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"PATENT PERFIDY."

Under this heading the *Prairie Farmer* devotes a long column to a denunciation of the patent system, exhibiting in its worst phase the spirit of unreason which just now pervades so large a portion of the agricultural world with respect to patent rights.

The grounds for complaint against the patent system appear to be in substance two: First, under its fostering influence inventors are continually introducing new machines, and improvements on old ones, which farmers cannot afford to do without; Second, the manufacturers of the improved machines actually charge money for them, and often get rich by making and selling them in large numbers. Incidentally the manufacturers are given to the wholesale purchase of patent rights from inventors, and erecting upon them greater "monopolies," to "the vexation of the public." In this way the beneficent purpose of the Patent Office, they tell us, has been and is constantly perverted, and the institution turned into an "engine of fraud and oppression."

This perversion of patent rights, our contemporary goes on to say, "presses harder on the farmers than upon any other class of the community. The necessities of existence compel the farmer to keep abreast of the times in all the mechanical improvements in the implements of his business. The penalty of not keeping up is worse than falling behind: it is that of going under. If he does not use the average quality of labor-saving machinery he cannot compete with those who do, and if he cannot compete he cannot live in a country where labor and the cost of living are high. Even his manual labor, separated from machinery, is comparatively valueless, so that, if he cannot use improved implements of his own, he must perforce hire out to use those of his more fortunate or more enterprising neighbors."

It is terrible to contemplate the pressure thus brought to bear upon farmers by this fertility of our inventors, and somewhat amazing to see how tenderly the *Prairie Farmer* regards them and their interests. If the patent system had become an engine for the oppression of the farmers only, the perversion of its function evidently would not be so grievous or unbearable; but it bears even harder upon the inventor, and for his sake its immediate abolition is demanded.

In the words of the *Farmer*, "the patent laws were designed to reward the original inventor of a valuable contrivance; but it is a rare, not to say phenomenal, case in which such intention is carried out. The design is almost invariably stolen by some tricky associate of the inventor, or boldly taken out of his possession by a superior in the establishment in which he works, or wheedled out of him for a song by some speculative capitalist. The sentimental arguments for granting patents may be dismissed summarily. The real inventors never get the benefit of their inventions, and the further pretense of protecting *them* is a hollow mockery."

Strange that the 20,000 inventors who apply for patents every year, and keep on inventing and taking out patents year after year, sometimes scores of them in the course of a lifetime, do not discover the extent to which they are swindled, and strike hands with the Grangers in securing the overthrow of this terrible "engine of fraud and oppression!"

Forgetting syntax and all save the enormity of the crime which the Patent Office commits in giving the deluded inventor his letters patent, the *Farmer* says: "The government takes the applicant's money, the agents takes all he can beg and borrow, and his return is a document seldom worth the paper its matter is printed on."

To put a stop to this official injustice, what remedy can be more summary and logical than the one the *Farmer* proposes when it says, "An act of Congress should declare all existing patents forfeited to the people!" and what proposition could more fitly fall under the heading "Patent Perfidy"?

The immediate occasion of this outburst against the patent system is the recent decision of the Supreme Court sustaining the barbed wire fence patents owned by Washburn, Moen & Company.

"The sweeping character of that decision," says our excited contemporary, "is almost beyond comprehension. The use of barbed wire will be practically unlimited for some years, and the profits of this one firm will distance the tales of the Arabian Nights, the treasures of Monte Christo, or the fortunes of the Bonanza kings. Allowing one firm to bleed hundreds of thousands is all the more doubtful policy from the fact that the firm produces nothing, but simply preys on the work and needs of others, under the protection of government, like the highwaymen and freebooters of the Romantic period."

That the company which own the barbed wire fence patents have a most desirable property is beyond question. That they may make a good deal of money out of their property, if their business is wisely conducted, is altogether probable. But where the bleeding and robbery of hundreds of thousands come in is not so apparent.

The company offer the Western farmers an excellent fencing material, and the farmers will buy it when they cannot do better. If the barbed wire fencing is so much cheaper and more efficient than any other to be had that the prairie farmers cannot do without it, the company are to be congratulated, and the farmers have no obvious reason for complaining. There are a great many species of property that are desirable, and that men would like to get without paying therefor the market price—land and cattle and corn, as well as fence material—but the intensity of that desire is no just ground for the legal or illegal seizure of such property; and any arguments which go to justify the confiscation of intellectual property justify with infinitely greater force the abolition of property in land. The champions of the farmers will do well, in this connection, to keep in mind the proverbial advice to those who live in glass houses.

In any case the objection to the barbed wire patents is largely sentimental and grossly exaggerated. The *Western Rural* cries out against the "barbed wire fence outrage" as loudly as the *Prairie Farmer*, and demands as shriekily the overturning of the patent system; yet, at the close of a long editorial on the "barbed wire fence monopoly," as an illustration of this "reckless disregard of justice and the interests of our farmers in the management of the patent shop at Washington," it says:

"Some of our subscribers in Iowa inform us that they intend to resort to the use of plain telegraph wire for fence purposes, setting the posts closer together, and using five wires, which they claim will answer the purpose just as well as barbed wire. It will be found, however—we think—that the additional wire, and the additional posts needed, will bring the cost up to a figure that will not be much under that at which barbed wire ought to be sold for, if indeed it comes much below what it now actually is sold for."

This plain statement of fact simply cuts the ground from under the anti-patent complaint. Thanks to the inventions which the barbed wire people legitimately control, they are able to set before the farmers of the West as good a fence as, if not a better fence than, the farmers can otherwise obtain, and in doing this they lessen in no way the freedom of the farmers to invent or construct a better and cheaper fence if they can.

No doubt it would be money in the pockets of the farmers if they could get their fences for nothing, or at prime cost; so it would be apparently to the profit of fence makers and other manufacturers to get their wheat and corn and beef and butter on the same terms. But useful things are not to be had in this world in that way, and fortunately sensible and sober-minded farmers are aware of the fact. The unthinking may be temporarily deluded by the sophistries of those who assume to guide them, but their common sense and sense of justice will dominate in the end.

OZONE AND THE SANITOLOGY OF ODORS.

At the meeting of the (Homeopathic) County Medical Society in this city, April 13, Dr. John S. Linsley read a paper on the "Sanitology of Odors," in which some astounding results were attributed to the influence of ozone in the air.

The old theory of the superior healthfulness of an ozonized atmosphere was not only enlarged upon, but it was shown to the doctor's satisfaction that the more or less remarkable careers of such men as Moses and John Adams and Daniel Webster and Horace Greeley and some of our popular poets, might be traced to the energizing property of an ozonic atmosphere. The atmosphere which "energized" Moses, we presume, must be accepted as specially ozonized, only by inference from its inferred effects, which is a somewhat unsatisfactory basis for an argument; but the doctor was able to point to the fact of more recent observation that the celebrated New Englanders he mentioned were all natives of what he called the ozonic region.

A considerable source of the ozone which is supposed to exert so beneficial an effect upon the atmosphere by disinfecting and "vitalizing" it, was attributed to plants whose foliage, fruit, or efflorescence emits fragrant volatile oils or resinous matters which yield ozone by oxidation. Among our native trees worthy of cultivation for the production of atmospheric ozone, the doctor mentioned Oregon maple, magnolia, pine, basswood, locust, and sassafras; and among the beneficent shrubs and plants, the golden currant, spice bush, azalea, wisteria, clematis, thyme, celery, sweet vernal grass, and clover.

The natural inference is that intending parents who wish to be progenitors of great men—national leaders, statesmen, poets, or what not—will do well to set their homes in ozonic regions, and surround them with as large a variety as possible of ozone-making trees and flowering plants.

It would be cruel to needlessly discourage any enterprise in this direction, for the world needs great men badly, and the suggested method of getting them is not an expensive or unpleasant one. Still it is but fair to say that it is not quite so certain, as the doctor appears to think, that there is ever any large ozone in the air, or that its effects would be as intimated.

A great many pretty hypotheses have been based upon supposed evidences of the occurrence of ozone under certain atmospheric conditions, and the supposed oxidizing and other effects due to its presence; but the whole subject has been thrown into confusion by the discovery that the trusted ozone tests are unreliable, and that the oxidizing principle of the atmosphere may be and probably is in large part, if not wholly, hydrogen superoxide. It appears that most of the reactions formerly relied upon for the detection of ozone are also produced by the hydrogen compound whose existence in the air has been demonstrated; and also that the remaining reactions may be due to other compounds known to occur in the air, as carbonate of ammonium and certain sulphides. The odor sometimes observed and ascribed to ozone is not a trustworthy evidence of its presence, since

most observers, according to Schoene, are liable to confound the odors of ozone and hyponitric acid. It is alleged further that ozone is not produced by the electric spark in a mixture of oxygen and nitrogen, but only oxide of nitrogen, and it is probably to the latter substance and not to ozone that we must attribute the odor sometimes observed after lightning discharges and sparks from an electric machine. Ozone, however, would appear to be produced by the silent discharge of electricity; but it has been justly observed that we know too little of this form of electrical action as an atmospheric phenomenon to justify our regarding it as a probable source of supply of ozone.

In view of all these uncertainties touching the occurrence and action of ozone in the air, it may be prudent to wait a while before admitting ozone to be quite so powerful a factor of individual or national genius, health, or social development as Dr. Linsley and others would have us believe.

PUBLIC WORKS IN NEW YORK CITY.

The report of the New York Commissioner of Public Works for the last quarter of 1880 contains many facts of more than local interest.

New York now has, south of Harlem River, 334½ miles of paved streets, classed as follows: Stone-block pavements, 229½ miles; cobble stone, 80 miles; macadam, 24½ miles; concrete, ½ mile. There were laid last year 244,807 square yards of pavement, covering twelve miles of streets. During the past four years $1,100,000 have been spent upon new pavements and in restoring old ones, 641,957 square yards of worn out and rotten pavements having been replaced by stone blocks.

An appropriation of $400,000 will be devoted this year to the substitution of stone-block pavement for the old cobble stones, which are all to be removed as fast as they can be. More than nine-tenths of the streets of New York will be paved with stone-blocks when the plan is carried out. All plans for concrete and wooden pavements have been dismissed as unadapted to the city, and the macadam roadbed is used to only a very limited extent.

The sewerage system of the island embraces 376½ miles of sewers, with 4,573 receiving basins. Over 5 miles of sewers and culverts, with 62 receiving basins, were added last year. In the older and more densely populated parts of the city the sewers are in anything but a suitable or desirable condition.

A large amount of work in the way of grading, curbing, guttering, and flagging new streets was done during the year, and a large area of new ground was made available for building.

Over 402 miles of streets are lighted, besides 2½ miles of piers and 61 acres of parks. The number of public lamps was 23,511, an increase of 374. Nearly 14 miles of new gas mains were laid, the entire length of gas mains now exceeding 874 miles. The cost of the public lamps was a little short of half a million dollars. The gas consumed was 321,583,860 cubic feet. One mile of Broadway has been lighted by electric lamps on the Brush system, and many private electric lamps help to illuminate the streets.

THE NATIONAL ACADEMY OF SCIENCES.

The annual meeting of the National Academy of Sciences began in Washington, April 19, the venerable President of the Academy, Professor W. B. Rogers, of Boston, in the chair. The list of papers read included: "The Domain of Physiology," T. Sterry Hunt; "The Compass Plant of the Western Prairie," B. Alvord; "The Solar Constant," S. P. Langley; "The Color of the Sun," S. P. Langley; "On Mountain Observations," S. P. Langley; "On the Relation of Soils to Health," R. Pumpelly; "Reduction to Sea Level of Barometric Observations made at Elevated Stations," Professor Abbey; "Electric Light Photometry" George F. Barker; "On the Relations between Strain and Impact," and "On the Structure of the Feet of Mammals," E. D. Cope; "On the Progress of Pendulum Work," C. S. Peirce; "The Production of Sound by Radiant Energy," A. G. Bell; "On the Carbon Lamp Fiber in the Thermo Balance," G. F. Barker; "Memoir of Count S. F. de Pourtales," Alexander Agassiz; "On the Utilization of the Sun's Rays in Heating and Ventilating," E. S. Morse; "On the Later Tertiary of the Gulf of Mexico," E. W. Hilgard; "An Account of the Land Ice of Kotzebue Sound," W. H. Dall.

At the Executive Session of Thursday, Professor A. W. Wright, of Yale College, and Professor H. A. Rowland, of Johns Hopkins University, were elected members, and the following were elected members of the council; Professor S. F. Baird, Professor Wolcott Gibbs, Cambridge; Professor A. Hall, United States Navy; Professor J. E. Hilgard, Coast Survey; Professor Clarence King, Professor Fairman Rogers, Philadelphia. Professor Simon Newcomb was elected Home Secretary, and Professor J. H. C. Coffin, United States Navy, Treasurer.

THE DATE OF THE GLACIAL ERA IN EASTERN NORTH AMERICA.

Mr. G. F. Wright, in a paper read before the American Association for the Advancement of Science, and published in the February number of the *American Journal of Science and Arts*, has made an attempt to calculate approximately the date of the glacial era in Eastern North America, by studying the depth of one of the bowl-shaped depressions which abound in the moraines and kames of New England. These depressions are of all shapes and sizes, from symmetrical "kettle holes" to ponds and lakes of no mean dimensions. It is evident that they cannot always exist, for they are wearing down at the top and filling up at the bottom. For the same reason we know that they cannot always have been in existence.

The basin chosen by Mr. Wright for his investigations was one located near Pomp's Pond, in Andover, Mass., with a diameter of 380 feet, and having an accumulation of peat 96 feet in diameter at the bottom. It is evident that since the first formation of the crater-like depression no material can have reached the bottom except from three sources: (1) The wash from the sides; (2) the decay of the vegetation growing within the rim; and (3) the dust brought by the winds. The problem is to determine the time it would require these three agencies to fill the bottom of this bowl to a depth of 24 feet, which would be equal to a depth of only 8 feet over its present surface—the present depth (17 feet) being estimated from the angle of declivity. Mr. J. Geikie, following the lead of Mr. Croll and others, who look to astronomical data alone, supposes that the so-called glacial period, whose marks we now study in these low latitudes, synchronized with the last period of high eccentricity of the earth's orbit, which closed about 80,000 years ago, and whose maximum influence must have been exerted about 200,000 or 210,000 years since. But once in 21,000 years the astronomical conditions dependent upon the precession of the equinoxes for a glaciation of the northern latitudes occur, though owing to the present low eccentricity of the earth's orbit this influence is now at its minimum.

The question with the crater-like depression above-mentioned is: Could this have stood with so little change for 80,000 years? or even for 40,000 years, as supposed by Prof. Hitchcock? If the close of the great glacial period be so far back as Mr. Croll and Mr. Geikie estimate, we must believe that detritus could accumulate, in the situation above described, over a surface of the area of the present peat bog, only at the rate of one inch in 1,000 years; while, if we put the close of this period back 10,000, the rate of accumulation would seem as slow as the imagination can well comprehend—one inch in 100 years. These considerations have led Mr. Wright to look with increasing distrust upon the astronomical calculations which are made concerning the glacial period, unless the moraines mark the limit reached at the last semi-revolution of the earth's equinoxes about 10,000 years ago. He believes it evident that the glacial phenomena of New England are comparatively recent in their origin.

PHOTOPHONIC AND SPECTROPHONIC DISCOVERIES.

At the meeting of the National Academy of Sciences, April 21, Prof. A. Graham Bell read an important paper describing at great length the recent investigations made by Mr. Tainter and himself in the field so brilliantly opened by them a year ago. After referring to their earlier observations on the production of sound by radiant energy, Prof. Bell said that at his suggestion and during his absence in Europe, Mr. Tainter had pursued the investigation of the sonorousness of matter under the influence of radiant energy, employing a vast number of substances inclosed in test tubes in a simple empirical search for loud effects. He was thus led gradually to the discovery that cotton-wool, worsted, silk, and fibrous materials generally, produced much louder sounds than hard rigid bodies like crystals or diaphragms, such as had hitherto been used.

Mr. Tainter next collected silks and worsteds of different colors, and speedily found that the darkest shades produced the best effects. Black worsted especially gave an extremely loud sound. As white cotton wool had proved itself equal, if not superior, to any other white fibrous material before tried, he was anxious to obtain colored specimens for comparison. Not having any at hand, however, he tried the effect of darkening some cotton wool with lampblack. Such a marked re-enforcement resulted that he was induced to try lampblack alone. About a teaspoonful of lampblack was placed in a test tube and exposed to an intermittent beam of sunlight. The sound produced was much louder than any heard before. Upon smoking a piece of plate glass and holding it in the intermittent beam, with the lampblack surface toward the sun, the sound produced was loud enough to be heard, with attention, in any part of the room. With the lampblack surface turned from the sun the sound was much feebler.

The experiments were repeated when Prof. Bell returned, and were continued by the two gentlemen together. It was found that when the beam was thrown into a resonator, the interior of which had been smoked over a lamp, very curious alternations of sound and silence were observed. The interrupting disk was set rotating at a high rate of speed, and was then allowed to come gradually to rest. An extremely feeble musical tone was at first heard, which gradually fell in pitch as the rate of interruption grew less. The loudness of the sound produced varied in an interesting manner. Minor re-enforcements were constantly occurring, which became more and more marked as the true pitch of the resonator was neared. When at last the frequency of the interruption corresponded to the frequency of the fundamental of the resonator, the sound produced was so loud that it might have been heard by an audience of hundreds of people.

The extremely loud sounds produced from lampblack demonstrated the feasibility of using this substance in an articulating photophone in place of the electrical receiver formerly employed. In regard to the sensitive materials that can be employed, the experiment indicated that in the case of solids the physical condition and the color are two conditions that markedly influence the intensity of the sonorous effects. The loudest sounds were produced from substances in a loose, porous, spongy condition, and from those that had the darkest or moist absorbent colors. The materials from which the best effects have been produced are cotton-wool, worsted, fibrous materials generally, cork, sponge, platinum, and other metals in spongy condition, and lampblack.

The explanation suggested for the superior loudness of the sounds produced by a dark porous substance, for example, lampblack, was as follows. Said Professor Bell:—"I look upon a mass of this substance as a sort of sponge, with its pores filled with air instead of water. When a beam of sunlight falls upon this mass, the particles of lampblack are heated, and consequently expand, causing a contraction of the air spaces or pores among them. Under these circumstances a pulse of air should be expelled, just as we would squeeze out water from a sponge. The force with which the air is expelled must be greatly increased by the expansion of the air itself, due to contact with the heated particles of lampblack. When the light is cut off the converse process takes place; the lampblack particles cool and contract, thus enlarging the air spaces among them, and the inclosed air also becomes cool. Under these circumstances a partial vacuum should be formed among the particles, and the outside air would then be absorbed, as water is by a sponge when the pressure of the hand is removed. I imagine that in some such manner as this a wave of condensation is started in the atmosphere each time a beam of sunlight falls upon lampblack, and a wave of rarefaction is originated when the light is cut off. We can thus understand how it is that a substance like lampblack produces intense sonorous vibrations in the surrounding air, while at the same time it communicates a very feeble vibration to the diaphragm or solid bed upon which it rests."

As intimated above the lampblack proved to be an efficient as well as economical substitute for selenium and tellurium in the electrical receiver of the photophone.

The investigation of the influence of radiant energy upon various substances, solid, liquid, and gaseous, placed in different parts of the solar spectrum, resulted in the production of a new instrument of physical research which has been called the spectrophone. When different substances were used as receivers it was found that the loudness of the sound varied in point of position upon the spectrum in a remarkable manner. With the lampblack receiver a continuous increase in the loudness of the sound was observed upon moving the receiver gradually from the violet into the ultra red. The point of maximum sound lay very far out in the ultra red. Beyond this point the sound began to decrease, and then stopped so suddenly that a very slight motion of the receiver made all the difference between almost maximum sound and complete silence. With red worsted entirely different results were obtained. The maximum effect was produced in the green at that part where the red worsted appeared to be black. On either side of this point the sound gradually died away, becoming inaudible on the one side in the middle of the indigo, and on the other at a short distance outside the edge of the red. With green silk the maximum was found in the red, with the limits of audition in the blue on the one hand and the ulta red on the other. Hard rubber shavings gave a maximum in yellow. Vapor of sulphuric ether produced no audible effect, until a point far out in the ultra red was reached, when suddenly a musical tone became distinctly audible. Vapor of iodine disclosed its maximum in green. With peroxide of nitrogen distinct sounds were obtained in all parts of the visible spectrum, but no sounds were observed in the ultra red.

The repetition of these tests in connection with an undistorted spectrum, that is, one produced by a diffraction grating, will obviously be necessary before any positive conclusions can be arrived at touching the exact relations of color or wave-length to the sonorousness of different substances.

In its present form the spectrophone is a modification of the ordinary spectroscope, made by substituting for the eye-piece a sensitive substance placed at the focal point of the instrument behind an opaque diaphragm containing a slit, the sensitive substance being put in communication with the ear by means of a hearing tube. With reference to the probable utility of the spectrophone, Professor Bell said:

"Of course the ear cannot for one moment compete with the eye in the examination of the visible part of the spectrum, but in the invisible part beyond the red, where the eye is useless, the ear is invaluable. In working in this region of the spectrum, lampblack alone may be used in the spectrophonic receiver. Indeed, the sounds produced by this substance in the ultra red are so well marked as to constitute our instrument a most reliable and convenient substitute for the thermopile. . . . I recognize the fact that the spectrophone must ever remain a mere adjunct to the spectroscope, but I anticipate that it has a wide and independent field of usefulness in the investigation of absorption spectra in the ultra red."

HOT WATER COMPRESSES IN TETANUS AND TRISMUS.—Sporer has successfully treated cases of tetanus by merely applying to the nape of the neck and along the spine large pieces of flannel dipped in hot water, of a temperature just bearable to the hand (50-55° C.)—*Allg. med.-cent. Zeit.*