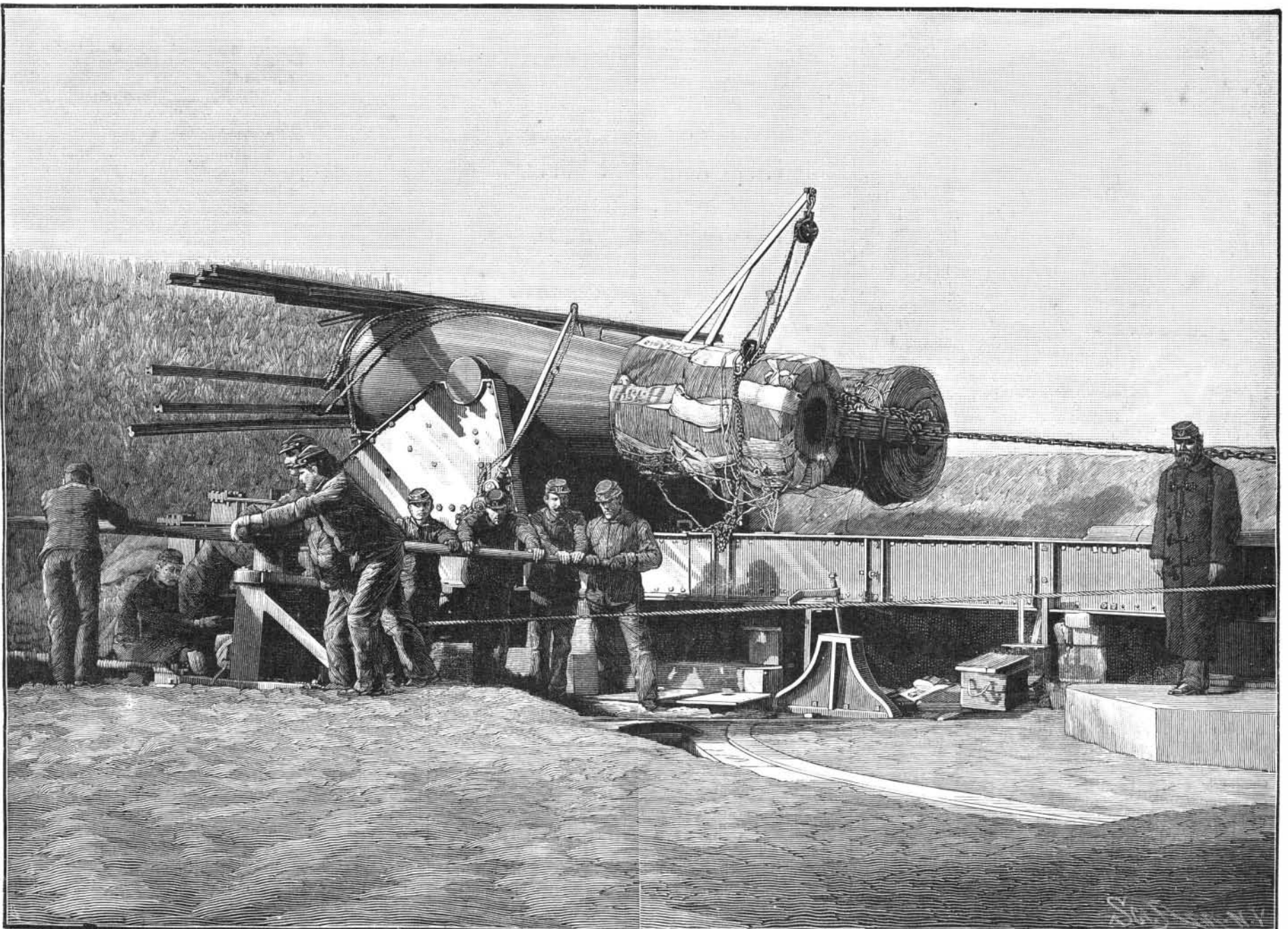
The wire used we understand was an old torpedo boat cable, consisting of 40 small insulated wires, forming a cable $\frac{3}{8}$ of an inch in diameter. Major King gives us the following additional particulars:

"I have not completed all the experiments I intend to make, but owing



to the lateness of the season the apparatus has been laid aside for the present. The guns were 15 inch Rodmans, weighing 50,000 lb. each, so that the entire mass of iron, including guns, carriages, armature, etc., must weigh about 130,000 lb. The length of insulated wire in the six coils was eight miles, and it was coupled in parallel on each gun and the guns in series. There was not wire enough on hand to give the length called for by theory, and it is quite probable that a different form of coupling would have given better results. The armature was made of 15 plates, each $\frac{1}{2}$ inch thick and 11 inches wide, or 82 square inches cross section, and should have been at least twice as heavy, as also should have been the pile of rails that connected the guns at the breach.

"Nevertheless, the power of the magnet was enormous, as will be seen from the line of four 15 in. shells suspended from one



MAJOR KING'S GREAT CANNON MAGNET, AT WILLETS POINT, N. Y.

of the guns, and from the fact that it required a strain of 20,600, lb. to remove the keeper—when the current was on. The current was furnished by a 20 arc light Weston dynamo.

"The lines of force were very appreciable when a piece of iron was held in the hand, five or six feet distant from the poles, and some very interesting points were noticed, among which was a neutral point about 1/2 inches from the face of the muzzle of each gun. Small pieces of wire were projected outward with considerable velocity, and then drawn back after reaching a point some two feet from the muzzle. Watches were of course stopped when accidentally brought near the guns."

The Sanitary Qualities of Artificial Butter.

BY JACOB R. LUDLOW, M.D., EASTON, PA.

The late Professor Hughes Bennett is quoted as saying that the great cause of the prevalence of pulmonary phthisis was the scarcity of good butter and the abundance of pastry cooks. The butter supply has always been inadequate. Years ago farmers and laboring men used pickled pork and bacon as fat foods, and butter only as a luxury. But nowadays everybody eats butter, whether he live in a shanty or in a palace, and the demand is so great that if we were dependent exclusively on the cow for our butter, the price would exclude it from the tables of all except those in comfortable circumstances.

Within a few years science and art have given us a substitute in oleomargarine and butterine. The skill and success that have been shown in its manufacture are quite phenomenal. It is really a triumph in its way. It is much better and more wholesome than much of the butter found in the markets. It has brought down the price of butter fully fifty per cent. The quality is uniform and the sources of supply inexhaustible. It is really a boon to the poor man and the man in moderate circumstances. Yet it is denounced and misrepresented by the dairy interest, because its extended use has diminished their profits.

It is called "stuff" and "nasty," and attempts are made to excite prejudice against it as unwholesome. Laws are passed taxing it, and more or less prohibiting its manufacture and sale. These laws and methods have chiefly one effect: they raise the price of butter, whether dairy or factory, on the consumer. They never will prevent its manufacture and sale. So long as men can make artificial butter which cannot be distinguished from dairy butter by sight, taste, or smell, so long will it be made and sold, and legal restrictions advance the price without diminishing the profits of its manufacture.

In the interest of the masses, I think the profession should protest against unnecessarily adding to the cost of a food so valuable and important. The rich man may enjoy his gilt-edged butter, but without this aid the poor man must be forced to use the inferior grades of dairy butter, strong, garlicky, carelessly made, and often unwholesome.

The wise fools calling themselves reformers, who, a few years ago, went about lecturing upon the injurious nature of fat as a food, did a great deal of harm in exciting a prejudice against fat ham, bacon, pickled pork, and other forms of wholesome fats; and now a delicately prepared fat, so closely resembling butter as to be easily substituted for it, is to be driven, if possible, from the market, for the sole purpose of adding to the profits of a special industry. Congress had better subsidize the dairy interest from the surplus in the treasury than to collect this additional tax directly from the people.

It is proposed to reduce the tariff on sugar. This would very likely not reduce the price of sugar to the consumer, and if it did, so much the worse. Sugar is too cheap already, and too much is eaten for the good of the public stomach, while a palatable fat food, which the people need, is discontinued by a prohibitory price.

I have no interest, pecuniary or otherwise, in either dairy-made or artificial butter, but as a practitioner of medicine my attention is called to forms of food that may not make a recourse to cod liver oil so often a necessity.—Medical and Surgical Reporter.

AN illustration of the practical usefulness of bacteriology was furnished recently in this city. An Italian steamer arrived loaded with immigrants. There had been no cholera on board, but, as the vessel reached this port, a suspicious case of diarrhoea occurred in a child. The symptoms were not perfectly typical of cholera. Some of the dejections were taken, and sterilized tubes were inoculated and taken to the Carnegie Laboratory in this city. It would take four days to develop the cultures, and the question arose whether the steamer should be delayed for that period of time. It was finally decided to do so. The cultures developed in the way characteristic of Asiatic cholera, and the diagnosis was made. Subsequently other cases of cholera appeared, and the culture diagnosis was abundantly confirmed. But no more striking example of the utility of scientific studies could be furnished than the one referred to.—Medical Record.

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THE BARBED WIRE PATENT DECLARED INVALID.

This famous patent has at last been declared invalid in Circuit Court proceedings. The rights were founded on the Glidden patent, No. 157,124, dated November 24, 1874. Hitherto it has met with no legal reverses, though numerous attempts have been made to overturn it. The last decision, rendered by Judge Shiras, in Iowa, declares it void for want of novelty.

The grounds afforded by the proofs for the decision are interesting. They illustrate the precarious tenure of a patent under the existing laws, yet in the life of fourteen years that the patent has enjoyed, an adequate reward to satisfy the equities of the case has doubtless been reaped by the owners.

The defendants in the suit averred that as early as 1859 a prior inventor named Morley had devised a barbed wire fence, and had constructed and exhibited it at a fair in Delhi, Iowa. Witnesses were produced who swore that they had seen it. One had been injured by contact with the barbs; another one had his horse cut by them; the blacksmith who had made it testified clearly to such fact. A sample of the material about a foot long and with two barbs still attached was produced as the only piece left of the original wire.

The witness who averred that he had been injured showed the scars, and the fact of their presence on his face was entered on the record by the examiner. All this testimony related to a period now nearly thirty years past. The details of the testimony are quite dramatic. The record occupies about 10,000 typewritten pages.

This reversal of preceding judgments probably means that the patent is extinguished, practically, forever. The case has been appealed to the Supreme Court, but in the ordinary course will not be reached for three years. This will be within a few months of the term of the patent, and will end the whole question, except as regards the collection of arrears of damages.

Great rejoicing, it is said, will follow this decision. The farmers are supposed to be greatly benefited by it. The contrary is the case. They will receive no benefit worth mentioning as regards reduction of price. By the intelligent exploiting of the patent, which embodied undoubtedly a bona fide invention on the part of Glidden, the farming world was immensely enriched. The farmers, not the patentee or owners of the patent, have secured the greatest good from the cheap and efficient form of fence that it supplied. It would seem a hardship that the patent should expire on account of the unused and dormant invention of thirty years ago, were it not that large royalties have already been collected. Except for this, abstract justice would seem absent from the results of the recent trial.

The illustration the matter affords of the actual good done to communities by patents is valuable. In 1859 the wire was invented and shown in public applied to fence construction. But it was not patented, and hence nearly faded from human knowledge. But when a later inventor reinvented it and patented it, he became at once a benefactor to his kind. When patented, which, etymologically, means laid open to the world, it at once became one of the most valuable franchises the country has seen, the value of which was in exact relation to the good it did to the farming community; as they used it largely, they afforded a measure of its worth.

It is proper that if the proofs are good, the patent should expire. But it has during its life been a source of profit to the users of the fence, and not of injury. It has given them what they never had before, it has cheapened fencing immensely, it has solved the problem of inclosing the vast prairies of the West, and for the good it has done, the trifling royalties are but an insignificant remuneration.

THE DESTRUCTION OF THE GREAT LUMBER RAFT.

The great timber raft, whose departure from Nova Scotia was chronicled by us December 24, has gone to pieces and is irreclaimably lost. On December 8 the structure left its port in tow of the steamship Miranda. The ingenious nature of the construction adopted became evident at an early period of the trip. The captain of the towing ship found that if he relaxed his pull upon the tow lines in a seaway, the logs would work loose. This was the precise feature the patentee and inventor had striven to secure. All went well until a position south and east of Nantucket was reached. Here a severe gale proved too much for the two cables and connections with which it was towed. First, a fifteen inch steel hawser broke, and shortly afterward its companion pulled away the bits to which it had been secured. The raft was now entirely disconnected from the steamer, and in five minutes was out of sight. This occurred on December 17. The Miranda immediately steered west and reached her destination in safety.

As great fears were entertained for incoming vessels, which might be sunk by colliding with the raft, the navy steamer Enterprise and the revenue cutter Grant set out to find the raft and warn vessels of its possible proximity. The Enterprise was successful in her quest, as she found the debris of the raft. It was completely broken up, and the logs were scattered over an im-