

only to the reader of the SCIENTIFIC AMERICAN, but to his employer as well, we venture to reproduce a portion of a communication just received from a neighboring city, suppressing only such parts as would betray the confidence of the writer and his unfamiliarity with the spelling book. The directness, force, and eloquent sincerity of the story could not be improved by the most skillful rhetorician. The writer says:

"A few years ago I had the fortune to be placed over the machinery department of a firm in this city. I was to fill a position until then occupied by a man of intellect and experience. I was nineteen years old, and addicted to many of the evil habits of young men of that age. I was pursuing a useless and unprofitable career, both to the disadvantage of myself and those around me. I managed to keep my position, and also to keep the work up to the mark of former years, in the matter of cost and amount manufactured. Two years passed. The machinery was getting very badly impaired. I knew I could not keep up the work if the machinery was not repaired properly. I yearned for some means by which I could find out the wanted information. I inquired of a newsdealer for some work on machinery, but having none, he sent me a copy of the SCIENTIFIC AMERICAN, which, he said, would give me the information I wanted. My joy was overshadowed when I perused its pages without understanding what I was reading about. That gives you the limit of my education at that time. I read it again, and a beam of enlightenment came over my senses. I tried it again and again. I believe I read that copy twenty-five times, jumping from one article to another, or to the one I thought I was most likely to derive some information from, each time bringing a new and encouraging result. I became a subscriber through the newsman, and have never missed a copy since.

"What is the result? I will try to tell in part, as no man living can tell all. There is an increase of 20 per cent in the amount of stock turned out, and a large increase in the demand for our manufactures. . . . There is a saving of one third in the expense of articles pertaining to the manufacture that is, in belting, oil, etc. The help get better wages and steadier employment than ever before. . . . In fine, the firm are in a fair way of becoming as well known as the SCIENTIFIC AMERICAN, to which I owe all the advantages I have gained, both in relation to my private and public career. I now superintend the entire manufacture, and have charge of the whole inside business, as well as the machinery department."

Our readers will pardon the length of the citation for its real merit. It is but one of a multitude of instances which have come to our knowledge, of young men of inherent force, but untrained and ignorant, who, through a new life of thoughtfulness and study aroused and sustained by the weekly instructions and suggestions of the SCIENTIFIC AMERICAN, have developed rapidly and profitably to themselves and their employers. In every workshop will be found rough diamonds of this sort, possibly wasting their time and strength in dissipation and thoughtlessness, with whom a subscription to the SCIENTIFIC AMERICAN might work wonders. Many employers have assured us that it pays them to provide the paper for such workmen. It is not a costly experiment to try, at all events; and, in view of communications like the foregoing, we may be pardoned the suggestion that the experiment be more generally tried.

THE NATIONAL OBSERVATORY.

Notwithstanding the observations of the numerous celestial phenomena which have occurred during the year about closing have somewhat interfered with the regular work of the Observatory, yet a large amount of it has been done, and the observations of the year are now being reduced. During the year the 26 inch equatorial, under the charge of Professors Hall and Holden, has been pretty constantly employed in observing satellites, nebulae, and comets. The optical power of this instrument is very fine, and was much praised by the foreign astronomers who visited it during the past year, but they considered its mounting as too light, and the justice of this criticism is shown in slight tremors in right ascension, though observations show that during the last five years the pole of the instrument has changed but the fraction of a minute of arc. Some changes, however, will have to be made, as the heavy dome makes it difficult to revolve. The continued observations of the ring and satellites of Saturn, which were made until the planet approached too near the sun, prove that Bessel's elements of the ring are very nearly correct. Frequent observations were made of the satellites of Mars, Uranus, and Neptune, and an unsuccessful search made for a satellite to Venus.

The thirty double stars selected by Otto Struve, of Pulkowa Observatory, for the determination of personal errors, were observed by Professor Hall, each star being observed six nights on an average. The different combinations of the angles and the distances of the stars in the trapezium of Orion were measured first with bright wires in a dark field, and then with dark wires in a bright field, six times by each method, and an adjustment of the measurements effected by the method of least squares. Sirius and its companion have been carefully observed with a view of settling the question whether the companion produces the variable proper motion of Sirius.

Nearly 3,500 observations have been made by Professors Eastman and Frisby and Assistant Astronomers Skinner, Paul, and Pritchett, with the transit circle. The work of this instrument for former years has been prepared for pub-

lication, but owing to lack of funds its printing is delayed. The 221 photographs taken by the transit of Venus parties in 1874 have been measured by Professor Harkness for the corrections of minute errors, such as were due to the shrinkage of the collodion and like causes. The observations of the transit of Mercury and the total solar eclipse have been compiled in detail, and their computation and reduction are now going on. The publications of the Observatory have been freely distributed to other observatories, institutions, and astronomers, and numerous valuable additions to the library have been received in exchange.

AN AMENDMENT TO DISCOURAGE INVENTION.

It is to be hoped that before final action is taken upon Mr. Wadleigh's bill for the revision of the Patent Law (Senate Bill 300), more particular and searching inquiry will be made with regard to the probable effect of Section 11. As it stands, this section provides that, in addition to the fees collected when a patent is applied for and when it is issued, there shall be paid to the Commissioner a duty of fifty dollars at the end of the first four years, and another duty of one hundred dollars at the end of the second four years, after the patent is issued; thus increasing the cost of patents more than fivefold. The failure of either of these payments it is further provided, will make void the patent. There are two very strong reasons why this section should not be adopted as part of the patent law.

In the first place, the patent system is already more than self-sustaining, the receipts from existing fees largely exceeding the cost of maintaining the Patent Office; and there is no good reason why the United States Government should seek to increase its revenues by laying a special tax upon inventors. Besides, the patent fees are sufficiently burdensome already. If any change is made in them they should rather be reduced, as they could be materially without diminishing in any way the efficiency of the office.

In the second place, the assumption on which the proposed amendment is based is altogether fallacious. It is said that a great many patents are worthless. They are never developed. Yet they stand in the way of industrial progress, in that they prevent the use of the idea or device they cover in a more practicable way; or they are made the basis of claims for damages when other men have introduced the idea successfully. In all such cases, however, it is the man that has invaded, or that wants to invade, a patent right, not the owner of it, who is desirous of having such a patent condemned and killed. But that is apart from the point at issue. It is said that there are a great many worthless patents that ought to be put out of the way; and that it can be done most readily by levying the proposed duties. If a patent has any value at all, say the advocates of this change, it will be more than worth paying for; and four years is ample time for demonstrating the worth or worthlessness of any invention. All this is inconsistent with fact and experience. The more novel an invention is the less the likelihood of its being immediately profitable. Indeed, the speedy development of a strikingly useful invention is quite exceptional; and with the average of inventions the time that elapses before they are assuredly profitable is oftener ten years than four or eight.

But the chief fallacy involved in the proposed amendment lies in the assumption that the value of an invention is always to be measured by the ability of the inventor to pay a heavy fee: if he can pay \$185, his invention is good; if he cannot, it is bad, and should be put out of the way. Under this rule there is scarcely an invention of exceptional merit, perhaps not one of the great inventions which have done so much to hasten our progress as a nation, that would not have been summarily extinguished. Their inventors have found them anything but profitable during the first few years, sometimes during the entire life of the patent. It would be sheer cruelty, and as impolitic as cruel, to add to the discouragements of the inventor the risk of losing all through inability to meet severe and needless demands.

Indeed it is altogether too common, in the discussion of this question, to overlook the fact that the majority of inventors are poor men, and that the public, which is ready enough to laud an inventor after he has compelled recognition of his merits, is only too ready to give him the cold shoulder while he is struggling against poverty and the inertia of professional routine and popular ignorance. The assurance that a patent once granted is property, that it will insure the protection of his rights when their value has been demonstrated, spurs the inventor on to efforts which very frequently make him a benefactor to his age and country. In multitudes of cases important improvements or radical innovations of great value are delayed because of the inventor's inability to command the relatively small fees already demanded at the Patent Office. To add one hundred and fifty dollars to them, as proposed, would put the hope of securing a patent out of their thoughts entirely, and in thousands of cases would result in putting an extinguisher upon their creative labors. The country cannot afford to have its best workers so seriously hampered, so needlessly discouraged.

This is not a theoretical objection. The practical effect of heavy patent fees may be seen in the history of every nation that has tried them. In England, for example, it is an admitted fact that poor men do not invent, or if they do the public reaps small benefit from their labors. Like the senior Bessemer they carry the secrets of their discoveries to the grave: and improvements of great industrial value are frequently lost in this way, when under a more just and

liberal patent system they would remain on record part of the stock of common knowledge for the enrichment of after years.

THE TUNNEL UNDER THE BRITISH CHANNEL.

The reason why the Channel Tunnel Company recently ceased their operations in St. Margaret's Bay is stated to be that, when the reports as to the soundings between Sangatte and St. Margaret's Bay were handed in by the surveyors, it was found that to cut a tunnel between those points would entail an enormous amount of work in sinking. The site in question has, therefore, been finally abandoned. The scheme now before the company provides for the sinking of a new shaft at or close to Dover.

The site on the French side at Sangatte, near Boulogne, is still looked upon as the best that could be chosen for the commencement of the tunnel. The shaft sunk there is already 70 meters in depth, with a diameter of 2 meters, and the engineers consider that when they have got 10 meters further down the horizontal cutting may be commenced.

The engineers of both countries agree that the French opening of the tunnel is the most difficult part of the undertaking, as a clayey soil has to be dealt with instead of chalk, and the incursion of water causes much trouble.

PROTECTION TO BANKS.

A correspondent suggests that an insurance society could be organized, which, for a moderate premium, could insure bank premises against burglary. It would then be the duty of trained inspectors to examine into the security of the safes and locks, and to order the adoption of the latest and strongest safeguards; and should these be broken through, the reserve fund of the insurance company would make good the loss, which would thus be equally distributed over the community.

Possibly an organization of this sort might be useful. It would have to be very careful in its agents, however, lest it be converted into a source of danger through the collusion of inspectors and burglars. In this, as in other cases, prevention is better than cure; it would be better, as well as cheaper, for the banks to forestall the burglars with scientific safeguards. There is no fear of time-locks and electric alarms betraying combinations.

THE HOG CHOLERA COMMISSION.

Congress having appropriated at the previous session \$10,000 to pay the expenses of investigating the nature and cause of the diseases prevalent among swine, the Commissioner of Agriculture appointed a number of competent gentlemen in the States of Indiana, Illinois, Iowa, Nebraska, Kansas, Missouri, North Carolina, Virginia, and the Western part of New York, who have been engaged in prosecuting their investigations, and have nearly all submitted extended reports, which have been carefully collated and the results embodied in a report that will shortly be presented to Congress. From these papers it appears that the identity of the disease in all portions of the country is pretty thoroughly established, that the term "hog cholera" appears to be a misnomer, and that in all cases of the disease the lungs appear to be affected. Among the gentlemen engaged in the investigation are Dr. H. J. Detmos, the veterinary writer for the Chicago *Tribune*; Professor Law, of the Cornell University; Dr. D. W. Voyles, of New Albany, Ind., and Dr. Salmon, of North Carolina, from whose knowledge it is supposed that the results of the investigation will prove of the highest importance in throwing light on a subject which has never been fully understood, and in checking a disease whose ravages yearly destroy a large portion of the revenue of our stock raisers and farmers.

Another Adverse Trade Mark Decision.

Some time ago a bill in equity was filed by Day & Frick, soap manufacturers, of Philadelphia, against P. Walls, another extensive soap manufacturer, in which an injunction was asked to restrain the employment of certain labels and wrappers used by Walls in his soaps. These labels, it was alleged, contained language similar to that registered as a trade mark at Washington by Day & Frick. The description secured by them in designating the soaps were the words "bleacher," "bleaching," together with a device of a pair of scales and other signs, and it was claimed that the use of this trade mark by Walls was an infringement.

In behalf of Walls, his counsel, Pierce Archer, subsequently filed a demurrer to the bill, claiming that the act of Congress was *ultra vires*—beyond the constitutional powers which authorize Congress "to promote the progress of science and the useful arts by securing for a limited time to authors and inventors the exclusive right to their respective writings and discoveries." A trade mark, Mr. Archer held, was neither an invention nor a writing, but simply an advertisement, and as such was not within the pale of the section.

Judge Cadwalader has sustained Mr. Archer's objections, on the ground that the court has no jurisdiction to entertain conflicts over trade marks. It is probable that this case will be taken to the Supreme Court of the United States.

Manes' Revolving Furnace.

The revolving furnace recently patented by Mr. James Manes, of 1844 Fulton Avenue, Brooklyn, N. Y. (formerly of New Haven, Conn.), has been applied to the extraction of quicksilver from cinnabar, to desulphurizing ores, drying fertilizers, and animal and vegetable matters, also for making gas. We are informed that it is economical and effective, and accomplishes its work without allowing injurious fumes to escape.