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No. 790.

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PATENT OFFICE REPORT FOR 1890.

The Commissioner of Patents is required to make two reports annually, one in the middle of the year, to the Secretary of the Interior, and one at the close of the year, to Congress.

The annual report to Congress for the year ending Dec. 31, 1890, has lately been presented, from which it appears that the business of the Patent Office has been well maintained. In 1890 the number of applications for patents made was 41,048, an increase of 500 over the previous year. The number of patents issued for 1890 was 26,292.

The State of New York takes the lead in respect to number of patents, 4,585 having been issued to her citizens, 2,641 to Pennsylvania, 2,152 to Illinois, 2,096 to Massachusetts, 1,762 to Ohio, 1,112 to New Jersey; Mississippi, 55.

In respect to patents and population, Connecticut takes the lead, one patent having been granted to 796 of population; District of Columbia, 1 to 980; Massachusetts, 1 to 1,068; New York, 1 to 1,308; Mississippi, 1 to 23,447.

The receipts of the Patent Office for 1890 were $1,340,372, and the expenses $1,099,297, leaving an excess of receipts over expenditures of $241,074.

The total balance to the credit of the patent fund now in the Treasury is $3,872,745.

Commissioner Mitchell in his report says:

"The first need of the Patent Office is additional room. During the past year the utmost effort and ingenuity have been rendered necessary in order to find space even for copies of patents as they have been produced from week to week. The income from these copies during the past year has been upward of $60,000. They have been stored in various parts of the building, upon different floors, in different halls and corridors, and only by the most careful systemization is a searcher, however experienced, enabled to know in what hall, corridor, or cranny he must look in order to find a particular patent. During the past year the office has been compelled to appropriate to other uses one of the rooms occupied by inventors and their attorneys for the purpose of inspecting their pending applications, and the consequence is that the remaining room, which has only 23 feet square of floor space, is overcrowded and every day occupied by more than thirty persons at a time. An effort is now being made to restore to the inventors and their attorneys the use of the other room formerly occupied by them. This will be accomplished, if at all, by walling off a space in the already crowded model halls. The Scientific Library, containing about 60,000 volumes, is crowded into disconnected rooms and galleries, appropriated from one of the model halls. The rooms of the examining divisions are overcrowded; some of them are unhealthy at best; others are rendered unhealthy by their crowded condition. From all parts of the office arises a daily demand for additional room, which cannot be supplied, but which must, nevertheless, be supplied if the Patent Office is to do its work at all. It is nearly ten years since my predecessors directed attention to this imperative need. Not a report has been made to Congress during the intervening decade which did not dwell upon the necessity for additional room, and with increasing emphasis from year to year. Meanwhile the amount of work annually transacted has nearly doubled; meanwhile the records and copies have vastly accumulated; meanwhile the number of rooms and the extent of space occupied by the Patent Office have become gradually less and less. During the last six years the patrons of the Patent Office have paid into the Treasury over a million of dollars in excess of every expenditure of every kind, either by the Patent Office or by the Department of the Interior for the benefit of the Patent Office. The net income of the present year is greater than it was during the year before. Last year it was greater than during the prior year. The inventors of the country cannot understand why their money is taken while adequate facilities are denied. The policy of making the Patent Office a permanent source of revenue—a bureau of taxation for the general purposes of the government—has never been advocated, so far as I know, by any one. The time will soon arrive when it will be impossible to discharge the functions of this bureau unless some provision is made to afford relief for its overcrowded condition; and I earnestly request that that relief may be afforded."

The circulation of the *Official Gazette* is 7,000 copies per week, of which 3,576 copies are given away to members of Congress and other public officers, balance sold at $5 a year. The cost of the *Gazette* is $61,439, or about $44,000 a year more than is received, nearly all of which comes out of the inventors.

The Commissioner strongly urges upon Congress the necessity for an increased force in order to facilitate and perfect the system of official examinations. He calls attention to the inadequacy of the present salaries paid to examiners, and urges a reasonable increase. He recommends a resumption of the work of making an abridgment of all patents, as it would greatly facilitate the work of examination, and enable inventors and their attorneys to make their own examinations.

The laws relating to the date of patents, respecting trade marks, limitation of patents, interference proceedings, need, in the opinion of the Commissioner, to be modified. The report, taken as a whole, is a most able and interesting document.

IMPROVEMENT NEEDED IN SECONDARY BATTERIES.

The late Gaston Planté, the originator of the first practical secondary battery, was in some respects like Faraday.

He prosecuted his scientific investigations for the love of science and for the benefit his labors might confer in the future on science and the arts, rather than from any immediate pecuniary benefit he might derive from his work.

The invention of the Planté secondary element bears much the same relation to recent secondary batteries that Faraday's discoveries in induction bear to the dynamo. Both are fundamental, and of great scientific and commercial importance, and both are represented by a host of modern inventions, but it is after all a question whether the highest perfection has been attained in these lines, notwithstanding years of development. Cannot recent results, as wonderful as they appear, be surpassed? We believe they can. In secondary batteries, for example, there are at least three chances for improvement, viz., in efficiency, in durability, and in the matter of weight.

The efficiency of the secondary battery, as compared with alternate transformers, is as 0·72 to 0·94. In point of durability, improvement is much needed. The question of weight is of little importance in a stationary plant, except in so far as it contributes to cost; but in portable batteries, undue weight becomes a serious drawback.

The weight per horse power hour of the Planté battery is 396 pounds; that of the Faure, according to Sir W. Thomson, is 165 pounds; while that of the E. P. S. battery is about 135 pounds. What is wanted is a lighter, more durable, and more efficient element. It is not likely that marked improvement can be made without patient, well directed effort, but we know of no field of invention more promising than that to which we refer.

The endeavor of the investigator in this line should be to inaugurate a new departure. This, we know, is easier said than done. It involves discovery rather than invention, which means months and possibly years of careful searching and experiment; but the prospective reward warrants patient and intelligent labor.

Detecting Olive Oil, Butter and Oleomargarine.

The reagent employed is a solution of silver nitrate at 25 per 1,000 in ethylic alcohol at 95°. About 12 c.c. of the oil in question and 5 c.c. of the reagent are placed in a test-tube. The tube is then set in a beaker of boiling water, and the changes of color which take place in the liquids are watched through the glass. Unless the oils are perfectly limpid, they must be previously filtered. Olive oils sooner or later take a fine green color, which is lighter in the superior qualities. Pure cotton-seed oil is turned completely black. Oil of earth nuts (*Arachis*) takes first a red-brown color and finally turns green, losing its transparency. Oil of sesame takes a deep red color and remains reddish. Oil of colza takes yellowish green colors and becomes turbid. Natural butter preserves its natural color. Oleomargarine becomes a brick red, which color may be detected even in samples containing as little as 5 per cent of margarine.—*Raoul Brulle.*

THE number of retail liquor dealers in the United States, according to the official returns of the officers of the internal revenue for the year ending May 1, 1890, was 185,868, or 1 liquor dealer to every 275 inhabitants, on the basis of the census of 1880. In New York there was 1 retail dealer in distilled liquors to every 150 inhabitants; in New Jersey, 1 to 175; in Ohio, 1 to 230; in Pennsylvania and Massachusetts, 1 to 400; in Indiana, 1 to 325; in Delaware, 1 to 160; and in California, 1 to 75. The average in all the States which have general license laws is 1 dram shop to 250 inhabitants. In Maine there is 1 retail dealer in distilled liquors to every 750 inhabitants; in Vermont, 1 to 820; in Iowa, 1 to 520; and in Kansas, 1 to 800.

THE director of the central dispensary at Bagdad has sent to *La Nature* a specimen of an edible substance which fell during an abundant shower in the neighborhood of Merdin and Diarbekir (Turkey in Asia) in August, 1890. The rain which accompanied the substance fell over a surface of about ten kilometers in circumference. The inhabitants collected the "manna," and made it into bread, which is said to have been very good and to have been easily digested. The specimen sent to *La Nature* is composed of small spherules. Yellowish on the outside, it is white within. Botanists who have examined it say that it belongs to the family of lichens known as *Lecanora esculenta.*

Detection of Flaws in Metal.

An instrument for detecting flaws in metal castings and forgings, which is called the schiseophone, has been invented by Captain De Place, of Paris. The apparatus, says the London *Times*, consists of a small pneumatic tapper worked by the hand, and with which the piece of steel or iron to be tested is tapped all over. Connected with the tapper is a telephone, with a microphone interposed in the circuit. Two operators are required—one to apply the tapper, and the other to listen through the telephone to the sounds produced. These operators are in separate apartments, so that the direct sounds of the taps may not disturb the listener, whose province it is to detect flaws. The two, however, are in electrical communication; so that the instant the listener hears a false sound, he can signal to his colleague to mark the metal at the point of the last tap. In practice, the listener sits with the telephone to his ear; and so long as the taps are normal, he does nothing. Directly a false sound—which is very distinct from the normal sound—is heard, heat once signals for the spot to be marked. By this means he is able not only to detect a flaw, but to localize it. Under the auspices of the Southeastern Railway Company, a demonstration of the sch seophone was given recently by Captain De Place at the Charing Cross Hotel, in the presence of several members of the Ordnance Committee and other government officials. Some samples of steel, wrought iron, and cast iron, which had been specially prepared and privately marked, were tested, and in many cases the flaws therein were correctly localized by the instrument. On the other hand, some bars were broken at points where a flaw was indicated, but where the metal proved perfectly sound. Consequently, however ingenious the invention may be, it can hardly yet be called a practical success.

Trees and Shrubs in Grass.

The inquiry is made for the treatment of trees and shrubs growing in a smooth lawn, so as to retain their richness and vigor, the well known retarding influence of a dense grass surface tending to give them a feeble and stunted appearance, with moss on their stems. The two leading remedies are fertilizers and a free natural or inherently strong growth. By the selection of the most vigorous growers, we may overcome partly the natural difficulty, which will apply to shade trees as well as the larger shrubs. The smaller shrubs will need, at least in their earlier years, a mellow and rich soil, and if set in small groups or beds, the grass ground in which they stand should be a circular or elliptical bed, kept clean and mellow and occasionally enriched with the application of such fertilizers as experience has proved best adapted to that locality. These beds should be simple and unobtrusive in their form, the ornament consisting in the fine growths which they contain. Arabesque beds, or those of fanciful shape, are only adapted to low-growing bulbous plants, or to annuals or herbaceous perennials which will not hide the outline. There are, however, many strong-growing perennials which will maintain their vigor entirely in grass, after a few years of cultivation. It is better to have fewer plants under the best care and in the best condition than a promiscuous assemblage which is crowded and stunted.

The check which is given to young trees by standing in grass will vary much with the condition of the grass. A tall and dense crop of timothy and clover will generally be too much for even strong trees of younger growth, sometimes destroying newly set ones. A meadow is not the place to set young trees. A sheep pasture is much better, the trees being shielded from their attacks. If kept always grazed short, the condition is still better. The want of the rank foliage checks the roots, and there is a shorter growth of them. Hence the reason that a closely shaven lawn is a better place for trees. When the lawn is top-dressed annually with a suitable fertilizer, it is in every way a more favorable place than a dense meadow, or even a rich pasture, care also being taken to let the clippings of the lawn mower fall to the ground where they are cut. The natural dressing of the falling leaves may be superseded by the annual application of the fertilizers at the same season of the year. It is important to let the clippings remain, as they aid in preserving the moisture of the soil, which otherwise might be dissipated by the heat of the sun's rays.

As a general rule for treatment, therefore, plant no trees in a meadow, nor in ground of a similar character. Strong growers may do in a grazed pasture, if shielded from the animals, and if mulched broadly while young. Finished lawns are still better if annually top-dressed, and the clippings from the weekly mowings remain on the ground. Best of all is a clean, mellow, cultivated surface, wide enough for a free extension of the roots. Large trees strike their roots deeper, and may do in heavy grass.

The fertilizers which may be used will vary with the condition or character of the soil. Bone ash has a great effect on some soils only; nitrate of soda on others; and wood ashes or land plaster on others—each to be determined by trial. Coarse barn manure, although nearly always a strong aid to growth, is too repulsive to be spread in lumps on a lawn near the dwelling, and the only shape in which it may be used is in a fine compost, or in old manure broken fine and spread evenly by passing through a Kemp spreader.

It should be well understood in this connection that the smaller fruits, as raspberries and currants, as well as dwarf pears, should stand in clean, well cultivated ground in all cases, and receive a due share of fertilizers, although dwarf pears after becoming well established may succeed in closely shaven grass, provided the ground is kept annually enriched with manure. These rules are not laid down as unalterable, but are to be modified according to the natural fertility and fitness of the soil.—*Country Gentleman.*

Water Power of Lake Superior.

Colonel Hope, of London, has, says the *Canadian Manufacturer*, organized a company for utilizing the enormous water power of Lake Superior and constructing very extensive works in the vicinity of Sault Ste. Marie. The waters of Lake Superior fall at the Sault about 30 feet to the level of Lake Huron, and the velocity has been recorded by General Powell, of the United States service, as a little more than 90,000 cubic feet a second. Colonel Hope, who has just returned from spending several weeks on the spot, made careful and accurate measurements and calculations, and finds the actual velocity and volume of water to be 122,000 feet per second, equivalent to 236,000 horse power. His company intend to build a tail race five miles long on the Canadian side and a canal five miles long on the American side. These canals will be each 1,000 feet wide, the widest in the world. They will construct large dry docks on both sides, to be filled and emptied by gravitation. They will be the only dry docks in the world, so far as Colonel Hope knows, filled and emptied by this method. On the Canadian side all the principal works will be above the rapids, and on the American side below the rapids. The reason of this is that the land for factories and mills is furnished on the Canadian side above and on the American side below the rapids. There will be blast furnaces and ship yards, and it is expected that there will be paper mills, pulp mills, flour mills and other industries, whose motive power will be supplied by this company, or by one of the several subsidiary companies which it is the intention of Colonel Hope's company to form.

Dr. James Croll.

The death is announced at Perth of that distinguished writer, Dr. James Croll, F.R.S., in his 70th year. Dr. Croll had been suffering for a long time from a mortal malady, but remained at his work almost to the last. Without any of the advantages of early scientific training, Croll raised himself from a very humble social position to that of a recognized authority in his special subjects, notably those connected with the relation of climate to geological phenomena. Some years ago, by the influence of Sir A. Ramsay, Croll, then resident in Glasgow, was appointed an officer of the Geological Survey of Scotland. Although best known by his work on "Climate and Time," he was the author of several others, such as "Climate and Cosmology," "Stellar Evolution," and the "Philosophy of Theism." The originality of his views frequently brought him into controversy with scientific men, who, differing from his opinions, learned to respect him as a doughty atagonis* who had something to say and knew how to say it.

American Lace Curtains.

Messrs. John Bromley & Sons, of Philadelphia, Pa., who at present employ about 2,000 hands making rugs and chenille curtains, have decided to commence the manufacture of lace curtains. Mr. J. H. Bromley has been to England, and after long and careful examination of the various makes of lace machines has placed the order for the whole of the machinery and apparatus necessary to make the finished and taped curtains from the raw material with Mr. John Jardine, of Nottingham.

We understand that Mr. Jardine has undertaken to produce 5,000 pairs of finished curtains per week, in Philadelphia, before turning over the plant to Messrs. Bromley.

Coal in Tonquin.

The seams of coal have been known for something like half a century. They crop out all round the bases of the lowish hills which fringe the shores of the Gulf of Tonquin. One of the seams is 152 feet thick, of almost solid coal. It is a semi-anthracite of very fine quality, having about 87 per cent of fixed carbon and from 7 to 12½ per cent of volatile matter, from 2 to 3 per cent ash, free from pyrites, and of course quite smokeless.

A NOVEL self-acting electrical balance was recently exhibited in Paris. The object to be weighed was placed in the pan, by which the circuit was closed and the motor put in operation which moved the weight out on the beam of the balance. When the equipoise was established the circuit was broken. Upon emptying the pan the weight returned.

Centennial Celebration of the American Patent System at Washington.

This promises to be one of the most interesting and memorable affairs of the day. The following is the preliminary programme:

First public meeting,* afternoon, April 8, 1891. To be presided over by the President of the United States.

Second public meeting, April 8, 7 to 8:30 P. M. To be presided over by the Hon. John W. Noble, Secretary of the Interior.

Special reception to inventors and manufacturers and the ladies who accompany them, at the Patent Office, April 8, 9 to 11:30 P. M., by the Hon. John W. Noble, Secretary of the Interior, and the Hon. Charles Eliot Mitchell, Commissioner of Patents.

Third public meeting, afternoon, April 9. To be presided over by Hon. Frederick Fraley, LL. D., President of the National Board of Trade and the American Philosophical Society, and charter member of Franklin Institute.

Fourth public meeting, evening, April 9. To be presided over by Professor S. P. Langley, LL. D., Secretary of the Smithsonian Institution.

Anniversary Day, April 10.—Anniversary of the signing of the first American patent law—"An Act to Promote the Progress of the Useful Arts"—by George Washington.

10 A. M. Excursion to Mount Vernon, where an address will be delivered by J. M. Toner, M. D., of Washington, upon "Washington as an Inventor and Promoter of Improvements."

Fifth public meeting, evening, April 10.—To be presided over by Prof. A. Graham Bell. Addresses† upon the following subjects are promised at the public meetings:

Edward Atkinson, Ph. D., LL. D., of Massachusetts.—Invention in its Effects upon Household Economy.

Dr. John S. Billings, Curator, U. S. Army Medical Museum. — American Invention and Discoveries in Medicine, Surgery, and Practical Sanitation.

Hon. Samuel Blatchford, Justice of the Supreme Court of the United States.—A Century of Patent Law.

Cyrus F. Brackett, M. D., LL. D., of New Jersey, Henry Professor of Physics, College of New Jersey, Princeton.—The Effect of Invention upon the Progress of Electrical Science.

Hon. Benjamin Butterworth, of Ohio, U. S. House of Representatives.—The Effect of our Patent System on the Material Development of the United States.

Octave Chanute, of Illinois, President of the American Society of Civil Engineers.—The Effect of Invention upon the Railroad and Other Means of Intercommunication.

Professor F. W. Clarke, S. B., of Ohio, Chief Chemist U. S. Geological Survey.—The Relations of Abstract Scientific Research to Practical Invention, with Special Reference to Chemistry and Physics.

Hon. John W. Daniel, of Virginia, U. S. Senator.—The New South as an Outgrowth of Invention and the American Patent Law.

Major Clarence E. Dutton, Ordnance Department, U. S. A.—The Influence of Invention upon the Implements and Munitions of Modern Warfare.

Thomas Gray, C. E., B. Sc., F. R. S. E., of Indiana, Professor of Dynamic Engineering, Rose Polytechnic Institute, Terre Haute.—The Inventors of the Telegraph and Telephone.

Professor Otis T. Mason, Ph. D., of Virginia, Curator U. S. National Museum.—The Birth of Invention.

Hon. Charles Eliot Mitchell, of Connecticut, Commissioner of Patents.—The Birth and Growth of the American Patent System.

Hon. O. H. Platt, LL. D., of Connecticut, U. S. Senator.—Invention and Advancement.

Col. F. A. Seely, of Pennsylvania, Principal Examiner U. S. Patent Office.—International Protection of Industrial Property.

Hon. A. R. Spofford, LL. D., Librarian U. S. Congress.—The Copyright System of the United States; Its Origin and its Growth.

Hon. Robert S. Taylor, of Indiana.—The Epoch-making Inventions of America.

Robert H. Thurston, A. M., LL. D., Doc. Eng., of New York, Director and Professor of Mechanical Engineering, Sibley College, Cornell University. — The Inventors of the Steam Engine.

William P. Trowbridge, Ph. D., LL. D., of New York, Professor of Engineering, School of Mines, Columbia College.—The Effect of Technological Schools upon the Progress of Invention.

Hon. Edwin Willits, of Michigan, Assistant Secretary of Agriculture.—The Relation of Invention to Agriculture.

Hon. Carroll D. Wright, M. A., of Washington, Commissioner of Labor.—The Relation of Invention to Labor.

*It is proposed to hold meetings for the organization of the National Association of Inventors and Manufacturers on the afternoon of April 7, and in the morning on April 8 and 9, and at such other times as may be necessary.

†Addresses are also expected from prominent inventors and manufacturers at the meetings for the organization of the National Association.