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ADVERTISERS.

The value of the SCIENTIFIC AMERICAN as an advertising medium cannot be over-estimated. Its circulation is ten times greater than that of any similar journal now published. It goes into all the States and territories, and is read in all the principal libraries and reading rooms of the world. We invite the attention of those who wish to make their business known to the liberal terms offered in our advertising columns. A business man wants something more than to see his advertisement in a printed newspaper. He wants circulation. If it is worth 25 cts. per line to advertise in a paper of three thousand circulation, it is worth \$2.50 per line to advertise in one of thirty thousand. The value of an advertisement depends chiefly upon the circulation that is given to it.

REFORMS IN THE PATENT OFFICE.

In our last number we called the attention of Congress to the condition of the Patent Office, and urged upon that body the importance of appointing a committee to enquire what further legislation is necessary, to provide for the present wants and future expansion of that department. We hope some member of Congress will take hold of this urgent matter, and move a committee.

Pending such inquiry, we wish to offer a few additional suggestions. An immediate relief can be given to the Office by the prompt removal of the Agricultural Bureau. A temporary building might be constructed for its use and convenience in the inchoate Geographical and Agricultural Park on Rock Creek. What more graceful or appropriate suggestion could be made? The usefulness of the Bureau could be much strengthened by such change. Commissioner Newton and his able staff could spend much time in that rural spot in experimenting upon vegetables and plants. He would be able to see how the seeds of the common egg-plant are made to produce the prince's feather—a change which we were astonished to witness in our garden the last season, the product of a few seeds kindly supplied to us from the Patent Office.

Another thing, still more important; the Patent Office, instead of being a mere dependency of the Interior Department, ought to be an independent bureau. The Commissioner should have full control of its details and its appointments. The Patent Office is no place for mere office hunters, but it always will be subject to this baleful influence so long as the Commissioner is held subordinate to the Secretary of the Interior, who cannot resist the clamor of his supporters for situations at his disposal. Whenever vacancies occur in the Patent Office, the Secretary—with the best intentions—is liable to repeat the error of appointing men to positions, who might be more profitably employed in pulling stumps and hoeing corn. An Examiner in the Patent Office should bring to its duties a mind well instructed in physics and mechanics. Unless he possesses these qualifications as a basis, he can never render such service as the law contemplates. The salaries now paid are beggarly. There are old and faithful Examiners in the Patent Office who are barely able to support themselves and their families on the pay they now get. This is a disgrace to the Government, and ought no longer to be tolerated. Valuable talent cannot be permanently secured unless the salaries are raised. We don't wonder that so many changes occur in the Office: the wonder is that there are no more.

The Government is building a new office for the Secretary of State, and a new War office is also to be built. This is all right: the old buildings were unfit. Now let us have a new building for the Department of the Interior, and another step will have been taken in the right direction.

FERTILITY OF AMERICAN GENIUS.

Archæologists recognize in the pre-historic times, the three periods known as the stone, the bronze, and the iron ages. During the reign of barbarism, the weapons, utensils and ornaments of the nations, were few and carved in the roughest manner from wood or stone by every individual, as occasion demanded. Working in metal was the first great step in civilization, and naturally with limited resources the easily fused alloys would be employed prior to the introduction of iron working.

The wants of the patriarchs were few, and of the simplest character. Ingenuity received no impetus for putting itself in action, comforts were of the most primitive character and luxuries there were none. Descending to comparative modern times, history shows that even the use of chimneys for fire places, was unknown in England till the time of Richard II. and as late as the Elizabethan age, such a simple contrivance was regarded as a luxury only to be enjoyed by the wealthy.

The list of patent claims granted during the past six months, and published in the volume of the SCIENTIFIC AMERICAN just completed, may be considered as an index of this age of progress, and on examination it may reveal some facts of interest. A comparison with similar records of previous years, shows that certain contrivances are either in great demand or open a wide range for the ingenuity of inventors. As instances of this class it appears that cultivators, plows, churns, and washing machines have been made the subjects of sixty-three, fifty-two, fifty, and forty-eight patents respectively. Agricultural and farming implements furnish a fruitful field for the ingenious, for we note patents issued for thirty-three varieties of harvesters, twenty-four hay forks, twenty horse rakes, twenty-five corn planters, twelve potato diggers, nine reapers; fences of forty-seven patterns, and forty-three gates, twenty-two beehives and an equal number of brick machines, bridles, and coloring matter for butter; the pumps number thirty-two, and evaporators fifteen.

In the household line we have seven different castors, twenty-eight broom heads, and eleven bottle stoppers, eighteen bed bottoms, and fifteen patent springs, baking pans, baskets, buttons, and apple parers; eight wringers, seven sprinklers and clothes dryers; pea sheller and fruit cans, stoves and sadirons; fourteen lamps, and twenty lanterns. Such a primitive contrivance as an umbrella seems hardly worthy of improvement, yet five successful inventors undoubtedly deem themselves fortunate in having obtained as many patents.

Property is defended and the curious are excluded by means of twenty-five locks and padlocks, while nine new burglar-alarms are warranted to detect and expose the intruder.

Contributions to the musical world are briefly enumerated: an improved cornet, banjo, piano, and harmonium, besides a musical attachment for bird cages.

For traveling, carriages and carriage fixtures have received twenty-five patents. For railroads we notice car brakes to the number of sixteen, twice that number of new car couplings, and the danger incident to such traveling is dispensed with by safety switches, car trucks and bridges. Should accident befall the traveler in spite of these precautions, the injured man may make use of one of the many artificial arms, legs, hands, eyes or teeth. "Patent medicines" of twenty varieties, are sure to find a ready sale.

Labor-saving machines have been opposed on the ground that by their introduction former workmen must be thrown out of employment. The fallacy of this reasoning is shown by the friends of progress, in a reference to the kindred branches of industry created thereby, and no better illustration of this truth can be found than is shown in the case of the sewing machine. In the past six months, nineteen machines proper have been patented, in addition to twenty-eight new attachments, connected with and dependent for success upon the use of the machine, and demanding in their manufacture, the services of a large body of additional hands.

Many items of interest might be further enumerated, but the result would be such a heterogeneous collection as to rival the far-famed inventory of goods displayed as a sign at a country store, which, informing the public in a poetic strain of the commodities to be disposed of, closed with "Gimlets Godly books and Groceries for sale here."

CASE HARDENING OF IRON.

This simple process, so useful to the mechanic, is not always understood even by workmen of considerable experience.

The effect of case hardening is to convert the surface of iron to steel. It is, in fact, a process of cementation, differing mainly from the manufacture of true steel in the different lengths of time employed. True case hardening is effected by packing the article to be hardened in a box with ground or broken bones, particles of horns, raw hide, and even tanned leather. The box should be of cast iron, of any convenient form, large enough to receive the article to be case-hardened and to admit of surrounding it with the material used. It ought really to be covered and luted air-tight, although tolerably good results may be obtained if it is left open. The box with its contents is placed in a furnace, the fire of which should surround it. The fuel may be anthracite or coke, but preferably charcoal. The longer the heat is kept up, the

deeper will be the action of the cementing materials. Ede says that in half an hour after the box and its contents are thoroughly heated, the coating of steel or case-hardening will be scarcely the thickness of a sixpence; in an hour double that, etc.

But this process is lengthy and not always convenient. Frequently all the mechanic requires is a thin coating of indurated metal on the outside of the article, which will not be subject to ordinary abrasion or the action of a file. For this purpose prussiate of potash is largely employed and has become an article of commercial importance. It is a ferrocyanide of potassium, and is made from animal matters containing nitrogen, as blood, hoofs, hides, woolen rags, hair, leather, and animal offal, charred in retorts and then fused with potash. The mass is then drawn, cooled, filtered, and dried for crystallization. The result is a crystallized yellow mass. This is pulverized for use.

In case hardening with prussiate of potash, the article of wrought or cast iron is heated in a furnace or forge to a light red, the powdered prussiate then sifted on, when it fluxes, and the article may be immediately removed and plunged into cold water. Reheating it is of no benefit, but really a detriment. One application of the prussiate is sufficient.

COMMISSIONERS TO THE FRENCH EXHIBITION.

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At the French Exhibition of 1855, the number of United States Commissioners in attendance nearly equaled the number of contributions from the States. One of the Commissioners spent most of his time in dealing out samples of Delpit's black snuff, of which he was an excellent judge, another superintended the sweeping and dusting out, the others dined out around and performed the duties of bowing and scraping to French dignitaries. In these respects they were found fully up to the standard of other nations. At the approaching Exhibition in the spring of 1867, the display of American Commissioners promises well. Barnum will probably establish an "American Museum," deliver lectures on temperance (the water in Paris is horrid,) and show off the go-ahead characteristics of the "universal Yankee nation." Stewart has money enough to open a first class hotel, or a mammoth dry goods store. Agassiz can lecture on fish and South America. Frank Leslie can publish the *Illustrated News*. Ruggles can devote himself to the metric system, Kennedy can furnish reminiscences of the American navy in other days, while Dr. Evans can operate on the teeth. Taken, as a whole, the American Commission is made up of all the elements necessary to exhibit almost any phase of our national character. England, Austria, Russia and Prussia, propose to send two or three Commissioners only, but what they fall behind us in the volume of personal display, will be made up in the greater number of articles on exhibition.

CANADIAN PATENT LAWS.

We have requests from four different parties, residents of Canada, asking us to urge their authorities to change the Canadian patent system. The shoe pinches just here, that these parties have applied for patents in the United States and have been compelled to pay in advance a patent fee of \$500, simply for the reason that the patent laws of Canada discriminate against the citizens of the United States to such an extent as to wholly prevent them from obtaining patents in those provinces. They very naturally dislike to pay this fee, and especially with no prospect of getting a cent in return if their claims are refused. Now we freely confess that this is a very awkward thing, but the remedy is simple. Whenever the Legislature of Canada enacts a law that will permit our citizens to take out patents there upon the same footing as resident subjects, that moment Canadian inventors can come here and get out patents on the same terms as citizens. The remedy is in their own hands and at their own option. We therefore urge our correspondents to turn their attention to the proper authorities and demand a remedy. The present Canadian patent system is a legalized bid for thieving upon the genius of our people. There is neither justice nor comity in it, and we shall be glad to chronicle the introduction of a patent code more in accordance with the spirit of the times. The same remarks apply equally to Nova Scotia. The system there is exclusive to residents, and belongs to the age of Queen Bess.

TUNNELING on railroads is being pushed to an extreme. Even where a *detour* would avoid a bore, engineers seem to have a peculiar gratification in piercing the earth. Apart from the pride of a great work completed, is it not possible that the fascination of delving after the mysterious and unknown may be a clue to the present rage for tunneling? We tunnel under lakes for water, through mountains for roads intended to save time and distance, and even propose to unite countries, severed by seas, with tunnels. This age may be called the age of the earth-borers.