

Scientific American.

ESTABLISHED 1845

MUNN & CO., EDITORS AND PROPRIETORS.

PUBLISHED WEEKLY AT

No. 361 BROADWAY, - - NEW YORK.

TERMS FOR THE SCIENTIFIC AMERICAN.

One copy, one year, for the U. S., Canada or Mexico, \$3.00

MUNN & CO., 361 Broadway, corner Franklin Street, New York.

The Scientific American Supplement

is a distinct paper from the SCIENTIFIC AMERICAN. THE SUPPLEMENT is issued weekly. Every number contains 16 octavo pages, uniform in size with SCIENTIFIC AMERICAN.

Building Edition of Scientific American.

THE BUILDING EDITION OF THE SCIENTIFIC AMERICAN is a large and splendidly illustrated periodical, issued monthly, containing floor plans and perspective views pertaining to modern architecture.

Export Edition of the Scientific American

with which is incorporated "LA AMERICA CIENTIFICA E INDUSTRIAL," or Spanish edition of the SCIENTIFIC AMERICAN, published monthly, uniform in size and typography with the SCIENTIFIC AMERICAN.

The safest way to remit is by postal order, express money order, draft or bank check. Make all remittances payable to order of MUNN & CO.

NEW YORK, SATURDAY, APRIL 9, 1898.

Contents.

Table listing contents of the issue, including 'Kentucky,' after launching*, 'Lighting, artificial, new method', 'Mame' disaster, official report', etc.

TABLE OF CONTENTS OF Scientific American Supplement No. 1162.

For the Week Ending April 9, 1898.

Table listing contents of the supplement, including 'I. ARCHITECTURE.—The Restoration of Marienburg.—1 illustration', 'II. ASTRONOMY.—A New Theory of the Milky Way.—By C. EASTON, in Knowledge', etc.

CONTENTS

Of the April Number of the SCIENTIFIC AMERICAN, BUILDING EDITION.

Table listing contents of the Building Edition, including 'Boston elevated stations', 'Builder's ready-made wood-work', 'Butcher's Boston Polish', etc.

THE OFFICIAL REPORT OF THE "MAINE" DISASTER.

It is not within the province of the SCIENTIFIC AMERICAN to discuss the political aspects of the problem which confronts this country with regard to Cuba. It is not for us to determine whether the present condition of this unhappy island, blighted as it is by all the miseries of a two years' war, can be considered as affording a casus belli between ourselves and Spain.

The blowing up of the battleship "Maine," however, presents a problem of an entirely different complexion—one that has touched the nation to the quick. How deeply we have felt the loss, and appreciate the terrible circumstances attending it, is shown by the significant, the portentous, calmness and self-restraint with which the situation has been endured.

The report of the Naval Court was made public by the President without a word of comment on Monday, March 28, and with regret we have to say that the worst fears have been realized and the suspicion that the "Maine" was destroyed by a submarine mine is fully confirmed.

The summary of the official report has been published in the daily press and is already widely known. On another page we reproduce the most important drawings which accompany the report, by studying which the present condition of the wreck will be made perfectly clear to our readers.

The appearance of the wreck, as indicated by the drawings, proves not only that the ship was wrecked by explosives placed beneath her, but that the mine must have been of vast size and power. No automobile torpedo could have blown the central portion of the hull out of existence and forced the keel at frame 18 right up through the body of the ship through a vertical distance of thirty-four feet.

The scale on which the scheme of destruction was carried out was too elaborate for execution by private individuals, and it is unlikely, on account of the risk to general shipping, that the mine was left to be exploded by being struck by a moving vessel. The "Maine," lying at anchor, would swing about with change of tide over an arc some 700 feet in diameter. The exact location of the mine must have been understood by the conspirators on shore, and careful observation of the exact position of the "Maine" must have been obtained in order that the mine could have been electrically exploded at the exact moment at which the ill-fated battleship floated over the fatal spot.

The authors of this horrible catastrophe are unknown. In all probability the solution of the question will ever remain a mystery. It seems, however, impossible that a mine containing many hundred pounds of guncotton or similar explosive could have been placed under the vessel after she was anchored there. If a mine had been placed there before this particular point of anchorage had been selected, it must have been with the knowledge of the authorities. The fact that this place of anchorage was an unusual one and that, according to the reported evidence of Capt. Stevens, of the "City of Washington," it was the least used buoy in the harbor, and no warships had been moored there, to his knowledge, for five or six years, lends food for a terrible suspicion. It is doubtful, however, after all has been said and done, whether the circumstantial evidence surrounding the case can do any more than suggest a strong suspicion of complicity on the part of some individuals who were familiar with the harbor and the conditions existing there. It is probable before this issue, on which we are now going to press, is published that the question of war or peace arising out of the political questions before mentioned will have been decided upon. Should this not be the case, we see no reason why the question of the "Maine" explosion should not be adjusted consistently with our honor and the humiliation of Spain, without the terrible arbitrament of the sword.

It does not seem to us that indemnity for the loss of the "Maine" would be an improper course for us to take. It is certain, however, that whatever form of indemnity may be determined upon, it must include the ultimate independence of the island of Cuba. We

speaking of indemnity, not because we feel that the loss of the poor fellows on the ill-fated battleship is one which can be determined in cold dollars and cents; not because we feel that a punitive award would repay us for the loss of the noble vessel under such circumstances; not because it is possible that an affair in which one's honor is involved can be treated as a commercial contract, but because this is the end of the nineteenth century and the time has been reached when differences, no matter how great their gravity, arising between nations as between individuals should be settled in some other manner than by force of arms. We have reached the period when a new century is about to dawn, and with it, we hope, a civilization that will enable us to settle our quarrels on a plane somewhat higher than that of the savage. All praise is due to the chief executive, who, during this time of crisis, has taken a wise and honorable course, and whose aim has been, as we believe it will be to the end, to preserve peace with honor.

A "QUEER" PATENT BILL.

At this season of the year Congress is usually deluged with a mass of patent bills, which, as a rule, are a mixture of good and evil. Some of them are drawn in entire ignorance of the aims, purposes or working of our patent system. Some of them are introduced to advance the peculiar theories of some enthusiast or to promote the particular interests of some locality. Some are introduced by members of Congress in good standing, but at the request of some constituent whose influence may not be disregarded. Some are introduced through motives that it would require the art of the Magi to understand, and some through no motive at all. We yearly take occasion to comment upon some of these freak bills. This year we have not given this class of legislation the usual attention, owing to war and rumors of war and other matters that have needed urgent attention.

One of the bills that falls within one or the other of the kinds of legislation referred to above is H. R. 5764, introduced by Mr. Reeves. This bill provides that any one may manufacture, sell and use a patented invention upon obtaining permission so to do from the Commissioner of Patents. The inventor is required, before the issue of the patent, to file a sworn statement of the estimated cost of manufacture "under favorable circumstances, and with proper machinery." Any person, corporation or manufacturing company shall have the right to begin to manufacture under the patent, with or without the consent of the owner of the patent, upon depositing with the Commissioner a sum not less than one percentum and not more than ten percentum of such estimated cost of manufacture. There is graciously included a provision, beautifully bound with red tape, whereby a fraction of the money thus deposited shall actually be paid to the patentee. Lest the inventor might be influenced by what Poe called "the Imp of the Perverse," and demur to the benevolence thus bestowed on him, there is another little joker provided in the form of an undisguised threat, and his patent is open to proceedings for its condemnation—proceedings well calculated to be short, sharp and decisive. If the subject matter of the proposed law were encountered elsewhere than in a bill actually presented in Congress, it might well pass as a delightful example of humor peculiarly American. Thus, any one having an acquaintance with inventions and patents knows, if he knows anything, that it is very often rather desirable to obtain patent protection here and in Europe before submitting the invention for estimates of the cost of "proper machinery," and that the "favorable circumstances" will depend on the size of the orders he can dispose of to the public. When any competitor may manufacture and sell without any cost of experimentation (the inventor having done all the experimenting), the large orders and "favorable circumstances" of the inventor will be made impossible. It is very clear that the inventor's "favorable circumstances" are not worrying the sponsors. The Commissioner of Patents is required to keep accounts, not of one person, firm or corporation, but of all persons, firms and corporations seeking to manufacture the inventions of others—a pleasing prospect to an official who is not given assistants enough to carry on expeditiously the ordinary routine business of the office. The Commissioner, under the provisions of this bill, however, would be expected to possess not only the vast knowledge and learning and experience that is now looked for in the incumbent of that office, but he will require an intellectual equipment far transcending the marvelous endowments of the all-wise Solomon; for he will be called upon to tell at a glance the proper value and fix a fair royalty upon the 20,000 or more patents which are issued annually. As every one knows who has had any experience in patent matters, there is no more difficult matter to determine than the market value of an untried or undeveloped invention. Merit alone does not enable one to determine such a value, as it is necessary that there should be a market; and the market value will fluctuate with the extent and nature of the demand, and with the character and financial resources of those who seek to obtain possession of the rights under the patent.

There is no danger, however, that such a bill will become a law. Before such a measure could receive favorable consideration in Congress, some member would doubtless rise on the floor of the House and would remind that body that the inventors are not the only class benefited by wise patent laws. Such a one could not do better than use the words of the Hon. Thos. A. Jenckes in an earnest address in Congress on April 22, 1870, delivered in defense of our patent system, in which he said:*

"Now every invention published through the Patent Office adds something to our knowledge, and, if useful, increases the material wealth of the world. And I do not hesitate to say that the sum of these values, the aggregate increase to the wealth of this country, from the inventive genius of the people fostered and protected by the patent laws, has been greater than that derived from the protective tariffs passed since the government was organized under the Constitution."

ANOTHER BILL

Of a similar character with the above bill may be mentioned Senate Bill 4239, introduced "by request." This bill is designed to fix the statute of limitation within which suit must be brought for infringement of a patent to a very short period. Anyone owning a patent or an interest in a patent must bring suit against any inventor or manufacturer infringing his patent within a term of one year from the date of said infringement. The hardship of such a provision need not be dwelt upon by us. Our country is a very vast one and extends over a territory of 3,000 miles from shore to shore. Still an inventor living in a remote portion of the country, perhaps, must begin suit against an infringing manufacturer within one year, or forever lose all right to recover either damages or royalty for the use of his invention, even though he may be in entire ignorance of said infringement. What is still more flagrant, he "is forever debarred from collecting damage from said . . . manufacturer." Such a bill puts the impecunious inventor living in the country, who is unaware what progress and development is being made in the industrial world, entirely at the mercy of the manufacturing community. This is an exception to the old saw, "Where ignorance is bliss 'tis folly to be wise." A manufacturer might surreptitiously manufacture a patented article and put it on the market in a remote section of the country, so that its introduction would not be known, and still, after having had the articles on sale for a year, he becomes owner of the patent in so far that, henceforward, he may continue the manufacture of same unmolested, and the inventor, as against such infringer, has no standing in court. Such a bill, if made a law, would bring about a system of such gross abuse and dishonesty as to serve in a little while to overturn our entire patent system.

THE SUBMARINE TORPEDO BOAT.

Rightly or wrongly, the naval world believes that the production of a successful submarine torpedo boat will mark the greatest revolution that has ever occurred in naval warfare. The change from sails to steam, the introduction of armor plate, the breechloading gun, the advent of the torpedo and the torpedo boat, have all in their turn produced radical changes in the construction and the tactics of war vessels, but not any one of them has ever produced the upheaval of long-established customs or the distrust of accepted theories which will occur on the day that a thoroughly practical submarine boat makes its appearance.

There is a general belief that an effective under-water warship would have the above-water ship at its mercy, and we think the belief is well founded.

Of all naval devices that have been made the object of painstaking invention, there is probably none whose history at once dates back so far and includes so many repeated and heartbreaking failures. We say this with the knowledge that submarine boats have been built which have contained many of the elements indispensable to success. Unfortunately, in most cases there have been defects which ultimately relegated the device to the rubbish heap. The reason for this is not far to seek. Submarine navigation and warfare are in the nature of things so difficult, are beset with so many contingencies, that the ships in which they are carried on must be marvels of ingenuity and constructive skill and must meet a number of exacting requirements which never trouble the designer of a ship of the ordinary type.

For instance, in these days of 20-knot warships with their great helm power, a successful submarine boat must be swift and capable of rapid maneuvering. It must be able to run at various degrees of submersion without any liability either to plunge or to rise to the surface. It must be capable of maintaining the same course after diving as it was holding on the surface. It must be capable of approaching the enemy unseen, or, if any part of it be visible, it must be so small as to be safe from destruction by rapid-fire guns. The boat should be large enough to contain a full crew and abundance of ammunition, for there is no reason to suppose that submarine artillery will miss the mark

less frequently than that in use above water. Moreover, the motive power must be of a kind that will not fill the vessel with poisonous products of combustion, and, above all, an absolutely reliable system of air supply must be provided for the crew.

In the century or more which has elapsed since serious attempts were first made to build a submarine boat, America has played an important part, the first at all practicable vessel being built toward the close of the last century by Bushnell. This tiny craft all but succeeded in destroying the British ship "Eagle," and, considering the time in which it was built, there is more credit to be given to Bushnell's boat than any of its successors, which have had the experience of their predecessors to guide them.

The celebrated Fulton was the next to grapple with the problem, and the story of his "Nautilus" is well known. Philips' boat, launched in 1851 on Lake Michigan, deserves notice, and next to that came the French boat "Le Plongeur." The destruction of the United States steamer "Housatonic" by a submarine boat showed the tremendous possibilities of this form of warfare. Passing by several more or less successful attempts after the civil war, we come to the celebrated Nordenfeldt boat, and later that of Goubet. Considerable claims are made for these craft and for the French boats, "Zedè" and "Gymnota," and the Spanish boat "Peral." It is for obvious reasons difficult to obtain accurate information regarding the performances of these vessels; but the fact that they are not being built in any numbers suggests that their success has been limited.

The Holland boat, which is described elsewhere in our columns, is the last of several that have been built by the inventor during the past twenty years. It embodies the results of a wide experience, and its trials indicate that the type contains all the elements of success. The larger boat, the "Plunger," now completing at Washington, will have speed, great offensive power and a wide radius of action. It will be capable of joining a fleet, cruising with it and forming part of the line of battle.

It is scarcely necessary to point out the deadly execution which could be wrought by such a vessel, not merely at night, but in an open battle by day upon the high seas. If the ordinary torpedo boat destroyer, which makes its dash upon the enemy in the open at the risk of being sunk by gun fire, is so dreaded by the larger warships, what shall be said of a torpedo boat which can sink beneath the waves and deliver half a dozen torpedoes from an unseen and unassailable position?

If it is deadly by day and in the open, it will be doubly so by night. No searchlight would be powerful enough to detect the insignificant conning tower of an approaching submarine boat before it was well within striking range. No roadstead would be secure from its attack, and no fleet would dare to enter a harbor defended by these invisible, swiftly moving and destructive little craft; indeed, it is difficult to imagine just what would happen if a flotilla of these deadly little vessels were dispatched against a fleet of the enemy's ships.

THE WELSBACH PATENT SUSTAINED.

The decision of Judge Townsend, a justice of the United States Circuit Court, on March 25, in the matter of the Welsbach Light Company vs. the Sunlight Incandescent Lamp Company, issues an injunction against the latter company and calls for an accounting. It is the first decision rendered by the courts, other than temporary injunction cases, wherein the Welsbach interests have sought to prevent others from manufacturing mantles. The case was based on what is known as the Rawson patent, which recites a method of treating mantles so that the strength of the material and the durability of form is imparted to the fragile incandescing hood. The Rawsons were practical men and were prompt to recognize that the mantles required supplementary treatment to render them rigid so that they could be transported safely.

It was found that paraffine answered the purpose, and this use of paraffine or other suitable material was patented. The defendants set up that they were not employing paraffine or any of its equivalents, using "a solution composed chiefly of collodion with the addition of a small percentage of castor oil."

Judge Townsend disregards the whole question of material, and says sweepingly:

"The invention of the patent in suit transferred the Welsbach mantle from a laboratory experiment into an article of commerce: that it has successfully overcome the obstacles previously encountered, and has accomplished results quite as important as the original Welsbach invention, is admitted. . . . For these reasons this patent should not be narrowly interpreted, but should be so construed as to cover a broad range of equivalents. . . . While collodion is not chemically an equivalent of a hydrocarbon resin gum, and is not paraffine or shellac, it performs the same function in the same manner and with the same result."

In short the court protects the result without regard to the materials which may be employed to attain that result. The decision will be far-reaching in its

effects and will tend to the good of the incandescent gas industry.

THE BILL TO INCREASE THE PATENT OFFICE FORCE.

The inventors and manufacturers of the country will learn with gratification that the bill for providing a moderate increase in the Patent Office force, which was more fully referred to editorially in the SCIENTIFIC AMERICAN of April 2, is meeting with strong official support, which is likely to secure its enactment into law. The Commissioner of Patents under date April 16 states that the members of the Senate Committee on Patents admit the urgency of the relief asked for in the bill. The passage of the bill will, without doubt, remedy the delay which now occurs in the examination of patent applications. The following urgent letter of the Commissioner sets forth the condition of the case:

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE,
WASHINGTON, March 18, 1898.

MY DEAR MR. SECRETARY: Referring to my conversations with you relative to an increased force for this office, I wish to report that Senator O. H. Platt, at my suggestion, introduced the bill in the form of an amendment to the sundry civil appropriation bill. I had a hearing before the committee yesterday. Every member of the committee present admitted the urgent necessity for the relief we asked for, but doubted the advisability of putting it into that appropriation. Upon their suggestion Senator Platt yesterday afternoon introduced the bill as Senate bill 4168.

I wish you would send to Senator O. H. Platt at the earliest possible moment your approval of the measure. The passage of the bill would without doubt result in the earlier issue of patents and enable a more complete and thorough examination to be made, thereby preventing the issue of many worthless patents. The public would be the gainers by this, and manufacturers and inventors certainly would be greatly assisted and pleased, because they would have their applications passed to issue in better form and at an earlier date.

In 1886 there were 188 examiners in this office, and at the present time there are 200. The number of applications received in 1886 was 35,968; in 1897 the number was 47,905. There was, as you will see, an increase in work of about 33 per cent, while the increase in force is only 6 per cent. Each examiner in 1897 did at least 17 per cent more work than in 1886.

These are a few of the reasons which lead me to ask you to make the indorsement as strong as possible.

I remain, very respectfully, yours,
Hon. C. N. BLISS, Secretary of the Interior. C. H. DUELL, Commissioner.

It is unnecessary to say that the bill has received the unqualified approval of the Secretary of the Interior, who wrote an urgent letter to Senator Platt, as suggested in the letter of the Commissioner.

NAVAL APPROPRIATION BILL PASSED.

A bill appropriating a sum of \$39,000,000 for naval purposes has been passed by the House. The alacrity with which this important measure was disposed of was prompted, no doubt, by the extremely critical condition of our relations with Spain and the growing impression that hostilities might be precipitated at an early date. The bill authorizes the construction of three first-class battleships of about 12,000 tons displacement, together with twelve torpedo boats and twelve torpedo boat destroyers. The original recommendation, as it came before the House, called for three battleships, six torpedo boats and six destroyers. An amendment was offered to strike out two battleships and double the number of torpedo craft; but, fortunately, while the latter part of the suggestion was followed, no reduction was made in the number of battleships. When these ships have been built, we shall possess twelve first-class battleships and between three and four dozen torpedo craft, large and small.

RELIEF FOR CUBAN FAMINE SUFFERERS.

The Central Cuban Relief Committee, appointed by the President of the United States, in this city, is undertaking an excellent work in securing contributions of food, clothing, etc., for the famine sufferers in Cuba, and is planning to load a ship to be dispatched as soon as possible, which is to be called the "New York and New Jersey Relief Ship."

The graphic reports made by our visiting United States Senators of the serious condition of affairs in Cuba must necessarily enlist the sympathy of all who desire to alleviate the sufferings of the famine-stricken inhabitants. We are advised that Mr. Stephen E. Barton, chairman, 401 Temple Court, of this city, will receive contributions and give information respecting the matter.

RAOUL PICTET in 1895 exposed himself, excepting his head, to a very low temperature in a refrigerator. There was no sensation as of chill from cold, but a tickling sensation was felt both on the exterior and interior of the body. There was also a marked feeling of hunger. He says that for the first time in six years he was really able to enjoy food.

* This address is published in full in this week's SUPPLEMENT.