

Scientific American.

ESTABLISHED 1845.

MUNN & CO., - - - EDITORS AND PROPRIETORS.
PUBLISHED WEEKLY AT
No. 361 BROADWAY, - - NEW YORK.

TERMS TO SUBSCRIBERS.

One copy, one year, for the United States, Canada, or Mexico \$3.00
One copy, one year, to any foreign country, postage prepaid, £0 16s. 5d. 4.00

THE SCIENTIFIC AMERICAN PUBLICATIONS.

Scientific American (Established 1845) \$3.00 a year.
Scientific American Supplement (Established 1876) 5.00
Scientific American Building Edition (Established 1855) 2.50
Scientific American Export Edition (Established 1876) 3.00

The combined subscription rates and rates to foreign countries will be furnished upon application.

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

NEW YORK, SATURDAY, OCTOBER 29, 1898.

OUR EXPORTS INFLUENCED BY OUR PATENT LAWS.

Twenty-five years ago the United States ranked fourth among the nations of the world in the value of her exports, but to day she stands second only to Great Britain, and there is little doubt that in a few years she will lead the world as a manufacturing and agricultural nation.

The inventive genius of the American is largely responsible for our tremendous stride forward, and the claim for second place among the nations is founded upon undisputed facts which formed the basis of the address delivered by Judge A. P. Greeley, Assistant Commissioner of Patents, at the recent dinner of the Patent Law Association in Chicago. This dinner followed the opening session of the Patent Investigating Commission now sitting in Chicago for the purpose of revising the patent and trade mark laws of the United States.

Foreign statisticians have been quick to grasp the significance of figures bearing on the export trade of the leading nations. Judge Greeley bears testimony to the accuracy of figures gathered abroad and tabulates them as follows:

	Amount of Exports.		Rank.	
	1872.	1896.	1872.	1896.
England.....	\$1,231,200,000	\$1,422,000,000	1	1
United States	430,583,000	1,050,692,000	4	2
Germany	559,700,000	994,156,000	3	3
France.....	726,066,000	656,393,000	2	4
Russia.....	270,586,000	513,908,000	5	5

These figures do not, however, tell all the story, as they are taken from the statement for the fiscal year ending June 30, 1897, but in the next fiscal year, which ended June 30, 1898, the exports of the United States increased to \$1,231,329,766—an increase over the preceding year greater than England's increase in twenty-five years. No more striking comparison of our wonderful advance in export trade is offered than this one, since Great Britain is the chief manufacturing nation in the world.

The increase in manufactures in the United States since 1860 forms the most remarkable feature of the growth in exports.

Judge Greeley states that the significant showing is undoubtedly due to the improvements in machinery made through patented inventions. Agricultural products have been outstripped in the race for foreign favor by the products of the inventor and mechanic. In 1860 agricultural products formed 81 per cent of the total exports of domestic products, while manufactured products amounted to less than 13 per cent. In 1898, however, out of the largest total exports ever known, they formed 24.06 per cent, amounting in value to \$291,208,358.

The direct bearing of patented inventions on the exports of manufactures is shown by taking certain classes of products and comparing the export values for 1898 with earlier years. For example, in 1873 there were no exports of bicycles, while in 1898 there were shipped abroad \$6,846,529 worth of bicycles and bicycle parts. Instruments and apparatus for scientific purposes, including telegraph, telephone, and other electrical machinery, were not included among the exports of the United States in 1873, but the records show that \$2,770,803 worth of this class of manufactures has been exported this year. Typewriters, photographic materials, and celluloid are other examples. Another large item in the exports of 1898 is that of fresh beef, which was not exported prior to 1877 in sufficient quantity to be worthy of separate mention. It has been increased this year to the value of \$22,966,556. Its export was only made possible by the invention of the refrigerating apparatus for cars and ships by which the meat can be transported without danger of spoiling. The most valuable comparisons that can be drawn from the exports of manufactured articles may be made by a glance at the annexed table:

	1873.	1898.
Agricultural implements	\$2,585,914	\$7,609,732
Iron and steel and manufactures of	13,649,027	70,367,527
Boots and shoes.....	421,518	1,816,538
Cottonseed oil.....	370,506	10,137,619
Paper and manufactures of	358,248	5,494,564
Total.....	\$17,686,243	\$96,426,960

There is no question that Judge Greeley is correct in assuming that we owe a large part of our success in the export trade to American inventions which have been fostered and protected by our patent laws.

IS THE THIRTEEN-INCH NAVAL GUN OBSOLETE?

A correspondent writes us that in reading over the annual report of the Chief of Ordnance of the Navy, a review of which is given in the adjoining column, he notes that while a new and powerful 12-inch gun is to be mounted on the three new ships of the "Maine" class, the old 13-inch weapon is to be placed on the vessels of the "Alabama" class. He asks whether it is too late to make such changes in the armament of the latter vessels as will make it up to date when they are commissioned. Our correspondent further asks whether he is wrong in thinking that the armament proposed for the "Alabama," "Wisconsin," and "Illinois" is even now behind the times, and whether it will not probably be still more so when these vessels are commissioned.

If the Navy Department were asked the question, it would probably answer that it is both too late and too early to substitute the new 12-inch gun for the old 13-inch weapon; too late, because the 13-inch guns for the "Alabama" class are already completed, and too early because the ships will be completed long before the new 12-inch gun could be built and tested, and the requisite number of weapons of the new type constructed.

The question, however, may reasonably be asked whether it would not be possible to find other employment for these 13-inch guns, and whether the great increase in the power of the main battery of these three first-class battleships, due to substituting the 12-inch for the 13-inch gun, would not be sufficient to warrant a delay of a few months in the date of their going into commission. If it should be determined that the change ought to be made, there would be no difficulty in disposing of the twelve 13-inch guns which would be displaced. They might be utilized for coast defense, either by mounting them on half a dozen sea-going coast defense vessels of the type of the "Jennuapes" in the French navy, ships of 6,600 tons and 16¾ knots speed, or they might be transferred to the army and be mounted in our coast fortifications. The 13-inch gun has about 2,000 foot-tons more energy than the 12-inch 40-caliber army gun, and as its breech mechanism is of the latest Fletcher type, its speed of fire would be considerably greater.

Is the 13-inch gun obsolete? For use in the second class of battleships, in coast-defense vessels, or on shore fortifications, it is not; but for mounting on first-class battleships, which will go into commission for the first time not before the twentieth century has opened, we think it is a decidedly obsolete weapon. In using the term obsolete in this discussion, we do so in a limited sense, as applied to the arming of first-class, up-to-date battleships. To determine its standing we cannot do better than compare the 13-inch with the new 12-inch weapon to be mounted on the "Maine" class. The correct way to determine the relative efficiency of two guns is to divide the energy of the projectile by the weight of the gun and compare the results. The 13-inch gun weighs 60.5 tons, and its muzzle energy is 33,627 foot-tons. The new 12-inch gun is to weigh, according to Captain O'Neill's report, 53 tons, and we believe its proposed energy is to be 48,000 foot-tons, with a velocity of 3,000 foot-seconds. Although no official statement of the energy has appeared, it is likely that the above figure is correct, as the new English 12 inch gun, which is 2.75 tons lighter, has an energy of 44,500 foot-tons, and with a heavier gun our experts will undoubtedly produce a more powerful weapon.

Assuming that 48,000 foot-tons is correct, and dividing this by the weight of the gun, and doing the same thing in the case of the 13-inch gun, we get 906 foot-tons of energy for each ton weight of the 12-inch gun, and only 556 foot-tons per ton of gun in the case of the 13-inch gun—an increase in efficiency of 63 per cent in the new over the old weapon. In view of these facts we must assure our correspondent that "the armament proposed for the 'Alabama,' 'Wisconsin,' and 'Illinois' is even now behind the times," and that it "will be still more so when those vessels are completed."

There are probably no structural difficulties of an insuperable character to prevent the substitution of the new 12-inch for the 13-inch gun. Turrets that have been designed for guns of a certain weight will certainly carry others of less size and weight. The new weapon, though of less caliber, will probably, being designed for smokeless powder, be of greater length; but the increase will be chiefly in the chase of the gun and outboard of the turret. There would be no difficulty in the arrangements of ammunition hoists, handling gear, and magazines, where the reduced size of the shell and charges would, indeed, favor the change.

Moreover, apart from the positively enormous increase in the power of the battery, there would be a great gain in the amount of ammunition that could be carried. Thirty tons would be saved in the weight of the four guns in each ship and about 600 pounds in the weight of each round, one round for the 13-inch gun

weighing 1,650 pounds, whereas a round for the new 12-inch gun would weigh only about 1,050 pounds. Consequently, if the substitution were made, not only would the power of the main battery of the "Alabama" class be raised 63 per cent, but the reduction in the weights of guns, mounts, and ammunition would allow fully 50 per cent more ammunition to be carried. This increased ammunition supply alone might well prove the determining factor in a prolonged naval engagement.

In view of these facts, it may well be asked whether the 13-inch gun is not obsolete as the armament of a first-class battleship whose first commission will bear date in the early months of the year 1900? We think it is, and we sincerely hope that when the three noble ships in question are sent out to uphold the dignity of our flag upon the high seas, they will carry the very best weapons that American skill can produce, and not, as is now proposed, a gun that was designed more than a decade ago, and before the present remarkable era of gun construction had well commenced.

WORK OF THE NAVAL BUREAU OF ORDNANCE.

The reports of the various chiefs of bureaus of the navy possess a special interest, coming, as they do, at the close of a foreign war. We all remember the general sense of unpreparedness with which the country commenced hostilities—the conviction, based upon no one knew just what grounds, that we were quite unready to face the responsibilities of war with a European power. There is no doubt that in some respects, notably in the matter of coast defense and the equipment of our army, we were not as well furnished for war with even such a minor power as Spain as could have been wished; but it is satisfactory to know that in one branch of the service—the navy—our ships were ready to take the sea on the day that war was declared.

In his annual report to the Secretary of the Navy, the Chief of the Naval Bureau of Ordnance says on this question, as far as it concerned his department, that the resources of the country to supply war material were scarcely touched, and unquestionably there is no limit to the amount that can be procured of all kinds, in case of need, provided time is not too important a factor. It is a pleasant surprise to learn that, contrary to the general impression, the amount of ordnance and ammunition purchased abroad was quite inconsiderable. We are informed that owing to the exigencies of the war, a number of minor caliber guns and some ammunition for them and a few torpedoes were purchased abroad, but that neither powder nor projectiles for heavy guns, nor in fact any war material, except as above quoted, was procured by the navy out of the United States.

The work done during the year included the placing of new batteries and the proper supplies of ammunition on 107 vessels that were acquired by the navy and transformed into auxiliary warships, and the arming of 12 torpedo boats and 2 gunboats. This brought up the total number of vessels furnished with guns and ammunition to 121, and of these the auxiliary vessels called for 576 guns, all of which had to be delivered within the space of a few weeks. It is interesting to learn that there are 564 breech-loading rifles of over 4-inch caliber in the main batteries of the regular naval vessels and 1,023 weapons of less than 4-inch caliber in the secondary batteries. These added to the guns mounted on the auxiliary ships give a total of 2,163 guns of all calibers in our navy at the close of the war.

It is gratifying to learn that the performance of guns, mounts, and their appurtenances under the active operations of the war "has been in general thoroughly satisfactory." The only defects occurred in the minor details of some of the mounts for guns of small caliber, and the general tenor of the reports received from the various vessels is that the guns, mounts, turrets, and ammunition worked well.

The lessons of the war from the view-point of the Bureau of Ordnance are of special interest. Capt. O'Neill, the Chief of Ordnance, is of the opinion that, while heavy guns in turrets must be regarded as one of the chief characteristics of modern battleships, the lessons of the day indicate that the greatest execution (except against the heaviest armor) may be expected from a number of quick-firing guns of small caliber, mounted separately in armored casemates or in a redoubt. While it is true that turrets afford the best protection for a gun, they provide no protection for the hull of the ship. They are cramped, close, hot in warm climates, provide only a contracted outlook for the gunner, and they are heavy and slow-moving. Nevertheless, they are a necessity.

But although we must retain the heavy armor-piercing gun, the Bureau is of the opinion that its caliber and weight may be reduced with advantage, and recommends that the 60.5-ton, 13-inch gun be replaced by a 12-inch gun, with a saving of 7½ tons of weight. While it is true that this does not seem to be a great reduction in itself, the reduction in size and weight of the turrets, barbets, and ammunition will be very large. It is certainly encouraging to know that the Ordnance Bureau is at last moving in this important matter, and