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SCIENTIFIC AMERICAN SUPPLEMENT

No. 688,

For the Week Ending February 18, 1888.

Price 10 cents. For sale by all newsdealers.

THE ANNUAL REPORT OF THE COMMISSIONER OF PATENTS.

The annual report of the Hon. Benton J. Hall, Commissioner of Patents, to the Senate and House of Representatives, dated January 31, 1887, has been published. It appears in the *Official Gazette* of Feb. 7, 1888. The report is rather longer than usual, and bears the mark of much careful work and thought. It begins by a statement of the need of additional room for the working force of the Patent Office. Additional employes, the Commissioner states, are not required; with the increased facilities that more space would give, the present force could satisfactorily perform the work. A laboratory is also asked for.

The Commissioner considers at some length the propriety of altering the statutes. He suggests an amendment of section 4,885, which at present gives the inventor six months within which to pay his final fee, the patent bearing date of the day of issue. He proposes that the term of a patent shall begin with the date on which the application was passed and allowed. This would do away with the inducement presented to draw out the term, practically speaking, for six months.

He would also have statute 4,887 amended so that a foreign patent would be without influence upon an American patent to the same inventor. He would have an American patent grant the seventeen years of protection to the patentee without regard to the expiration of any foreign patent he might take out. This statute also interferes with any advantage patentees of inventions might obtain from the "International Union for the Protection of Industrial Property." The Commissioner is very decided in his views as to the expediency of expunging this section from the statute books, or of modifying it materially.

The subject of assignments of patents is considered. At present such instruments must be filed in the Patent Office within three months of the date thereof. The Commissioner recommends that the statute should be amended so that filing at a later date shall be valid against subsequent purchases or mortgages. The correction of errors in payment of fees, it is recommended, should be in the hands of the Commissioner, even after such money has been paid into the treasury.

The abuse of the period of two years allowed for completion of the application for a patent is spoken of. It is perfectly possible under this rule (section 4,894) to prolong an application for a number of years, and this is sometimes done. A granting of discretionary power to the Commissioner is recommended, by which he shall be able to declare cases closed for want of prosecution.

Other points of less interest are treated, and toward the end of the report the "destruction of some of the coils of the patent system" is spoken of. The Commissioner supports the patent system as productive of great good, admitting that it would seem entirely proper for the government to have the power of extinguishing a patent by paying a proper sum to the owners thereof.

During the year 1887, 21,378 patents for inventions and designs were issued; 34,420 applications for such patents were received. The total receipts were $1,144,509.60; excess of receipts over expenditures, $150,037.38; total balance in treasury to credit of Patent Office, $3,257,490.91.

Underground Wires in New York.

A law for placing electric wires under the streets and removing the poles is now in operation. It is in charge of the Board of Electrical Control, consisting at present of Mayor Hewitt, Jacob Hess, Theodore Moss, and Henry S. Kearney. It appears from their first annual report that a construction company (the Consolidated Telegraph and Electrical Subway Company) is authorized to construct the subways designed by the commission, and to permit the use of them by electrical companies upon fair and impartial terms.

Over the excavations of this construction company in the streets, the local authorities, represented by the commissioner of public works, have full control.

Its profits are limited to ten per cent on the money actually invested by it in carrying out the directions of the commission—the excess going to the city; and to all its books and accounts the local authorities, represented by the comptroller, have access.

A provision of law makes it incumbent upon the board to give to companies operating conductors overhead ninety (90) days of notice for the removal of their overhead wires after a sufficient construction of subways has been made ready in any street or locality—reference being had to the general direction of the wires in use; and in the event of the companies so notified not removing their poles and wires from the street before the expiration of the ninety days of notice, it is provided that the local authorities shall thereupon remove them.

The total length of tranch excavated for the laying of subways since July, 1887, is 189,918 feet.

The total construction of single duct for telephone and telegraph service is 903,180 feet, to which must be added 4,050 feet for distributing service and connections to central stations.

Estimating 80 wires per single duct, the total capacity for telegraph and telephone service is 72,254,400 feet or about 13,700 miles of wire.

The total construction of single duct conduit for arc lighting and power service is 254,250 feet, and the capacity of this conduit may be estimated as sufficient for 2,542,500 feet, or nearly 500 miles of wire.

In addition to the above, the number of feet of conduit for incandescent lighting is 186,745, containing 560,235 feet of conductors.

The capacity of conduit provided in the city of New York during the existence of the Board of Electrical Control is considerably greater than there is in any city in the world, so far as the information of the board extends; and notwithstanding the great difficulties which surround this whole subject in this city, which has a greater mileage of wire than any other, and where the circumstances of underground construction are as difficult as in any other, the conversion of the present overhead to an underground system is a fact about to be accomplished, to a very great extent at least, in the near future.

Already the Western Union Telegraph Company is occupying the conduits which have been constructed, with some five hundred miles of wire. The Metropolitan Telephone & Telegraph Company has some one thousand miles of wire in the subways; and the Edison Illuminating Company, whose conductors were laid in the trench at the time of construction, has, as has already been said, more than one hundred miles underground.

The Metropolitan Telephone & Telegraph Company, the Western Union Telegraph Company, the Brush Electric Light Company, and others, are preparing to enter the subways at many points, and should the efforts of the board be seconded by energetic action on the part of the local authorities when the ninety days of notice has expired, many of the streets must necessarily be freed from the dangerous and unsightly pole systems.

The policy of the board is to insist upon the electrical companies converting their overhead systems to underground systems as rapidly as is consistent with the convenient use of their service by the public, and where companies in good faith are making preparations to enter the subways, no harsh measures seem desirable.

So many considerations of preparing proper conductors, drawing them in, making connections, and testing their efficiency, enter into the problem of removing overhead wires from any particular street or locality, that in very many cases the ninety days allowed by law may very properly be extended, and must be extended, to avoid serious injustice to the companies and inconvenience to their customers.

The electric light conductors are very dangerous both to life and property whenever improperly insulated; and improper insulation of these dangerous and deadly wires is to be found almost everywhere throughout the city. The only regulations affecting the use of electrical conductors in the city of New York prior to the organization of this board were a few resolutions of the board of aldermen which have never been, so far as this board is able to ascertain, at all regarded or complied with; and the provisions of the fire underwriters in reference to the insulation of the arc lighting and power wires, which, though probably sufficient to protect property if strictly adhered to, are of little avail, owing to the absence of proper inspection and supervision of the wires from time to time, as their insulation becomes affected by the elements and by natural decay and deterioration.

DECISIONS RELATING TO PATENTS.

Supreme Court of the United States.

LAWTHER *vs.* HAMILTON *et al.*

Mr. Justice Bradley delivered the opinion of the court.

Letters patent No. 168,164, granted to Alfred B. Lawther, September 28, 1875, for improvements in processes for treating oleaginous seeds, declared valid and to have been infringed.

The omission of one step of an old process with an improved result constitutes a new process.

Where the new process requires greater care, or even greater skill, on the part of the workmen than formerly, it does not change its character as a process or materially affect its utility.

A patent sufficiently describes a process when by the aid of the knowledge derived from the state of the art the same may be carried out from the description in the patent by those skilled in the particular manufacture.

A claim for a process consisting of several steps may be limited by the state of the art and the description in the patent to the instrumentalities or their equivalents as thus described, which are essential in the carrying out of the process claimed.

Supreme Court of the United States.

DREYFUS *et al. vs.* SEARLE.

Letters patent No. 48,728, granted to John Searle, July 11, 1865, for a process for imparting age to wines, declared invalid for lack of patentable invention.

The application of artificial heat to ripen wine being old, and the application of artificial heat to the outside of casks to ripen wine contained therein being old, it did not require invention to apply artificial heat to the inside of the casks to ripen the wine in the same.

There was no invention in applying steam pipes to the interior of a cask for the purpose of heating the wine contained therein, steam pipes having been previously applied to the interior of a closed tub for the purpose of heating water in the same.

MILITARY NOTES.

Eiserne Portionen (rations of iron) is the name given by the *Militar Wochenblatt* to the canned provisions which the German soldier is now compelled to carry in his knapsack or haversack, not for immediate consumption, but for use at those times when his command is removed from the base of supplies or the quartermaster's department is short. It says: "These victuals of iron are, during war, to be used on the evening preceding a great battle, or, better, when, the army making a sudden change of front, the convoys are for a day or two retarded." Much of this canned provision is put up in America, and is said to be both better and cheaper than the German. The 7th corps (Westphalian) commanders have recently experimented with canned chocolate and cocoa, which, though seemingly light refection for a marching column, has, on the contrary, been found excellently adapted.

The report made to the French Chirurgical Society by the surgeons who examined the bodies of the soldiers killed by the explosion of *melinite* at Belfort shows, as printed in *L'Avenir Militaire*, that the effects of this new explosive are even more to be dreaded than was supposed. Of the 17 men hit, only six lived. The bodies of the slain, it is said, were literally torn into shreds, and it is the belief of Dr. Tachard and his assistants that much of the substance exploded only after entering the bodies, or, in other words, that melinite as now compounded explodes at different periods, some early, some late; the first bursting the shell into fragments, and the latter, adhering to these fragments, exploding when driven home. They remarked on the absence of burns and of poisoning. The bodies of the wounded were found to be tattooed as if with explosive dust.

The French military authorities have recently issued stringent orders regarding the observance of the Sabbath day, and an over-zealous officer, Colonel Pons, commanding the 3d Infantry of Marine, who insisted upon calling out his men for practice on Sunday, has been sent to the penal colony—New Caledonia.

That grand old ship the Victory, Nelson's flagship off Cape Trafalgar, when he encountered and beat the combined French and Spanish fleet, October 21, 1805, was recently found to be in a sinking condition, but, happily, has been saved, and now, after weathering the storms of a century, rides at anchor in Portsmouth harbor. A plate fastened to her quarter deck marks the spot where the great admiral, shot through the body by a musket ball, survived only long enough to see the enemy strike his colors.

The *Revue Militaire de l'Etranger* says the Russians are constructing sledges at Stanislau for the transportation of field artillery through the snow. It says, as quoted by the *Broad Arrow:*

"A stout log of timber, destined to support the axletree, is placed in the longitudinal axis of the sledge and stoutly secured. The gun carriage is run trail first over the sledge, the width of which, being less than the track of the wheels of the gun, renders this possible. The under surface of the axletree being made to rest on the log above mentioned, the wheels are removed and placed over the trail. Provision is made for the security from injury of the elevating gear. The axletree arms and trail are now secured by lashings, as also the wheels. The whole rides with sufficient stability, and the axletree seats, if any, may be occupied by two gunners. The limber is similarly disposed on a second sledge, except that no log is here necessary to support the axletrees. The pole (or shafts) may be lashed between the 'sabots' of the sledge. Three gunners may be seated on the limber boxes."

Compare this complicated apparatus with the simple plan adopted by Bonaparte when, in his first Italian campaign, he dragged his cannon over Alpine snows, set in grooves roughly hewn out of the trees which the soldiery felled, the wheels set, pair by pair, astride of mules and horses. Field guns, it is true, are larger now than they were then, but knowing as we do, from subsequent tests, how great was the ingenuity of the great master of war, there can be little doubt he would have suggested to himself a ready means of handling heavier material of like kind. Ready wit is worth a deal of preparation!

The Italian expeditionary army, encamped in the fortified town of Massowah, Abyssinia, and now awaiting the attack of King John, are said to be under fine discipline, notwithstanding the ravages of the fever. The Italian foot soldier bears fatigue poorly, if he is correctly reported, though the corps called Bersagliers, recruited from the Italian Alps and Apennines, is hardy and enduring. At Dogali, where a previous Italian expeditionary force were slaughtered almost to a man, the Abyssinians captured many stands of arms of the repeating type, with a store of ammunition pertaining to the same, and it is said a portion of the enemy's force are armed with these rifles. King John's lieutenants, Negus and Ras Alula, and most of their men, are of Coptic, that is to say Christian, extraction. They are big men, hardy, courageous, and intelligent, and since only one of the many armies sent against them in recent years succeeded—it was that under Lord Napier of Magdala—they are by no means to be regarded as a despicable foe. Lord Napier carried the war, without delay, into the very heart of their country, and thus gave them no time for preparation, and the terrible fever no chance to spread among his troops. The Italians, on the contrary, have been playing a waiting, and what old African soldiers regard as a dangerous, game, and there is authority for the report that they have tired of this, and will soon re-embark for Naples, as the rainy season is about to set in.

The Austrians are busily strengthening the fortifications of Pola, which has become the headquarters of the Austro-Hugarian navy. Pola is at the extremity of the Istrian peninsula, which protrudes 60 miles into the head of the Adriatic and flanks the approaches to the two principal commercial harbors of the empire, Trieste and Fiume, and commanding what may become the hostile port of Venice. Austria is looking to acquire a port in the Ægean Sea. Her navy consists of 11 ironclads, 2 unarmored cruisers, 5 corvettes, 39 torpedo boats, 8 river monitors—the same being manned by 9,000 men.

Government Telegraphy.

Nearly all the discoveries and improvements in telegraphic science have been American. The specially American demand for the improvements stimulated the most ingenious and ambitious operators in our telegraph companies to discover newer and better methods. There were many rival lines of telegraph, and competition between them was fruitful in efforts to acquire greater control over electricity, and get out of it faster and cheaper work. To all these inventors Senator Edmunds stands in his place in the United States Senate and gives notice: "If my postal telegraph bill becomes law, the Secretary of War will have power to seize your devices and machines, and use them in the government service; and if you and he cannot agree upon a price for them, your only remedy will be to sue the government in the Court of Claims, with the privilege, if dissatisfied with its award, of appealing to the Supreme Court." Whatever influence this language, perfected into law, may have on other things, it will end telegraphic invention. That is dead sure. Research and endeavor in this most delicate and elusive department of science will no longer have the encouragement of large reward and a competitive market. The admirable business of these finely organized men, who lead lives of ingenious experiment and patient trial, will be struck with paralysis in face of the brigand purpose of the government to seize their devices, and to drive them to the cost and heart-breaking of law suits.

And what will become of our business of commercial and social telegraphy, thus stolen from private ownership and corporate management? It is now the best in the world. Why? Its owners are Americans, driven to unceasing endeavor in their business by unceasing competition. Its managers are Americans, who cannot be matched for administrative ability and technical knowledge. Its operators are Americans, exceptionally intelligent and skillful. Indeed, the Western Union Telegraph is the most distinctive American institution in the United States. But within a year after the government should get hold of it, it would be impossible to recognize it, so wholly would it have lost every characteristic excellence. For government telegraphy will be a flat failure. It will be a failure: First, for want of the stimulus of private ownership spurred by competition; secondly, because the most skillful, brightest, and manliest of the operators will not accept public service, there being no future in it, and a government clerkship being to them a descent in life; thirdly, because these skilled specialists would scorn to be officered by politicians who have no knowledge of the business of which they are justly proud; fourthly, principally for the reason that the skilled men who, as superintendents of divisions, now manage the business and plans of the great telegraph lines, could not be drawn into the public service.

Federal office holding is the business of second rate and third rate men; of men who drop their muskets in the battle of life and straggle to the rear; of men willing to exchange large possibilities for small certainties. The corporate telegraph managers, on the other hand, are first rate men and high priced. When they leave the wires, as they are constantly tempted to do in every direction, they go upward in responsibility, rank, and pay, and never go downward. Mr. Hughitt, the president of the Chicago and Northwestern Railroad Company, confessedly the best railroad man in America, started on his upward career as a telegraph operator under the great Tom Scott, with but a common school education. His schooling on the wires, in and out of a railroad station and on its platform, was worth a dozen university educations. Fifty thousand dollars a year would not draw this great administrator into the management of a government telegraph, either as Postmaster-General or Superintendent.

Among the great steel rail makers and iron masters of the world are the Brothers Carnegie, of Pittsburg. Each in unaided youth was a telegraph operator on the Pennsylvania Railroad. Each left the wires for higher service and larger pay in railroad management. Both went as part purchasers and managers into a Bessemer steel mill on the line of the road. Sheer volume and quality of brain, inspired by a genius for organization and command, and directed by courage and morality, carried them to the summit of industrial success. A column of this paper would not suffice for the mention of the promoted operators, officers of the Western Union Telegraph Company, of kin in quality to the Carnegies and Hughitt, who have been captured from the wires by great railroads, banking institutions, and manufacturing corporations, and carried off to superintendency on high pay. It is officers like these who have given success to American telegraphy. Politics attract not these men. To them public employment is a tomb for the young and an asylum for the aged. In the case of the chief of them, to whom the government would naturally turn for management of a telegraph plant to include over 53,000 post offices, we do not believe that the Presidential salary would tempt Gen. Eckert to think of undertaking it.

Bad enough will be the case of the government's postal telegraph without adequate general and division officers to manage it, capable and ambitious men, trained in every department of their business. It has been truthfully said that, excepting a woman's spring bonnet, nothing quicker gets out of usefulness than a telegraph line not constantly looked after.

In corporate telegraph service the operators live and work under discipline. The conditions of employment are fidelity, industry, and obedience to rules. For want of these virtues operators lose their places. Transmute these men, by act of Congress, into federal office holder, straightway they pass out from the discipline of a well managed corporation, and take life easy in the short hour, go-as-you-please ways of a government department.

We warn the people of the United States that if they permit the system of telegraphy they now enjoy to be carried off into the Post Office Department, government telegraphy will as surely be a failure in America as it has been in Europe.—*N. Y. Sun.*

Cities of Half a Million and Over.

London, England	3,955,819
Paris, France	2,269,023
Canton, China	1,500,000
New York, N. Y.	1,400,000
Aitchi, Japan	1,332,050
Berlin, Prussia	1,122,330
Changchoofoo, China	1,000,000
Sian, China	1,000,000
Tschautchau-fu, China	1,000,000
Tokio, Japan	987,887
Sartama, Japan	962,717
Tien-tsin, China	950,000
Philadelphia, Pa	850,000
Hang-tcheon, China	800,000
Pekin, China	800,000
Tschingtu-fu, China	800,000
Woo-chang, China	800,000
Brooklyn, N. Y.	771,000
St. Petersburg, Russia	766,664
Calcutta, India	766,298
Vienna, Austria	720,105
Chicago, Ill	715,000
Constantinople, Turkey	700,000
Foo-choo, China	630,000
Moscow, Russia	611,974
Hang-chow-foo, China	600,000
Hankow, China	600,000
Liverpool, England	573,000
Glasgow, Scotland	514,043
Pekalonga, Java	505,204
Madrid, Spain	500,900
Bangkok, Siam	500,000
King-te-chiang, China	500,000
St. Louis, Mo.	500,000
Tat-seen-loy, China	500,000

An Automatic Electric Chess Recorder.

Dr. Wurstenberger, of Zurich, Switzerland, has constructed an electrical machine that records the movement of chess men on the usual board. It is now at work in London. The record is printed on a paper strip, like the stock printing machine. A print is made when a chessman is taken up or removed from the board; also when set down on the board. It is a very complicated machine.