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#### AMERICA'S INDUSTRIAL SUPREMACY ASSURED.

and did no fighting. This great burden was borne chiefly by the enormous armies and armaments of Europe finds no Spain, \$28,560,000; Turkey, \$23,800,000.

This profitless squandering of money-which the overtaxed producers have to furnish—is unfortunately not the but one of the great blessings we have to be thankful for whole of the blood tax upon Europe in times of peace. The but one of the conditions which go to make sure our superinational debts of Europe, due almost entirely to past wars ority in productive power—our supremacy in the arts of and preparations for future conflicts, amount to more than peace. And the advantage of all this must and does accrue twenty billion dollars, the interest of which the producers mainly to the American producer, showing itself in lighter have to meet. About eighteen billions of debt stand against taxes, higher wages, a greater diffusion of wealth, and a

withdrawing able-bodied men from productive labor is an the lives of American workers. item of scarce'y less magnitude, for the standing armies of Europe foot up something over eight millions. In a late report by the Hungarian ministry, designed to show the relaof the five chief States of Europe were enumerated as follows:

all classes is represented by 2,004,300 men, of whom 1,076,-1,016,200, her total strength will reach 2,024,200. Austro- in the year for every year since 1850. Hungary possesses a standing army of 800,000, a landwehr For the purpose of adding to our specific information in bine to lay upon the shoulders of Europe's working popula-

Not the least disheartening feature of this state of things condition of the greater part of the city. is its tendency to grow steadily worse. As a leading Eng. The water is very impure, and so insufficient in quantity citizens to disciplinary training.

to foreign entanglements is likely to keep us from offensive fever. foreign wars.

portunities. The problem of industrial supremacy is, there-"Every war, even a victorious war, is a national calam fore, not hard to solve. The single advantage we enjoy in ity." So writes the Count Von Moltke, Germany's most | being free from the terrible war-bardens of Europe even in successful warrior. And he might have added To be con-times of peace, and our practical exemption from risk of stantly preparing for war is a national calamity but little in-foreign wars, cannot fail to maintain us in our position as ferior to actual warfare. Last year Europe expended for the most prosperous people in the world. The annual tale military and naval purposes something near \$800,000,000, of labor prevented, labor misapplied, and labor driven away by eight powers, as follows: Russia, \$173,740,000; Great counterpart here. All our labor is productive, all tends to Britain, \$153,510,000; France, \$128,520,000; Germany, \$101,- swell our national wealth, and to increase our power to do 626,000; Austro-Hungary, \$53,074,000; Italy, \$44,030,000; and to enjoy. This alone would insure our industrial supremacy, other things being equal, in a very few years; and fortunately our freedom from Europe's military burdens is more generous style of living; all of which are everywhere This is the tax paid in money. That which comes from recognizable by European tourists here as characteristic of

## PROTECTION FROM YELLOW FEVER.

"Out of sight, out of mind," has been too much the rule tive weakness of the Austro-Hungarian forces, the armies in regard to this matter. Two successive years of severe visitation of this dreadful disease at New Orleans and Memphis each time drew general attention to the necessity for The military strength of Russia consists of 3,046,800 men, some action in the way of prevention, but with its disappearof whom 600,000 belong to the reserve and 2,446,800 to the ance the matter appears to have passed almost completely standing army. The regular army of France comprises out of the public mind. Doctors are by no means agreed as 1,689,000 soldiers of all arms, the territorial army, 1,208,000 to the best method for its treatment, nor as to its original total, 2,289,000; to be increased in 1892 by the addition of cause, and just how it is propagated, other than by contact 300,000 reserve men to 2,723,000. The German power of with the developed disease or its germs, our knowledge is very limited. The fact that stands out most prominently in 200 belong to the standing army, 307,200 to the landwehr, connection with the subject is that the island of Cuba, and and 620,900 to the reserve. Italy has an army of 698,000 and particularly the city of Havana, seem to be its chosen home, a militia of 310,000. In 1892, when the reserve will number and in the latter city the disease has been present each month

of 299,318, and a reserve of 95,030 men; total, 1,194,318. regard to yellow fever the National Board of Health last The grand total of all these forces amounts to 16,471,918, year sent a special commission to Cuba, whose preliminary the standing armies alone numbering 7,925,000. To these report has just been published. What they have furnished figures there should be added for the armies of Great Britain, does not throw much light on the pathology of the disease, Spain, and Turkey, about 700,000 regular soldiers and twice but the facts they present as to the sanitary condition of the as many reserves. Allowing that half of the men nominally island are such as should compel our authorities to erect in the European armies are at home on furlough, and able more effectual barricades than have yet been provided against to take part in productive labor, there cannot be less than ! this pest-house at our very doors. It is impossible to say 4,000,000 men in the prime of life permanently withdrawn when the disease first occurred there, but it was first known from productive industry in the great states named. Count- as an epidemic in Havana in 1761 and 1762, and from that ing the labor of these men as worth no more than a hundred time to this that city has been its principal headquarters, it dollars each a year, the burden of their idleness can be meas being generally epidemic there from June to October. The ured only by hundreds of millions of dollars annually. Add- poison is always present, the climatic conditions favor its ing the value of the time lost by the millions of reserves in development, the government takes no practical measures drilling, and the losses incident to the spoiling of men for to eradicate it, and the sanitary state of a large portion of peaceful industry by enforced soldiering during the years of the city, as described by the commissioners, is bad almost early manhood, a rough idea can be formed of the aggregate beyond belief. Many of our citizens go to Havana every burden which governmental ambition and mutual fear com year, but it is only a small section of the city that foreigners ever visit, and none will be more surprised than those who have been there at what is said in the report of the actual

lish journal pertinently remarks, it is the special aggravation that "a large portion of the population purchase their water of this waste of human energies that it is interminable, that it daily in kegs and carboys from street venders." The streets settles nothing finally, that the consequence of war is not are not paved, except in about one-fourth of the city; many peace, but a condition of further preparation, in which vic- of them are so narrow as to afford room for but one vehicle, tory and defeat alike are used as arguments for further pre- and in but few cases have any sewers, while the most of parations. Germany is victor, and becomes a camp; France these are so filled with solid materials as to be inoperative. is vanquished, and becomes a parade ground. Germany is Nine-tenths of the houses are only one story high, many of united and must therefore be drilled; Italy is united and them having the sleeping rooms adjoining the kitchen, privy, must therefore be drilled; the Balkan peninsula is disunited and sometimes a stable. Most of the floors are of brick or and must therefore be drilled. Whatever the circumstances stone, on a level with or below the streets. "The privy is or the sacrifices or the hopes there must be more and ever almost a part of the kitchen; it consists of an excavation, more men drilled, more expenditure on preparations for war, which often extends several feet under the flags of the court; it more devotion by rulers to military work, more surrender of is never emptied until it will hold no more, which seemed generally to be from five to ten years; it has no ventilating pipe, To this frightful extent Europe is handicapped in the race and belches forth its nauseous odors at times even to the front for industrial supremacy. It is the penalty which the peodoor . . . In the summer season a fæcal or urinary odor ple have to pay for the accidents of their geographical posi- prevails generally, and is distinctly perceptible as it oozes from tion, the forms of government they have inherited, and their the doors and windows of almost every house." Notwithworse inheritance of military history, national hatreds, and standing that the houses are so mean, rents are very high, as political entanglements. At the same time the ability of the are all to the expenses of living. The government is greatly in European workers to meet these heavy obligations is being debt, its credit is poor, and the taxation very oppressive. On steadily lessened, not only by the drafting of their best this account any material improvement in the sewage system brawn and bone into the armies, but by the voluntary expa- is hardly to be looked forward to, it being estimated that to triation every year of thousands of their more energetic sons make this effective, provide a proper water supply, etc., and daughters. "to correct some few of the most glaring insanitary evils," The United States comprise about the same area as the would cost \$20,000,000. There are many other places in great states of Europe combined, and already have nearly the world that are no cleaner than Havana, and where the one fifth as many inhabitants. In all probability children temperature is as high or higher, but where the yellow fever now born may live to see United America equal in popula- never comes, as Canton and Bombay, for instance, and one tion to all Europe. From our continental position any great of the suggestions made in the report is that possibly the aggressive war in America by American men is altogether alkalinity of the air of Havana has much to do with the preimpossible, and the prospect of great civil wars is, we are valence of the disease. The atmosphere of the city is conhappy to believe, not less remote. Our strength is rapidly stantly alkaline, but this condition is especially marked durbecoming so great-if it is not already so-that no foreign ing the summer months, and the times of high atmospheric nations are likely to assail us; and the aversion of our people alkalinity coincide with the greatest intensity of yellow

Under these conditions it is quite plain that any protection The natural advantages of America for diversified and we have from constant visits of this disease must come from prosperous industries are certainly not less than those en- a more stringent regulation of our commercial intercourse joyed by Europe; and our people are quite as capable as with Cuba, as substantially the same circumstances exist in  gree. Our government endeavored to do something in this direction by the law of June 2, 1879, which provided that our consuls in foreign ports should see that every vessel hibiting the entry here of any vessel not provided with a prescribed "certificate required to be obtained at the port of departure." In Cuba this law was denounced and its enforcement rendered impracticable, so that it has remained a dead letter. It is evident, therefore, that something further Cuba for the United States, for, with our present exposure accorded to this interesting feature of this paper. we are constantly running the risk of a pestilence which may, in some particularly trying year, be brought thence to our Atlantic cities. Our commercial intercourse with Cuba, important as it may be deemed, should not be considered of sufficient moment to justify our taking any further risks of this kind.

## CHEAP PATENTS CHEAPEN GOODS.

rhetoric in describing the burdens put upon purchasers by the multiplication of patent rights. Everything is patented or made with patented machinery or by patented processes; therefore everything must cost a great deal more than it would were there no patents. This is their logic stripped of verbiage. The only fault with it is the persistence of facts in always going dead to the contrary. It is plausible, but it is not true. The moment one sees the word "patented" stamped on an article it is safe to infer one of two things: either the thing is cheaper and better than anything of the sort previously in market, or it is an entirely novel article, which in all probability would never have been produced except for the patent laws.

A pretty illustration of this industrial and commercial paradox occurs in a paper lately read by a prominent English builder before the Manchester (England) Scientific and Mechanical Society. The reader had been, for the second time, comparing English with American made builders' hardware, showing the "marked superiority" of the latter, and was summing up the causes which had led to the competition upon their own doorsteps from American manufac-

"Another and most important factor in the sum of deadweight under which we have to stagger in this race is our intention of suppressing the inventive genius of the country, they could not have succeeded more completely than they have done. Can we wonder that America is such a close competitor in the manufacture of these small articles, when we know that for a payment of £18 the inventor can secure himself for seventeen years, whilst in this country it will cost at least twice the money to secure an invention for three years only? How can a man with inventive skill, but with limited means, make the most of his talents? Too often he spends all his little savings, ruins himself, and, when his three years have expired, sees some other person take his invention in hand and realize the profit that belongs to himself. The result is that, disheartened and disgusted, he for ever after buries his talent in the earth. I show you here a small article of American make, not connected with the building trade, as an illustration of the different influence of (an apple parer) carries eight patents, yet its wholesale price in England to-day is less than 4s."

A most ingenious paradox, truly!

The apple-parer was beyond English competition because it carried eight patents. It is safe to say that every single patent had improved its working or lessened its price.

But why could not the English manufacturer, having no patent royalties to pay, produce and sell the article on the spot cheaper than the American, with 3,000 miles of freightage to pay in addition to the cost of manufacture? There may be several reasons more or less sufficient: but one is enough. Having no monopoly of the manufacture, the Englishman could not afford to risk the investment necessary to enable him to produce the article cheaply.

Our Canadian friends discovered that law of trade when they undertook to reap the benefit of Yankee inventions without payment of patent royalties. The only drawback imple circumstance that, though Canadians had everybody else was free to set up in opposition. Canadian access. For the want of facilities for transportation, the few ment recognized the property rights of all inventors; then ginia have used charcoal at great expense. During the war the Canadians began to be a manufacturing people.

the same important lesson. Industries increase and multiply, and industrial products improve and cheapen in direct proportion to the number of patents issued; and the number the official fees for issuing them. Which brings us round to our thesis, that cheapening patents cheapens products.

# American Manufacturing Industries,

others the pardonable pride we feel in referring to the ing a prosperity such as Virginia has never had. At present there was neither dust nor waste.

superior engravings which our artists produce each week for this paper.

We allude, especially, to the series of full page engravbound for the United States should comply with the rules ings, illustrative of the most prominent American indus of his researches into the mysteries of the "fifteen puzzle," have already appeared in these columns. The views of the several manufacturing establishments we have illustrated were sketched by our own skilled artists on the premises, and for accuracy and artistic grouping of the interior views, showing the various processes of manufacture, we believe should be done in the way of enforcing a more stringent there has been nothing attempted before in journalism that supervision than is at present exercised on vessels leaving has met with the same gratifying success which has been

> A continuation of this industrial series we purpose to continue until every important industry of the country has been illustrated and described, and we would thank our 000. M. Charnay, the French scientist and explorer, will readers to suggest what extensive works in their vicinity would furnish interesting material for publication.

## NEW YORK ACADEMY OF SCIENCES.

A meeting of the New York Academy of Sciences was The attorneys of anti-patent associations waste no end of held Monday, March 15, at 8 P.M., President Newberry in the chair.

Mr. Kunz exhibited a necklace made of beautiful iridescent shells, and also several handsome pearls from fresh water mussels found near Portland, Maine. Mr. McCarty exhibited several minerals.

The Recording Secretary, Prof. Leeds, read a letter from Norman Lockyer, in which the latter expressed his thanks to the Academy for his election as an honorary member.

THE COAL AND IRON RESOURCES OF VIRGINIA.

The paper announced for the evening was on the coal and iron resources of Virginia, by Prof. Thomas Egleston. The following is a brief synopsis of it:

When Alsace was separated from Lorraine the commissioners drew the boundary in such a manner as to give to Germany all the iron lands and leave nothing of value to France. In like manner the division of Virginia left all the iron in the old State and gave the new one all the coal. These are not, however, the only mineral resources of Virginia. Gold, small quantities of silver, lead, and zinc are also found. Near Wythevill, particularly, the zinc ore rivals that of Friedensville near Bethlehem, Pennsylvania. It appears to be very free from lead, and the zinc made from it has been commanding more than double the price of the common metal in the market.

The great iron region of Virginia lies between the Alleghanies on the west and the Blue Ridge on the east. The space thus inclosed consists of a number of shorter ranges, abounding in limonite, hæmatite, specular iron, and especially on the James River region, in magnetite. For magnitude of extent and facility of exploitation this region is second to none in the United States. As we ascend the successive terraces of the mountains we find the iron deposits folded so as to form numerous outcroppings succeeding each other at short intervals. Over 80 ores coming from the region between Stanton and the James River were analyzed, and none of them contained over 1.2 per cent of phosphorus. Most of the ores contain only from one to five-tenths of one per cent of phosphorus. A year ago Bessemer engineers would have considered this circumstance a great advantage; but with the new processes larger quantities of phosphorus are rendered available and even necessary to obtain the requisite the patent laws of the two countries. This little machine degree of heat in the converter. Taking the whole iron region together the ore will average from 45 to 55 per cent of metal.

To the west of the iron district there are very extensive limestone deposits, and as we enter West Virginia we strike the coal measures. There is a belief current in that region that it is only the lower coal that will coke well, but this is an error. Coal has been found there that will give only two per cent of ash, and the coke formed from it gives but six per cent. As we leave the river banks the coal deposits increase in thickness, until they reach a depth of twelve feet, as, for example, at Hawk's Nest. The valley of the Kanawha River is not one of erosion, but was formed by a geological accident. As a consequence of this the mines that have been started along the banks will have to be abandoned sooner or later and carried over the hills further inland to follow the veins.

It is impossible to tell how much coal there is in Virginia, and nowhere is there so little known about it as in Virginia the world's best inventions to choose from gratis, no man itself. Since Prof. Roger's report, in 1838, no systematic dared to undertake the manufacture of novel articles when explorations have been made on account of the difficulty of tion engines can abolish the use of mules on the Western industries would not multiply until the Canadian Governiron furnaces that have been run from time to time in Vir cult, if not impossible, for the engines to travel. the Confederate Government was particularly unfortunate Our Western and Southern citizens are rapidly learning, in locating its furnaces near ore containing an exceptionally large amount of phosphorus which they did not then know how to manage.

> If the present great revival in the iron trade should conbinations will be formed between the iron interests of Virginia and the coal interests of West Virginia, and the effect

these deposits are but dormant wealth for a future generation.

At the conclusion of the paper Mr. Warner gave the fruits and regulations necessary "to secure the best sanitary con- tries. The present issue, containing the article on book paper in the shape of a method of determining by inspection dition of the vessel, cargo, passengers, and crew," and pro- making, is the thirty-seventh of the industrial series which whether a given arrangement is or is not capable of solution. C. F. K.

#### Proposed Exploration of Mexico.

It is announced that Mr. Pierre Lorillard, of this city, has entered into an agreement with the French Government to assist in the prosecution of a scheme of exploration among the ruins of Mexico. The French Government furnishes the outfit of the expedition and \$9,000 in money; Mr. Lorillard gives \$20,000 at once, and as much more when it is needed. The whole cost of the expedition for two years is put at \$60take charge of the work, which will begin next spring. The material results of the exploration will go to swell the treasures of the French museums. The report of M. Charnay will be first printed in the North American Review.

The field to be explored is rich in relics of the splendid though partial civilizations which had flourished for un known ages, and were in part declining, if not forgotten, when the Spanish conquerors arrived. But, since the days of the ill-fated Maximilian very little has been done toward their investigation except by our government surveyors in Colorado, New Mexico, and Arizona. These have found evidences of an antiquity for the origins of the civilizations of ancient Mexico far exceeding anything dreamed of a few years ago; and it is altogether probable that the questions of historic and prehistoric interest raised by such discoveries may be materially helped on toward solution by the labors of M. Charnay. At least, he cannot fail to add much to our limited knowledge of the later civilizations of Mexico, as shown in the ruins of the Aztec and Toltec cities destroyed by the Spaniards.

#### Road Engines and Wagons for Western Transportation.

A number of road locomotives and trains of wagons, for the transportation of minerals and general merchandise over the common roads of the far West, were received in this city by the steamship Erin the latter part of February. They were built in Rochester, England, and were consigned to Wadsworth, Nevada, where they are intended to take the place of mule trains on certain central routes in that State.

The engines weigh about 7 tons each, and are rated at 12 to 14 horse power. They have horizontal boilers, which are fitted with large fire boxes for burning almost any description of fuel, and water tanks are affixed capable of holding a supply for three or four hours. The engines are so arranged that they can be used for turning fixed machinery, The driving wheels are 7 feet in diameter and 12 inches in width, and the steering or front wheels are 4 feet in diameter and 9 inches wide. An important advantage in the road locomotive is that in case of need the road wheels can be replaced by the ordinary flange wheels for running on

With the addition of a winding drum, fitted to the driving axle, capable of holding from 50 to 100 yards of coiled rope, these engines can be employed inhoisting heavy weights and in hauling the loaded wagons up otherwise impracticable grades.

It is claimed that one engineer and two laborers are all the manual force necessary for the management of each train, and on moderate roads, with grades not exceeding 1 foot in 12, each engine of the size sent to Wadsworth will haul from 10 to 12 tons of paying load, and travel at an average speed of 31/2 miles per hour. Two or three wagons, each capable of containing from 5 to 6 tons weight, and the engine form the train. The wagons are coupled together and to the locomo. tive by strong coupling bars, and the whole train follows exactly in the track of the engines, even when turning sharp curves. The total cost of hauling by the road locomotives, it is estimated, will range from 5 to 10 cents per ton per mile, varying with the condition of road and load. This is probably not one-fourth of the cost of doing similar work with mules. The ordinary mule team, consisting of 16 mules. with heavy wagons capable of holding 6 to 10 tons, will not average more than 2 miles an hour. The first cost of the locomotive, with its train of wagons, compares favorably with the first cost of the mule team and wagons roads, as the latter may be employed where it would be diffi-

# The Electric Middlings Purifier.

A public exhibition was given in New Haven, March 13, of the electric middlings purifier, the joint invention of  $two\,$ young men of that city. The working of the device is said to have been highly promising. Over the wire bolting cloths of patents issued depends very largely upon the lowness of tinue greater efforts will, no doubt, be made in a few months are placed a bank of bard rubber cylinders, which are slowly by the railroads to open up these great mining regions; com- revolved against strips of sheep skin and thus electrified. To these rollers the light bran is attracted, to be mechanically brushed into a proper receptacle. This substitution of will be to raise the district to the importance of the Penn-electric attraction for the air blast in separating bran from sylvania iron and coal regions. Then surveys will be made flour is said to lessen the waste, while it obviates the neces-There are few qualities in one's nature more objectionable either by private enterprise or by the governments of these sity of doing the work in a closed chamber and the risk of perhaps, than egotism, but it is difficult to withhold from States, and the capital of the country will pour in, productive explosions. The exhibition was made in an open room, and