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REFORM IN THE PATENT OFFICE.

Congress, at its last session, voted to take away the surplus fund of the Patent Office, and passed an act appropriating the sum of \$250,000 to pay its current annual expenses, and simply for the good reason that during some years past the financial affairs of the Office have not been conducted with skill and economy. It appears from a report now before us of a Committee appointed to investigate the matter of printing done by authority of Commissioner Theaker, that within the space of two years the large sum of \$181,000 was expended upon the items of books, paper, and printing, and among other transactions of a doubtful character, \$48 per thousand were paid for manilla envelopes having the Commissioner's frank printed thereon. The expenses of the Office also ran up from \$274,199, in 1865, to \$639,293 in 1867. We conclude, from these and other items in the Committee's report, that Congress was justified in interfering to prevent an extension of this system of wasteful—we might almost say criminal—misuse of the patent fund.

For some reason the surplus fund of the Patent Office—taxed out of the pockets of inventors—has furnished an easy opportunity for our Commissioners to gratify some very luxurious notions, as any one may see by a visit to the barbaric upper gallery, decorated under the supervision of Commissioner Holloway, whose knowledge of fine art must have been acquired in studying the faces and baskets of the aborigines who migrated west of the Mississippi before railroads had introduced a more refined and civilized art.

However, that job is done, and paid for, and we cherish the hope that it may long remain a curiosity to all beholders. We submit, however, that the sum of \$250,000 is not enough to meet the necessary annual expenditures of the Office. The present pay-roll amounts to \$340,000, to say nothing of the contingent expenses, which are considerable.

Commissioner Foote assumes the duties of his position hampered by the effects of mal-administration and a procrastinating policy which well nigh destroyed the good name and efficiency of the Patent Office.

We are happy to be assured, however, that the new Commissioner is bending all his energies towards introducing much-needed radical reforms. He has already cut down needless expenditure, and with a careful weeding out of all blockheads and suspicious characters—if there are any—to clog the business, and betray its sacred trusts, the public may expect to see the Patent Office restored to its ancient vigor and recognized usefulness. Commissioner Foote has the ability and energy to put the house in order, and inventors may safely repose confidence in his integrity and firm purpose to administer the affairs of the Office, not only in a generous spirit, but without fear or favor.

THE VALUE OF EXPERIENCE IN THE MECHANICAL ARTS.

While it may be conceded that "success is the measure of ability," it may not be improper to ask, "What are the conditions which produce the ability necessary to success?" Only one of these conditions we propose to speak of; that is experience, and necessary to experience is time. Many a young mechanic wonders why he, when he can do as good a job as an "old hand," cannot receive as much pay. If a machinist, he may do a job at the lathe, or on the planer, as perfectly as he who has grown gray in the business, and he wonders why the "old man" should receive more for his work than himself. To him it appears that the business is easily learned, that there are no secrets of the methods of doing the work withheld from him, and he knows that in some respects he is fully equal to his senior. So he is, ordinarily, and it is not strange that he should chafe under the fact that his work is

not so well rewarded as the same work when performed by a veteran in the business. But he forgets that while he may be able to put through a plain job as effectually and rapidly as an old hand, he lacks the experience, the maturity of judgment, the fund of resources valuable in exigencies, which the experienced workman possesses. These old men are invaluable. They "know whereof they affirm." Years of practice have made their manipulations perfect, and no amount of attention and sheer endeavor alone can ever take the place of the experience which can be gained only by time.

We remember an old bald headed and white bearded man, whose sole business in the shop, at a time when the file held a much higher and more important place than now, was to fit the gibs and keys for the straps of locomotive connections. He worked, as became his age, moderately—little by little, like a "day by day" machine—never hurried, never driven. But when night came his bench showed a goodly result in amount, and a better result in quality of work. None of his jobs ever came back, like curses to roost with him. What he did was well done. Continual practice, careful attention, and, above all, the experience gained by years of practice, made him, as a filer, as nearly perfect as one could hope to be. He was also the recourse of "boss" and hands in any and every emergency, and he never failed to meet the difficulty and to show the way out or over it. "Smartness" will not do as preferable to experience. Youthful confidence, and self-sufficient assurance, are not the conditions or qualities which prove useful when emergencies and accidents arise or occur. To be a good mechanic one must be an experienced mechanic. Ability, talent, and earnestness, are necessary to success; but experience—the wisdom gained by years—tells. The young mechanic should not feel harshly toward those whose years make them his masters, but strive to overtake them and antedate their success by his more careful attention to the details of his business. If he does not succeed in this, immediately, he can assure himself of gaining, in time, as good a name and as pleasant a position as that of those whom he now envies.

OPTICAL ILLUSIONS.

We place more dependence upon the evidence of the senses than facts will warrant. The senses are not infallible guides to truth; they frequently mislead on occasions and at times when it would seem the conditions were most favorable to their normal and proper exercise. The state or condition of color blindness—incorrectly designated—is one evidence; as when one mistakes one color for its complement, even a green being mistaken for a red. This extreme case may not be often noticed, but it is quite a common fact that a person cannot distinguish between scarlet and crimson, or orange and yellow. These faults of vision may be laid to an organic defect; for it is well known, for instance, that the best painters—the best colorists—are those who have blue, gray, or light eyes. The black eyes may be excellent for seizing upon the forms and dimensions of objects and the relative proportions of parts; but they cannot well determine the shades of color. Scarlet is no more like crimson than it is like orange. Nor is yellow either like orange or green. Violet is not blue, nor is purple either red or blue. Shades of color formed by the combination of the original prismatic tints must bear some distinctive names, and by these names many recognize them, rather than by the use of the eye. It has become the fashion to affix arbitrary names to shades of color which are calculated to mislead. The bismark and cuir is merely what was known years ago as snuff or light brown. Magenta is merely a cross between crimson and purple. In short, the gamut of colors is capable of as much extension and change as the gamut of the musical scale. And music and colors are very closely allied. The one suggests the other to many persons of very sensitive organizations. We remember a man who always asserted that white suggested to him the note, A, the key of three sharps; red, F; and blue, E flat. This may have been merely a fancy or the product of a too vivid imagination; but how often do our fancies and whims prove, on investigation, to be founded on fact.

The mirage, either on land or sea, is a notable instance of optical illusion. We have stood on the beach at Lynn, Mass., and seen Egg Rock and the point of the promontory of Nahant apparently within a stone's throw of the point of observation, while, in fact, they were more than a mile away. Vessels, also, which, when the atmosphere, changed by the sun's rays, were invisible, were shown clear above the surface of the sea.

A friend related the other day a most singular experience. He was crossing the western plains and saw distinctly a broad stream, fringed with trees, and having dwellings on its banks, so plainly described and fairly presented that he urged his horse on to reach what, to him, was a paradise, but found only bare sand.

These appearances are not to be attributed wholly to the exercise of the imagination, and no explanation, founded on the law of optics, has, as yet, been made, which seems to meet all the conditions and explain all the difficulties necessary to be removed to reach a solution. It is evident that the sense of sight is not always reliable.

Is it not possible that some railway accidents, now attributable to culpable negligence or carelessness in the management of switch signals, are really occasioned by this defect in the eye which prevents the distinguishing of colors?

THE TRANSATLANTIC STEAMSHIP COMPANY.

The report of the Transatlantic Steamship Company, recently made public, contains many items of general interest. This company own three lines of steamships running between Havre, Brest, Saint Nazaire, and America. The first

line runs directly from Havre and Brest to New York; the second to Havana, St. Thomas, Vera Cruz, and New Orleans; the third to Guadaloupe, St. Thomas, Guaymas, Venezuela, Aspinwall, and Panama. The second of these lines has suffered somewhat in its business from the suspension of trade consequent upon the evacuation of Mexico by the French, the recent earthquakes in St. Thomas, and the prevalence of yellow fever last year in Louisiana. It is proposed by the company to establish a line to the Pacific States of South America, as it is believed that they will thus secure a trade amounting annually to \$26,000,000. A monthly line is also to be established between Panama and Valparaiso, including the intermediate ports. Upon this line are to be placed three new steamers, each of 3,000 tons burden, and with an engine nominally of 450-horse power.

The business of the company has been constantly on the increase since its first establishment. It owns in all twenty-one steamships, with an aggregate of 80,000 tons capacity. They are gradually substituting screws for the side wheels formerly used upon their steamers. Each steamer to New York is to have a new condenser and to be provided with a double screw, which, from their experiments with it on the *Washington*, the company feel confident, will give excellent results. The *Washington*, on her last trip to Vera Cruz, ran at an average speed of over 12 knots per hour, thus making a reduction of three days and nights over the average trips of other steamers on the same line.

The company has introduced another improvement invented by M. Foucault, the Doctor of the *Europe*. It is called an electrical speaking telegraph. By its use orders can be transmitted instantaneously to all parts of the vessel, and the ship is worked without a word being spoken. Several seconds are said to be gained by this apparatus in the transmission of orders, an important consideration in some emergencies, as the abrupt meeting of two vessels in a fog. This apparatus is in use upon the *Europe*, and it is soon to be adopted by the French Government to be applied to the service of artillery in place of the speaking tube now in use. That it will wholly supersede the old system of giving orders in the working of vessels is however improbable.

THE CATTLE PLAGUE.

The accounts of the plague which has caused such devastation among the cattle in different parts of the United States, particularly in the West, have probably been somewhat exaggerated to subserve the purposes of speculators. Making due allowances for this fact, the disease has been, without doubt, a terrible reality, all the more to be dreaded, from the universal ignorance in regard to its cause, method of propagation, and cure. The only thing which can be said to be known in regard to it, is that it can sometimes be prevented by the use of disinfectants. Many take strong grounds in favor of the contagious character of the disease, while others, among whom may be mentioned Prof. Gamgee, of the Veterinary College in London, now in this country, maintain the opinion that it is not contagious. Some strange and inconsistent statements are made about the complaint as it prevails in the West; one of which is that the Texas cattle do not manifest the symptoms of the disease themselves, while they impart it to others when brought in contact with them. A tour of inspection having been fixed upon by the Pork Packers Association of Chicago, Prof. Gamgee, accompanied by Mr. M. E. Ricardson, have visited Tolono, Farina, Cairo, and other infected points, and give the following conclusions as the result of their observations:

- First:—We have not to deal with a contagion or an infectious plague, but with a form of poisoning, due to the native cattle eating off lands polluted by droves of Texas steers.
- Second:—We fail to find a single case of disease beyond the limits over which the Southern stock has been distributed, and every animal, without exception, dies on the Texas trails.
- Third:—No system of medical treatment can be relied on or conveniently applied. Plagues call for preventives, and are not among the curable maladies.
- Fourth:—Prevention consists in herding native stock on inclosed pastures wherever Texas cattle exist, and then not moving the Texas herds to and fro, as panic-stricken communities insist on, but keeping them well by themselves and in proper inclosures.
- Fifth:—In relation to the trade in Texas cattle, which is as important for the meat consumer of the North as for the cattle producer of the South, it is obvious, from all we have learned, that during the entire winter the trade can go on unchecked, without the least danger of disease arising among our native cattle. In all probability, however, the theory is sound which was suggested at our last meeting, that even in summer, under judicious treatment, Texas steers can be cleared of the poison which infects them.

The chief disinfectant relied upon is carbolic acid, the nature of which is fully described in No. 4, current volume of the SCIENTIFIC AMERICAN, and it is recommended to use the crude and cheap fluids known as heavy oil of coal-tar, or the coal-tar itself, upon yards, paths, and all the droppings and manure. The cheapest kind of carbolic acid will be best upon the floors and sides of cattle cars. There should be a complete coating or wash of these sprinkled over the entire surface that is to be disinfected. Grounds and paths should first receive a thin coating of quick-lime, and upon this sprinkle the heavy oil of the tar from a common watering-pot. The floor and sides of foul cars should be thoroughly moistened with carbolic acid. It may be applied with sprinkler or brush.

Manure heaps and droppings from Western cattle should be carefully disinfected with a sufficient quantity of quick-lime and heavy oil or crude acid. A barrel or two to the acre of "heavy oil" or of good coal-tar would be a sufficient quantity; and a pint of carbolic acid diluted in 50 parts water would suffice for a 16-head car.

TRIAL OF HALL'S AUTOMATIC ELECTRIC RAILWAY SIGNAL.

On Thursday, August 20th, a number of practical railroad men and prominent mechanics, were invited to witness the operation of the above mentioned device, which was illustrated and briefly described on page 277, Vol. XVI., SCIENTIFIC AMERICAN, and patented through this agency. In this case, the apparatus was located on the west side of the Chest-