

is a characteristic which attaches to no other species of property. Every patent has in it the germ of a new patent, which in turn is property. Like that marvelous creation of God, 'the tree, in the which is the fruit of a tree yielding seed,' every patented invention contains the fruit of an invention yielding seed. For instance, the telegraph generated the telephone, and other motors are to be the progeny of the steam-engine. The children of the steam-engine are already born that shall grow up to perform their work more easily, more expeditiously, more cheaply than the parent invention.

Nature is one vast storehouse of wealth, but it is a locked storehouse, and the human brain alone can unlock it. Invention is the magic key. Men seek gold in the bowels of the earth, but it lies in the air, in light, in the gases, in electricity. It needs no enchanter's wand, no talismanic words, to set it free—only the processes of thought.

Let me give you an illustration of the saving of patents. I take perhaps as the most marked instance of the saving made by the use of patented inventions the Bessemer steel plant.

In 1868 the average price of steel rails was \$165 per ton. The price since the commencement of 1884 is \$34 per ton. The production of steel rails in 1883 was 1,295,740 tons. The same quantity made in 1868 would have cost more than they cost in 1884 by \$168,446,200. That is the saving of a single year as the result of this invention.

But when we have thus considered the saving in the cost of production we have just begun to consider the saving which is effected by this patent. The entire transportation question of the country has been affected by it. The life of a Bessemer steel rail is double the life of an iron rail; it is more than double, and it is capable of very much harder usage. Now take a single fact as suggesting the saving, aside from that of cost of the production of the steel rail which has been effected by this patent. In 1868 the freight charge per bushel from Chicago to New York was by lake and canal 25³/₈ cents, by all rail 42⁶/₈ cents. In 1884 by lake and canal it is 9 cents only, and by all rail 17 cents only. Now take the 119,000 miles of railroad in the United States which are used in the transportation of merchandise. Apply that fact to the reduction of the cost of transportation, a large portion of which has resulted directly from the use of the Bessemer steel rail, and tell me if you can estimate, see if you can find the figures which will represent the saving to this nation by reason of the use of this one patented invention.

This leads me to speak of the value of patents as measured by their effect in enhancing the value of their products. Here we have no data, and every one must judge from his own standpoint and from his own opinion as to how much has been added to the wealth of this country which would not have been added to it except for our inventions and our patent system. How much has been added to the value of land which otherwise would not have been fenced, how much to the value of urban property consequent upon the improvement and development of farms; how many cities owe their existence to the production of the Bessemer steel rail; how much, to come home to our own city, of the \$5 per square foot of land near the outskirts of Washington is due to patented inventions? These are suggestive inquiries.

For my part, I believe that two-thirds of the aggregate wealth of the United States is due to patented inventions. Two-thirds of the \$43,000,000,000 which represents the aggregate wealth of the United States, in my judgment, rests solely upon the inventions, past and present, of this country. The only way to test the opinion is by imagining the effect upon values which would follow a prohibition of the use of patented inventions.

Take the expired and unexpired patents; prohibit the application of steam to the creation of power; prohibit the use of patents relating to agriculture and the production of the cereals and of cotton; prohibit the use of the inventions relating to electricity in all its uses; prohibit the use of inventions relating to printing, and tell me how much you have subtracted from the value of the property of this country? Tell me what the property of the country would be worth with such a prohibition? Then banish the knowledge of them, and tell me how this wealth is to be reproduced.

I would gladly speak here of the addition to our comforts and our enjoyments by the use of patented inventions, but I forbear. If we can conceive a situation in which we should live in a home in the building or fitting up of which no patent was employed; eat our family meal in the provision or preparation of which there was no invention; be clothed in apparel into the making of which no patent entered; ride to our business in a conveyance in the construction of which all patents were prohibitory; read only such books and papers as were produced without the intervention of patented machinery, we may realize partially how much of our social and domestic happiness is derived from patents.

We protect all our personal property by patents, we lock it up with patented locks, and if anybody breaks through and steals our treasures we overtake the thief by a patented telegraph. We defend our national honor by patents. We heard only yesterday that an unfortunate riot occurred in

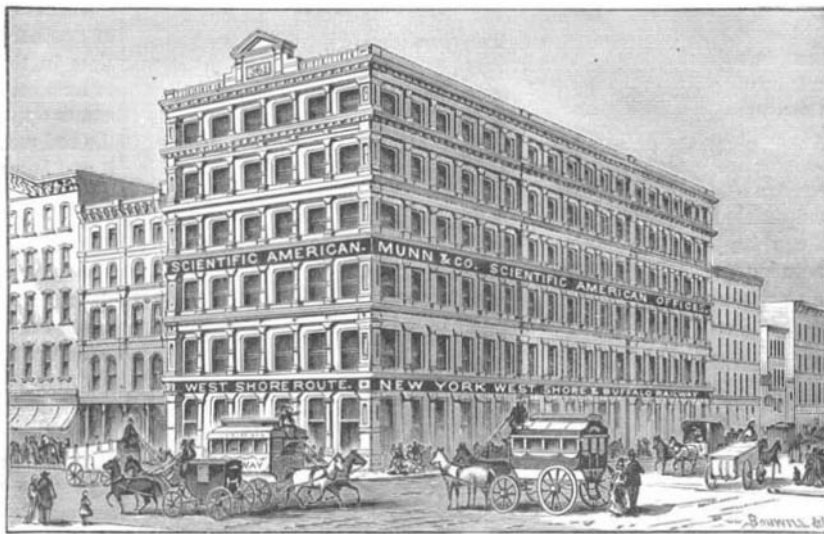
one of our principal cities. It was the telegraph which summoned the troops of the State to Cincinnati; it was that subtle force, so intangible, impalpable, invisible, that we scarcely know whether it is material or spiritual, which the inventive genius of man has harnessed to do his business, which at an instant's time summoned soldiers from all sections of Ohio to the defense of Cincinnati.

A distinguished member of the Army told me within a short time that the only reliance of this country in case of war was upon the inventive genius of its people; that it had no Navy, that it had no sufficient Army, that it could only defend itself by a special exercise of the inventive faculty of its citizens in calling into immediate use and power new implements of warfare.

Is not this vast system of property worth protecting? Does not the patent system attain a dignity which entitles it to fair and generous treatment? Is it not large enough to be independent?

I have heard it said that we should have all these inventions anyway; that men would have invented without regard to the encouragement which was given to them by our patent laws; that if this exclusive use of their inventions had not been secured to them for a term of years, that if their property in patents were not protected, yet they would have gone on and will go on inventing all the same; that there has been in some way a marvelous birth in this country of inventive capacity, and that it must grow whether it is protected or not.

Mr. President, it is not true. The inventor is no more a philanthropist than is the agriculturist. He works for his support. He works to achieve a competency. He invents, if you please, to become rich; but he is no more a philanthropist than any other man in any other walk or vocation of life, and you have no right to demand of him that he shall be a mere philanthropist. He is entitled to his reward. He is a laborer entitled to his hire, entitled to it more if possible than any other laborer, as his labor is higher in dignity and grandeur than that of any other laborer.



THE NEW OFFICES OF THE SCIENTIFIC AMERICAN, 361 BROADWAY, CORNER FRANKLIN STREET.

The universal testimony of all inventors is that it is the reward which they hope to secure which stimulates their efforts. Is it so that an inventor, of all the men in the world, has no right to his reward? Is it so that he has no right to be protected in his property? It is the security to an inventor of his invention which makes it valuable, and which stimulates him in his effort to make new inventions.

Mr. President, every round of the ladder on which we have climbed to national pre-eminence is a patented invention, and every sign-board which points to a greater future of achievement and progress shows that the path continues to lead through the field of invention. We are nearing the end of the contest to which our fathers invited us, when they gave to our Government the power to promote the progress of science and the useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries. That contest was for the supremacy of the world, and the prize is now in full view.

Shall we forget, shall we neglect, the system which has enabled us to outstrip our competitors in the race, or shall we rather perfect and develop it, that through its perfection and development we may attain still grander results?

We stand to-day in the gateway of a most marvelous future. Let us hope that eyes may be given us to see that the inscription over the gate reads, 'Protection to the American patent system and all that it comprehends and involves.'

Our limited space forbids further quotations. For the full text of the oration, the reader is referred to our this week's SUPPLEMENT, in which it fills nearly ten pages.

THE DOSE OF QUININE.—Professors Bartholow and Du Costa agree that the antipyretic dose of quinine is not less than five grains every two hours until four doses are taken, or else thirty grains in two or three doses close together. The former believed a small dose of morphine given with quinine is the best thing to counteract the unpleasant cerebral symptoms of the latter.

MALARIAL FEVERS.

In an article in the SCIENTIFIC AMERICAN of March 22, in which the spread of malaria was traced into many regions formerly exempt from the disease, the town of Litchfield, Conn., "a city set on a hill," was instanced as having succumbed to the mysterious invader. It is gratifying to be able to present the evidence of the principal physicians of that favored locality showing that malaria has no habitation there. May her peaceful hills and vales be forever salubrious!

To the Editor of the Scientific American:

An editorial in your paper of March 22, states that "Litchfield, a city set on a hill," which has always boasted its healthfulness, acknowledged the tread of the invader in 1880, and he had come to stay, to their disgust.

The undersigned, practicing physicians for many years past, desire hereby to contradict the above statement in the most positive and unqualified manner, and to state that we have not, either in 1880 or any other year, known of a single case of malarial fever originating in this village, or its immediate vicinity.

HENRY W. BUEL, M.D.
HOWARD E. GATES, M.D.
WM. DEMING, M.D.
WILLIS J. BEACH.

Litchfield, Conn., March 28, 1884.

NEW SCIENTIFIC AMERICAN OFFICES.

The growth of the business connected with the SCIENTIFIC AMERICAN is such that we have been compelled to change our headquarters; and we have now removed to the new and splendid fireproof building No. 361 Broadway, corner of Franklin Street, a few steps from our old place. Our engraving shows the exterior appearance of the building. Here in the third and fourth floors the SCIENTIFIC AMERICAN, the SCIENTIFIC AMERICAN SUPPLEMENT, the SCIENTIFIC AMERICAN EXPORT EDITION, and the world-renowned SCIENTIFIC AMERICAN PATENT AGENCY, are now located. Taking the

elevator at the street door, 361, our friends will land on the main floor of the principal office, a beautifully lighted, airy apartment, more than fifty feet wide and one hundred and sixty feet long. It is furnished with everything needful for the prompt and efficient execution of business, and forms no doubt the finest patent office in the world. We cordially invite our many friends in town and country to call in and take a look. Remember the number and tell everybody—MUNN & Co., 361 Broadway.

UNEVEN SHRINKING.

Much loss is occasioned in the foundry by uneven shrinking of castings, causing distortions and fractures. Some of these may be avoided by previous preparation in the construction of the patterns. Rimmed wheels with arms, like pulleys and gears, are particularly liable to these shrinkage losses. This is because the continuous rim and the solid hub retain their heat longer than the separated and comparatively light arms. The remedy that suggests itself is to make these arms

longer, so as to allow them more shrinkage. Obviously the only way to lengthen the arms is to make them dishing; instead of having them run on a straight line from rim, through the hub, to rim, deflect them out of a right line, having the result of making a dish wheel, the hub being out of line with the edges of the rim, and the arms on a corresponding slant. The amount of this "dish" or drop of the hub should be about that of the estimated shrinkage of cast iron—one-eighth of an inch to the foot. Thus, a pulley of twelve inches diameter and six inches face should be dishd by the patternmaker so that the hub drops about one-eighth of an inch below the level of the pulley rim edge.

Pulleys and gears cast with these dishd arms come straight on cooling, and they do not require to be uncovered—or partially uncovered—in the mould to facilitate even shrinkage. Every machinist knows what annoyance he has suffered from the chilling of cored hub holes and of the rims of pulleys, the core hole in the hub being sometimes swabbed while red hot, and the sand from the rim dug away, making much trouble in boring, and necessitating the grinding of a pulley face instead of turning it.

Doctor Crosby and Free Trade.

The Reverend Howard Crosby, one of New York's most useful and energetic citizens, as well as celebrated divines—a man full of patriotism and good works—sent the following characteristic reply to an invitation to attend a recent free trade dinner in this city:

"I have received your invitation to purchase a ticket to the Free Trade Club dinner, which I should accept were I a free trader, but I am a benighted protectionist, and could have no place at your table, unless to hear words of wisdom to convert me; but these I can get in the morning papers, and weep over my errors without being seen."

Such men as the above model citizen are just the men to take hold of the tariff reform question in place of the parlor statesmen, who have never done anything for their country except to talk and live off of her by eating more than they produce.