Scientific American.

ESTABLISHED 1845.

MUNN & CO., Editors and Proprietors.

PUBLISHED WEEKLY AT
NO. 37 PARK ROW, NEW YORK.

O. D. MUNN. A. E. BEACH.

TERMS FOR THE SCIENTIFIC AMERICAN.

One copy, one year, postage included..... **$3 20**
One copy, six months, postage included **1 60**

Clubs.—One extra copy of THE SCIENTIFIC AMERICAN will be supplied gratis for every club of five subscribers at $3.20 each; additional copies at same proportionate rate. Postage prepaid.

The Scientific American Supplement

is a distinct paper from the SCIENTIFIC AMERICAN. THE SUPPLEMENT is issued weekly; every number contains 16 octavo pages, with handsome cover, uniform in size with SCIENTIFIC AMERICAN. Terms of subscription for SUPPLEMENT, $5.00 a year, postage paid, to subscribers. Single copies 10 cents. Sold by all news dealers throughout the country.

Combined Rates.—The SCIENTIFIC AMERICAN and SUPPLEMENT will be sent for one year, postage free, on receipt of *seven dollars*. Both papers to one address or different addresses, as desired.

The safest way to remit is by draft, postal order, or registered letter.

Address MUNN & CO., 37 Park Row, N. Y.

☞ Subscriptions received and single copies of either paper sold by all the news agents.

VOL. XXXVIII., No. 15. [NEW SERIES.] *Thirty-third Year.*

NEW YORK, SATURDAY, APRIL 13, 1878.

Contents.

(Illustrated articles are marked with an asterisk.)

TABLE OF CONTENTS OF
THE SCIENTIFIC AMERICAN SUPPLEMENT
No. 119,
For the Week ending April 13, 1878.

Price 10 cents. To be had at this office and of all newsdealers.

Remit by postal order. Address

MUNN & CO., 37 Park Row, New York.

THE PROPOSED EMASCULATION OF THE PATENT LAW.

Section II. of Mr. Wadleigh's amended patent bill, now before the Senate, reads as follows:

"On each and every patent for an invention issued after the passage of this act, there shall be paid to the Commissioner a duty, as follows, namely: Fifty dollars to be paid on or before the first day of January occurring next after the expiration of four years from the date of the original patent, and one hundred dollars on or before the first day of January occurring next after the expiration of nine years from the date of the original patent; and in default of any such payment, the patent shall expire on the first day of April next thereafter. But the Commissioner, for good cause shown, may allow the payment to be made at any time before such first day of April, in which case the patent shall not become void. The Commissioner shall annually, in the month of April, publish a list of the patents which have expired for non-payment of duties." (The remainder of the section provides simply for the recording and certification of the prescribed payments.)

It is much to be regretted that a bill, otherwise commendable, should embrace a provision like this, since it involves nothing less than an abandonment of a characteristic and valuable feature of the American patent system. Hitherto this country has stood almost alone in giving to the inventor an absolute patent in return for the publication of his invention, and its surrender to the public at the end of a term of years. There have been no drawbacks or subsequent duties; once the patent was issued, the patentee entered into a full and exclusive right to control his invention for the stipulated period.

The beneficial effect of this feature of our patent system has been amply demonstrated. In no other country have *poor* men contributed so enormously to the progress of the arts and sciences through useful inventions, for in no other country have the benefits of patent rights been so accessible to men of limited means.

The theory of the founders of the system was substantially this: The life of a patent is but an insignificant period compared with the life of the nation. Even should the patentee be unable or unwilling to develop his patent, the publication of his idea and its surrender to the community at the close of a limited term of years more than compensate the public for the special privilege which the patent confers. At most, that merely deprives some other possible inventor of the *same* device, during the life of the patent, of the privilege of controlling *his* invention; and the injury likely to be done through such infrequent occurrences is as nothing compared with the good sure to flow from the issue of unrestricted patents. Accordingly no conditions were affixed to the right. The inventor was not compelled to put his device into practical use within a specified time on pain of forfeiture of his right, as in other countries.

He was not compelled to issue licenses to make or use his invention. He was not required to keep his patent alive by periodical fees. In short, his right, so long as it lasted, was absolute and unconditional. And the working of the system has abundantly demonstrated the wisdom of its founders.

It is now proposed to reverse this principle. In obedience to the wishes of wealthy corporations, which would naturally like to control all patents issued for inventions within their spheres of operation, it is proposed to discriminate against inventors of limited means. Worse, it is proposed to reduce the actual life of patents from seventeen years to four years, with the privilege of extending that life to the full period on the payment first of fifty dollars, and subsequently one hundred dollars more.

Since the existing patent fees more than suffice to support the Patent Office, the proposed increase of cost cannot be justified on the score of necessity. Its sole purpose is to facilitate the confiscation of valuable patents by those who want to use them without payment therefor; and we are confident that the obnoxious section will be stricken out before the passage of the act, provided the attention of the Senate is called to its vicious effect.

Inventors do not spend their time and strength and means in putting their ideas into material form, and thus communicating them to the world, from a pure love for invention. They work like other men for pay. There is no public fund provided for the hiring or rewarding of inventors, nor is it desirable that there should be such a fund. It is desirable, however, that invention should be encouraged; and the simplest and best way to do this has been found to be through the granting of patents; that is, simple official recognition of a limited property right in the fruit of one's thought and labor.

The life of a patent is now seventeen years. Should the new bill be passed as it stands, the assured life of patents will be reduced to four years—certainly an unjustifiable lessening of the encouragement hitherto held out to inventors.

But, the friends of this Section II. may urge, four years is time enough to show whether a patent is worth anything, and fifty dollars is no great sum to pay for the perfecting of an inventor's title for five years more. If the inventor does not think it worth fifty dollars, it had better be killed and out of the way.

There are several fallacies and false assumptions here. There have been multitudes of valuable patents whose real worth has not been demonstrated during the first four years; often the inventor's reward does not fall to him until nearly the end of the allotted seventeen years. Very often the additional fees proposed would bear so heavily upon the inventor as to cause him to relinquish his apparently barren, yet really valuable, right; and there is just where this feature of Mr. Wadleigh's bill may be made the means of working grave injustice to deserving inventors, in addition to its general bad effect in discouraging invention. If any change at this point is to be made in the working of the system, it should rather be toward diminishing the fees, and thereby increasing the inducement held out to poor men to develop their inventive genius. There is no telling how many suggestions of infinite possibilities for the public good may already have been allowed to die undeveloped, for the simple reason that their immediate promise has not seemed to warrant the sacrifices involved in taking out a patent. Small as the charges of the Patent Office are, compared with those of other countries they are still of serious magnitude to poor men.

But the worst phase of this obnoxious section is seen through the door it opens for the subjection of many inventors to the mercy of grasping corporations, whose inordinate selfishness needs no such encouragement. The manifest anxiety of such parties to have certain patents killed and out of their way is conclusive evidence of their value to somebody. And it is quite possible that the prospect of enjoying the free use of an invention at the end of four years might often induce covetous corporations to unite in its condemnation, thereby depriving the public of the benefit of the invention during that period, as well as ultimately defrauding the inventor, who might be unable to perfect his title or unwilling to sink more money in a right that promised no return.

No doubt it is often unpleasant, both to individuals and corporations, to pay an inventor his price for the use of his invention; but that does not justify their robbing him. Much less would it justify the public, which has been so enormously benefited by the law as it stands, in emasculating the system to facilitate the robbery.

"KERAMICS" AND WOMAN'S WORK.

The desire to decorate pottery for purposes of household adornment seems to be a kind of chronic inclination which suddenly affects large numbers of people at the same time, and as suddenly disaffects them. The influx of paste, paint, and varnish pots, of jars and vases of glass and crockery, of sheets of gayly colored pictures, into that part of the domicile sacred to the feminine members of the family usually indicates the beginning of the attack; the prevalence of said jars and vases (which too often are liquid blacking bottles or ginger pots artfully disguised) in the parlors marks its advanced stage; and the contemptuous removal of the same to the attic, under the stigma of "looking cheap," denotes its termination. Thus far the mania has appeared in three forms. About fifteen years ago it bore the name of *potichomanie*, and it took the form of pasting scrap pictures inside of clear glass jars, backing them with thick white paint, and then persuading yourself that an accurate counterfeit of Oriental porcelain had been produced. This gave place to *decalcomanie*, a useful species of decoration which enables colored pictures printed on gelatine films to be applied to any smooth surface. It is much in vogue yet for decorating cheap furniture, carriages, and safes; but during its fashionable prevalence no object of household use was safe from its incursions, and the marble center table or the kitchen pails were beautified with indiscriminating impartiality. The term *keramics* has lately been twisted out of its proper signification to be popularly applied to the sticking of paper pictures on pottery of any kind, and adding a coat of varnish, an alleged imitation of painted china being the result.

Upon the broad general principle that anything which tends to increase the popular taste for beauty is to be encouraged, the above named manias may be beneficial apart from their obvious utility as a means of amusement; but, on the other hand, when it is remembered that the same inclinations, directed in the proper channel, may with little or no more labor produce objects of real artistic merit and of far more value as educating and refining the tastes, it would almost seem that time and talents are being wasted. Nothing that is false is artistic. Decorated ginger pots are in truth but ginger pots; blacking bottles cannot be foisted upon the world as Etruscan vases or Haviland faïence. A certain amount of falsity is conventionally accepted, such as imitation wood and sheet iron architectural ornament; but when an object is diverted from its recognized use, especially if that use be humble, the deception is only tolerated for a time, and eventually is repudiated; and the pity of it is that so large an amount of the female energy in the world seeking an outlet finds it in such a way. The legitimate result is the degradation of woman's work as a unit in social economy, for while no one would wish to do away with the numberless delicate devices which the feminine mind delights in conceiving, or would remove one source of pleasure to the gentler sex, all must agree that if that work were, as a rule, directed to the production of objects, no matter how intrinsically trivial, which satisfied the precepts of correct artistic taste, and were capable of affording permanent gratification, there would be less heard about the lack of openings for woman's labor.

It requires but a brief glance at the statistics of our imports and exports to show how largely dependent we are upon foreign nations for objects valuable only because beautiful. Take the class known as fancy goods: for the year ending last June we exported these to the value of $335,310, and imported them to the value of $3,828,302. We imported nearly four million dollars' worth of china and stone ware,

which includes nearly all the decorative pottery used in the country. It is true that manufacturers in this vicinity are making great efforts to produce as finely decorated porcelain as can be obtained from abroad. and their progress has been satisfactorily rapid; but it needed only a casual examination of the exceptionally fine display of American porcelain at the American Institute Fair of last year to show that artistic taste and skill were even more lacking than the ability of the manufacturer to reproduce the delicate or rich colors of the foreign ware. There can be no question but that we have in this country every variety of clay necessary for the production of all kinds of pottery from earthen ware to porcelain. Indiana kaolin is claimed to be superior in composition and perfect whiteness to any European clay. We are producing large quantities of common ware, which, although it requires skilled labor, does not enlist the artistic element. We would produce fine ware if the artistic ability which abundantly exists in the country could be properly brought into play.

But, as we have endeavored to point out above, a large percentage of that ability among the women who, by their inherent delicacy, natural refinement of taste, and physical circumstances are far better suited to its exercise in ceramic art industry than are men, is being frittered away aimlessly and uselessly. Perhaps worse than this, for they are filling their homes with objects which falsely educate the eye and mind, and lead the rising generation to form its first standard of taste upon vicious principles. At the same time they are neglecting the cultivation of a field which urgently needs laborers. Women who are competent to decorate pottery finely will find their services in ample demand, and their means of livelihood secure against chances of fortune. Whether the art be followed for this reason or as an amusement only, it is refining and educating, and its influence is always beneficial, and this cannot be said of "potichomanie," "decalcomanie," or "keramics."

THE MANUFACTURE OF DAUBS.

Art degraded to a trade, the *Tribune* calls it, but that is an insult to honest industry. It is because the daubs are made to be sold for what they are not that the business of making and mounting imitation works of art is objectionable. The daubs, known to the trade as "buckeyes," are turned out by the thousand, some shops in this city being able to produce them at the rate of a hundred a day. About nine tenths of them are copies of landscapes. The "artists" need only so much skill as will enable them to handle a common paint brush or to manage a stencil plate. In many of the shops the most of the work is done by boys and girls earning from fifty cents to a dollar a day. The maturer workmen paint by the piece, getting from fifty cents to two dollars for each painting.

They paint entirely by rule, using paints and canvas prepared by the manufacturers. The canvas costs about eight cents a square yard. Poor artists are employed by the day to touch up the pictures, which are varnished to hide their more glaring faults, and then flashingly mounted in imitation gilt frames. The entire cost of paintings and frames is about one fifth the cost of good frames; yet when new they appear very attractive to the inexperienced, especially when displayed under gas light in auction rooms. Placarded as choice collections of American and foreign artists, daubs, which can be bought of the manufacturers at the rate of $50 a dozen, often sell for $20 or $30 a piece.

The largest manufactory of such paintings in the city occupies the whole of a three story building. The most of the pictures go out of the city. The owner said to the *Tribune* reporter: "I get orders from all parts of the country now, and can fill an order for a hundred pictures with a few hours' notice." The prices of this maker range from $30 to $100 a dozen, frames included, most of these pictures being 36x22 inches, a size convenient for the economical cutting of canvas. At a rival shop the prices ranged from $40 to $150 a dozen. Another manufacturer of "buckeyes" of a smaller size sells them for $16 a dozen.

The swindling devices adopted by dealers in these fraudulent pictures are those of mock auctioneers everywhere; and the manufacturers abet the swindle by signing their daubs with the names of popular painters ingeniously misspelled, or with initials wanting. It is a common trick of hawkers of these pictures to profess to be artists in distress and willing to leave valuable pictures as security for a small loan; or they are about to leave the city to fulfill a profitable engagement, and would be glad to sell at a great sacrifice to raise the money needed for the journey. A gentleman who took a painting as security for a loan of $80, the other day, discovered soon after that the regular price of the picture "by the dozen" was fifty cents a piece!

THE SCIENTIFIC APPLICATIONS OF PHOTOGRAPHY.

In a recent article we briefly reviewed late progress in astronomical photography. In the present we propose to point out some of the latest and most curious applications of photography to scientific investigation, besides its special adaptations to many useful purposes, many of which have been recently explained by M. Radau.

With the magnificent panoramic views of sketches of landscape which it is now possible to produce by photography every one is familiar. Apart from the value of these as works of art, they have practical applications to topographical uses, to which reference will be made further on. A curious feature of photographic representations of archæological objects is that the careful study of the picture is often the means of revealing facts hitherto unnoticed. For example, on a photograph of the Acropolis, at Athens, Baron Gros discovered, by the aid of a lens, a curious carving on one of the stones which formed part of the ruin. The engraving represented a lion devouring a serpent, the design evidently dating from an ancient Egyptian epoch. Another odd circumstance is that photography sometimes reveals things totally invisible to the eye. Inscriptions on ancient manuscripts have thus been brought to light. The ink, containing peroxide of iron, had faded so that it was no longer visible, but it had affected the photogenic power of the surface, so that in the photographic print the characters once more appeared in their original blackness.

Geodesy and military topography now find an important aid in photographic views. The picture being produced by lenses is made to conform to geometrical rules, and represents a central perspective much more exactly than could be produced by means of measuring instruments. A number of such photographs of a given locality, taken from different stations, allow of the determination of both the relative situation and the location of objects, and thus charts may be accurately constructed without the necessity of making actual surveys.

It has been proposed in this way to map new regions, such as the interior of Africa, photographs being taken of large expanses of country from commanding eminences, thus avoiding a large amount of arduous personal labor. Military maps are not only now reproduced in large numbers by photography, but they are supplemented by numerous views of the district plotted, so that an army in strange territory is thus afforded minute information, not only of the general physical characteristics of the region, but of its minute peculiarities.

There is probably no more important application of photography to scientific uses than as an auxiliary to meteorological work. Photographic registering apparatus operating automatically produces curves, which show by simple inspection all the phenomena incident to climate. If, for example, it is necessary to register the indications of a barometer or thermometer, a clockwork movement unwinds in rear of the instrument, which is suitably illuminated, a band of sensitized paper, on which the varying heights of the mercury are recorded.

Atmospheric pressure is registered in this way by the aid of an ordinary barometer, suspended so that the shadow of the mercury meniscus and the divisions of a scale traced on the tube are projected simultaneously on the sensitized leaf. To record the movements of a thermometer the beam of light is caused to pass, not through the vacant space above the mercury, but through a small air bubble introduced in the mercurial column, and which thus serves as an index. The addition of a wet bulb thermometer allows of the production of two thermometric curves, which separate as the air becomes drier, or approach when more moisture is present. The relative humidity of the atmosphere may also be registered by means of a hair hygrometer, the needle of which travels across the slit through which the beam of light passes.

In order to record the fluctuations of terrestrial magnetism, movable magnetized bars are used, each having attached to it a small mirror which, when at rest, forms the prolongation of a fixed mirror. The beams of light which the two mirrors reflect through a slit describe on the sensitized paper a black spot, which becomes a line as the paper moves. The least oscillation of the bars causes the separation from this line of the trace produced by the movable mirror, and in this way all the movements of the magnetized bar are registered. It will easily be understood how arrangements analogous to the above will allow of an exact representation of all the physical or physiological phenomena which are manifested by visible movements. M. Stein, for example, proposes thus to record the level of tides, now commonly marked by a pencil fixed to a vertical rod attached to a float. M. Neumeyer, of Berlin, has constructed an ingenious apparatus for studying submarine currents and determining the temperature of the sea bottom. A copper cylindrical box, which is attached to the sounding line, contains a thermometer and a magnetic needle, which are illuminated by Geissler tubes filled with rarefied nitrogen, through which electric sparks are passed. This light suffices to mark in less than three minutes, on sensitized paper, the image of a mercury column and the position of the magnetized needle. A sort of vane or rudder attached to the box serves to maintain the "lubber's point" of the compass in the direction of the current.

Dr. Forel has adopted the same means of investigation to the examination of the causes which produce periodical variations in the transparency of the water of Lake Leman. This water is more transparent in winter than in summer, and in order to determine the extent of this variation, it became necessary to obtain precise numerical data. One method used consisted in placing at the bottom of the lake a box, in which was adjusted under glass a sheet of sensitized paper. This was left for two days exposed to the solar rays which passed through the water. Half of the paper was covered by a screen, so that the degree of coloration could be determined by comparison. On removing the sheet the color was fixed by hypo solution, and it was then compared with a scale of shades determined in advance. In this way it was found, for example, that in February, at the depth of 160 feet, a coloration represented by 20 was obtained, while during July no effect was visible at the same depth. The limit of obscurity was thus found to be 160 feet in summer and 320 feet in winter. This was verified by noting the depth at which a white disk attached to a sounding line ceased to be visible. M. Forel reached the conclusion that the cause of the variation in the transparence was the presence of organic matters in the water, which distributed themselves differently in summer and winter.

The study of the solar spectrum and other luminous spectra has been greatly advanced by the intervention of photography, which has been the means of recognizing dark lines or spaces in the ultra violet region, the rays of which produce scarcely any impression on the retina. A large number of such lines have been thus determined by Rutherford, Draper, and Mascart. Similarly Vogel has made some new discoveries with regard to the obscure rays in the red region. He has found that it is sufficient to mix with collodion coloring matters which absorb the red rays to render it sensitive to the action of such rays, so that the special designation of "chemical rays" applied to those of the violet and ultra violet region may be considered as obsolete, all the spectral colors being capable of affecting a photographic plate properly prepared.

Photography renders important aid in physical investigations. Bunsen and Roscoe, by the aid of sensitized paper, have measured the changing intensity of solar radiations. Dr. Stein has photographed zigzag lightning. The indented image of the manometric gas flame produced on the rotating mirror has been photographed. Instead of ordinary illuminating gas cyanogen is now employed, on account of the superior photogenic power of the flame. The rapid oscillations of tense cords and the beatings of the human pulse have also been photographed. The applications of photography to medical studies are numerous and valuable. Without mentioning the faithful reproduction of anatomical preparations, which is facilitated by the injection of colored liquids, it is possible to send the investigating ray into the depths of the living body. To the ophthalmoscope, which reveals the inner eye, the laryngoscope, which shows the interior of the throat, the otoscope, which explores the ear, may be added the sensitized plate on which the image of the impaired organs may be fixed. By the aid of photomicrography, images of microscopic objects, the rapid alteration in which fatigues and baffles the eye, may be permanently caught. Dr. Duchenne, of Boulogne, has made a complete series of photographs of muscles under the influence of various passions (the electric current being used to produce the necessary contractions), which have been of great assistance to Mr. Darwin in his study of the expression of emotions in man and brutes.

Perhaps most curious of all the applications of photography is its possible adaptation to the discovery of disease. Vogel mentions a case where the face of a sitter appeared in the portrait covered with spots, although none were visible on the skin. On the day following that on which the picture was taken, an eruption did appear, and the person afterwards died of varioloid. The feeble yellow of the incipient pustules had evidently affected the sensitized surface, and the disease had shown itself to the camera before it had been recognized by the doctors. Lastly, we may mention Dr. Oridtmann's suggestion of the value of collections of family photographs in the study of anthropology. He has already begun the collection of large numbers of portraits, and from these he proposes to investigate what modifications selection may exercise on the hereditary transmission of personal characteristics.

Torpedo Inventions Wanted Abroad.

Inventors will do well to remember that now is the time to bring out military inventions, and especially devices relating to torpedoes and torpedo defense. The Russo-Turkish war afforded very little opportunity for the testing of the efficacy of torpedoes in actual combat, though the blocking of the Russian harbors on the Black Sea by their agency against the Turkish fleet added some new proof of their value as a means of keeping off an enemy. The difficulty between Russia and England is, however, so far from adjustment that both powers are busily arming. Recent intelligence reports the Russians as building 100 new torpedo boats, and that the English are giving out large contracts for the same kind of craft and for immense numbers of torpedo sinkers. Inventors who have ideas on the subject should now get them into practical form, and after obtaining the necessary protection take steps to lay them before the English or Russian authorities. The English government receives and examines inventions of this kind, on their being submitted to the Admiralty.

WORK is being pushed upon the Gilbert Elevated Railroad, in this city, with great vigor, and the cars are to run next month. The iron work is covered with a soft drab color quite agreeable to the eye, and in good contrast to the dark somber colors often used upon iron bridges, etc. The contract for supplying paints for the Gilbert road has been awarded to the H. W. Johns Manufacturing Company, and is said to be the largest contract ever made for any single structure in this country.

MANY alloys of tin and other metals, which are rendered harder by additions of antimony, copper, etc., do not, when struck, emit a clear sound. M. Lilliman, says *Les Mondes*, finds that this may be remedied by dipping the metal for about a minute in a bath of paraffin or oil heated to a temperature of 122° Fah. This operation is said to augment the hardness of the alloy.