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THE SCIENTIFIC AMERICAN SUPPLEMENT

No. 482,

For the Week ending April 12, 1884.

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PATENTS IN CONGRESS.

The most interesting incident of the past few days relating to the patent agitation has been the delivery before the Senate, on the 31st of March, of a most remarkable oration on the "Reorganization of the Patent Office," by the Hon. Orville H. Platt, Senator from Connecticut, and Chairman of the Committee on Patents. We look upon this discourse as one of the most able, eloquent, and profound expositions ever pronounced concerning the nature of patents and the marvelous influence upon the country of new inventions. It is a wonderful essay, powerful in its reasoning, a great honor to its author; entitling him to the gratitude and respect of the nation.

Senator Platt begins at the very beginning of our patent system. He reproduces from the government archives records showing the gradual unfolding of the system, and tells us of the deep interest our fathers took in new inventions and new industries. He proceeds:

"Mr. President, to my mind the passage of the act of 1836 creating the Patent Office marks the most important epoch in the history of our development—I think the most important event in the history of our Government from the Constitution until the war of the rebellion. The establishment of the Patent Office marked the commencement of the marvelous development of the resources of the country which is the admiration and wonder of the world, a development which challenges all history for a parallel; and it is not too much to say that this unexampled progress has been not only dependent upon but has been coincident with the growth and development of the patent system of this country.

Words fail in attempting to portray the advancement of this country for the last fifty years. We have had fifty years of progress, fifty years of inventions applied to the every-day wants of life, fifty years of patent encouragement, and fifty years of a development in wealth, resources, grandeur, culture, power, which is little short of miraculous. Population, production, business, wealth, comfort, culture, power, grandeur, these have all kept step with the expansion of the inventive genius of this country; and this progress has been made possible only by the inventions of its citizens. All history confirms us in the conclusion that it is the development by the mechanic arts, of the industries of a country, which brings to it greatness and power and glory.

No purely agricultural, pastoral people ever achieved any high standing among the nations of the earth. It is only when the brain evolves and the cunning hand fashions labor-saving machines that a nation begins to throb with new energy and life, and expands with a new growth. It is only when thought wrings from nature her untold secret resources that solid wealth and strength are accumulated by a people.

Concede all you claim—free institutions, Christian civilization, industrious habits; grant respect for law; acknowledge all our vast natural resources; and then deduct patents and patented inventions from the causes which have led to this development, and you have subtracted from material, yes, from moral, prosperity nearly all that is worth enjoying. Subtract invention from the causes which have led to our growth and our grandeur, and you remit us, you remit our people, to the condition of the people of Italy, of Switzerland, of Russia. If "knowledge is power," invention is prosperity.

I am not a very old man, but recollection carries me back fifty years, when there was no railroad, no coal used, no steam power used; no woolen factories except of the rudest sort; no telegraph in Connecticut. Possibly there were one hundred tons of coal consumed in the State annually.

There was no carpet; no piano; few books; hand sewing only; hand knitting; the tallow candle; the unwarmed, unlighted church; the school house with its hard, rough benches; and the slow post route, the mail once a week; a weekly paper only. It was a week's journey from Connecticut to Washington; six weeks' journey from Connecticut to Ohio. Five thousand dollars in those days was a competence, and $10,000 was a fortune. What has accomplished all the transformation which we witness as we compare the condition of the country fifty years ago with its condition at the present day?

I insist, Mr. President, that it is traceable directly to invention. The railroad, the child of patented inventions, the production of cotton, silk, broadcloth, and linen, is due absolutely and entirely to the perfection of machinery for their manufacture. The daily press, the teeming books, are part of our civilization. They are all dependent upon patented inventions. The carpet, the piano, and the carriage conduce to our comfort and our convenience, and they are also children of patents. Every comfort which we have, every convenience which we enjoy, every element of wealth which we acquire, has its root and development in the patent system of this country. They are born of patents, and they live only by permission of patents.

The author then traces the growth of population, of imports and exports, of railways, production of coal, wool, values of agricultural lands, and the same lands where manufactures are carried on; he gives multitudes of statistics and tables; he presents proofs for all his statements.

Every department of business, every pursuit of organized life, has been fed, nourished, and enabled to keep step in this wonderful march of progress by the patented inventions of the age. . . . Imagine, if you can, how we should reach our agricultural regions, the great wheat fields of the West, without railroads; and I may say here that a railroad—from the steel rail to the top of the smoke stack, from its locomotive headlight to the signal lantern on the platform of the last car—is but one aggregation of patents. Think of the crops raised without improved plows, without seeders, without cultivators, without mowers, without harvesters, without thrashing machines! Think of the crops hauled to market by horses! Think, if it be possible, of the wheat converted into flour without patented milling processes! and say what proportion of profitable agriculture in this country is not due directly to patents and to the patent system of the country. The truth is, and there is no avoiding it, that you cannot disconnect in this country invention, manufactures, and agriculture. The triumph and the success of the one is the triumph and the success of all. They are interdependent, coequal factors, as it were, in producing our prosperity and our happiness; and so with regard to the other industries of the country, patents are directly connected with them all, and absolutely necessary to their successful pursuit.

We are a nation of 50,000,000 people, but we have the productive capacity of many more millions, how many more no man can estimate. Coal and water are now performing the work of human hands. What agents will perform them in the near future it is impossible to tell.

The steam power used in the manufactories of the United States, by the census of 1880, was equal to 2,183,488 horse power; the water power was equal to 1,225,379 horse power; making in all the horse power of the United States 3,408,867. Counting one horse power to be equal to that of six men, we have in the power used in the driving of our factories alone in this country the equivalent of the power of 20,453,202 men. The steam power used in driving our factories, not including the water power, is equivalent to the labor of 13,100,928 men; and of our 50,000,000 people only 35 per cent are supposed to be capable of labor—in round numbers, 17,500,000 laborers, persons capable of pursuing gainful avocations, in the country; and yet it would nearly take these 17,500,000 men to furnish the force that is exercised by steam in driving the engines of our factories, the wheels, the spindles, and the machinery of this country; and we do not begin to touch even then upon the saving of power by the use of the machines which are manufactured in these factories.

Take the capacity of locomotive engines as compared with the capacity of horses. We find that the locomotives in the entire country are doing the work of 29,676,960 horses on common roads.

Remember that eight-tenths of the manufacturing of the country is dependent on patented processes. Take the statement cited the other day by the Senator from Florida [Mr. Call], in which he quotes from Mulhall's Progress of the World, a book from which I have already quoted, as to the capacity of the sewing-machine:

'In effect, the adoption of machinery and steam has given mankind an accession of power beyond calculation. The United States, for example, make a million sewing-machines yearly, which can do as much work as formerly required 12,000,000 women working by hand. A single shoe factory in Massachusetts turns out as many pairs of boots as 30,000 boot-makers in Paris.'

Mulhall here gives the total horse power in comparison with steam as 13,071,000, the horse power of the world dependent upon the use of steam, equivalent to about 78,000,000 men.

Take the loom and see what it has done in adding to the productive capacity of the country.

In one of our manufactories you will see a girl of fifteen minding a machine that spins 2,100 miles of thread in a day—a thread that would reach from Washington to California.

Take the figures which I have given of the wool production and consumption of this country. In 1880 the wool grown was 290,000,000 pounds; that imported was 70,575,478 pounds. We exported 4,074,517 pounds, which left for home consumption in the United States 356,500,961 pounds of wool. Now, imagine for a moment what kind of a figure the mothers and daughters of the land would make in carding it with the old hand cards, or spinning it with the old spinning-wheel, or weaving it with the old hand loom. Take the single matter of cleaning cotton.

Under the old process of cleaning cotton, before the invention of the Whitney gin, a man could clean four pounds a day. The gins now in use clean 4,000 pounds a day.

Whenever a machine is invented which does the work of ten men with one attendant, nine men are released from that occupation in which they have theretofore engaged to engage in other productive operation. The men so released do not remain idle, nor do they descend in the grade of labor.

I know the argument is often used that inventions are opposed to the labor interests of the country. It is not true. There is a redistribution of labor whenever a new labor-saving machine is invented, but there is no destruction of labor. There is no degradation of labor in invention. The man released from a particular kind of labor by the introduction of a labor-saving machine does not go down in the grade and scale of labor, but he ascends. He engages in some higher employment, in some more productive vocation, for patents elevate the laborer. New inventions open new fields of labor. The laborer who lives and breathes the air of invention produces more, man for man, than he who does not live in such an atmosphere, for patents are educators.

Property in patents is a property which contains within itself the principle of the reproduction of property, and that

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 25·3 cents, by all rail 42 6 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 the 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 Da 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 lofts 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 undoubtedly 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 dished 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 dished 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 dished 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.