AN ADDRESS ON THE PATENT LAWS.

Sir David Brewster recently delivered an introductory address at the opening of the Edinburgh University, from which we extract the following interesting passages on the subject of the patent laws:

"Among the subjects which occasionally arrest and agitate the public mind, there are few which immediately affect the position and interests of educated men. Such questions, however, have occurred, but they have generally been settled by the united wisdom of the Government and the Legislature, without any of those appeals to popular or party clamor under which great measures have been often abandoned or impaired. A question of this kind, however, has unexpectedly arisen respecting the amount of protection which inventors should receive from the Legislature; and there is, doubtless, no subject more important to educated men, whether their education has been completed in the school, the workshop, or the university. You are all aware that the author of any literary work, however small be its dimensions and however frivolous its subject, enjoys, by the laws of England, the sole right of publishing it for twenty-eight years, and during the rest of his life. The only tax exacted by the law, and that only for the benefit of the public, is the presentation of five copies to the principal libraries in the kingdom. The artist, the engineer, the draftsman, the geographer, the hydrographer, and the sculptor enjoy the same valuable right; and so complete is the protection afforded by the law that piracy is almost unknown and works thus secured constitute a property which can be as safely transferred as land or money in the funds. It is otherwise, however, with the inventor of new machines, new instruments, and new processes in the fine and useful arts. While the author can instantly dispose of his work or draw the profits which it may yield, the inventor must devote himself to the development and practical application of his invention. When his arrangements are complete, he applies for a patent and he receives a right to use his invention for fourteen years by paying fees and expenses which, half a century ago, amounted in many cases to £400 or £500. The right thus obtained was entirely illusory. His parchment, indeed, bore the Great Seal of England, but the patent could be refused, and the price of it forfeited, either from want of complete originality in the invention or from frivolous defects in his own description of it. In this state of the patent law, injurious to the interests of the public and ruinous to inventors, our distinguished Chancellor, Lord Brougham, directed his attention to the subject, and carried two bills through Parliament, which reduced the price of patents and removed many of the more obnoxious provisions of the former law. These improvements were generally acceptable, and though inventors were still dissatisfied with the large sum of about £150 or £200 which they had to pay, and with the imperfect protection which their patent secured, they nevertheless submitted to the operation of the law, in the hope that future legislation might improve it. Under these circumstances, men of science, and inventors of all classes, were startled with a proposal made by a distinguished engineer, that the patent law should be repealed, and that there should be something like free trade in inventions. In addressing an assembly of civil engineers at Sheffield, Sir William Armstrong stated that the dauntless spirit which, in matters of commerce, had led this country to cast off the trammels of protection had resulted in augmented prosperity to the nation, showing the injurious tendencies of class legislation when opposed to general freedom of action; and he expressed a hope that the same bold and enlightened policy might be extended, in some degree at least, to matters of invention. For his own part, he was inclined to think that the prestige of successful invention would, as a rule, bring with it sufficient reward, and that protection might be entirely dispensed with. Under the free trade of the present day, thus highly and justly appreciated, we receive the corn and the wines of one country in return for the iron and the coal of another; but it exceeds our comprehension how there can be free-trade between two parties, one of which is the small class of discoverers or inventors and the other the whole mass of society, who are not inventors at all, and who, with all the influence of numbers, wealth, and position, would instantly appropriate and turn to profit every discovery in science that had a practical bearing and every mechanical idea that could be embodied in an instrument or a machine. Between such parties as these there can be no interchange of ideas and no reciprocity of interests; and as there can be no dealings between them, there can be no freedom of trade in any sense analogous to that great commercial doctrine to which reference has been made. But even under the present patent laws, as they exist in every part of the Old and New Worlds, there is already something approaching to freedom of trade. Every foreigner can obtain a patent in England, and an Englishman enjoys a similar right in return. The producers of ideas, therefore, are in every country in the same relative position nearly as the producers of those commodities which are interchanged under free trade—the non-producers of commodities deriving analogous advantages under the law—the one from the importation of useful inventions and the other from the importation of the necessaries and luxuries of life. There is still, however, another variety of free trade in inventions which, I think, is the only one that deserves the name. Were a patent right granted at the cost merely of its registration to every applicant and continued with equal security during the same period as a copyright, every new idea—every scheme of ingenuity or adventure—would be brought before the public and elaborated for the use of man. Such a scheme may be expected in some future age, when statesmen may have learned to face problems before which they now quail, and to appreciate interests to which they are now insensible. Regarding all intellectual rights as equal, and as sacred as any other species of property, it is not easy to understand why they should not be placed under the same ægis. *Esto perpetuum* is the brand which God and reason have stamped upon whatever man's genius or man's industry has created for the good of man. If the rich or the barren soil, which conquest has wrested from the savage or industry won from nature is protected with as much care as the life of its owner, why should we not equally protect the right achieved by genius, whether in the useful arts it creates for humanity new powers and products, or blesses our species with the divine creations of poetry, or eloquence, or art? If James Watt has bequeathed to us mechanism to bring water from its earth-bosomed springs, or iron from its stony bed, or coal from its fossil grave—if Milton has sung the loss and recovery of Paradise in strains moral, religious and sublime—why should not the philosopher and the poet enjoy the same right of property as a landlord who reclaims a moss, gives verdure to a heath, or makes the yellow grain wave over a beach of sand? I should hardly have been justified by the speech of Sir W. Armstrong in taking alarm at the revolutionary opinions which he has maintained; but it is well known that a Cabinet minister of high influence has given utterance to the same views, and a committee of Parliament has been appointed to report on the subject of patents in all their relations. The British Association was the first public body that took alarm at the new doctrines and boldly denounced them; and an inventors' institute has been formed in the metropolis to resist, by every legal means, any measure of spoliation that the Government may be induced to support. I have brought this subject under your notice in the belief that every educated man has a substantial interest in obtaining a due protection to inventors, and in the hope that in your debating societies you may regard this subject as worthy of discussion."

RAPID DRY COLLODION PHOTOGRAPHY.

In the practice of photography the pictures are usually taken on glass plates, from which prints are afterward obtained on prepared sheets of paper, by permitting the rays of light to pass through the glass plates and fall upon the prepared paper. A problem of great interest to photographers has been the discovery of a dry collodion process by which plates can be prepared and rendered as sensitive as by the usual "wet collodion process." By the wet process the plate is finally prepared and the negative picture has to be taken and finished on the spot where the view is taken. This is easily accomplished in a house, but the traveling artist, who takes pictures of the sublime and beautiful in nature, is required to carry a load of articles to operate by such a process. To avoid this he employs dry plates, but hitherto these have not been made so sensitive and certain as wet plates, hence they require to be much longer exposed to the light. As shadows and figures in nature are constantly moving; it is very essential to obtain sensitive plates. The following is the substance of a paper upon this very interesting subject, recently read before the British Association for the Advancement of Science, by Thomas Sutton:—

Dry plates have been produced by an improvement and have proved to be as sensitive as wet plates, and they have preserved their good qualities for many weeks. Their sensitiveness depends upon the accelerating effect of bromine in dry collodion, and in this respect an analogy exists between the daguerreotype and dry collodion processes. In the former a silver plate, simply iodized, is extremely insensitive, but when submitted to the fumes of bromine its sensitiveness is increased a hundred-fold, the same thing happens in those collodion processes, wet or dry, in which the free nitrate of silver is washed out of the film. A collodion film, simply iodized, and without free nitrate, is as insensitive as an iodized daguerreotype plate, but a bromo-iodized collodion film without free nitrate may be rendered as sensitive as a bromo-iodized silver plate. In the wet collodion process the most exalted sensibility is conferred upon a simply iodized film by the presence of free nitrate of silver; but free nitrate cannot be retained in a dry collodion film, because it not only crystallizes on drying, but by becoming concentrated as the water evaporates, dissolves the iodide of silver, and forms a curious and interesting double salt, the exact properties of which have not yet been fully investigated. The principle, therefore, of preparing a rapid dry collodion plate consists in using bromo-iodized collodion, and removing all the free nitrate, which is the element of instability.

But the image produced upon a bromo-iodized silver plate, developed with mercury, is extremely thin and superficial, as may be proved by transferring it to a sheet of gelatinized paper; and similarly, the image developed by pyrogallic acid upon a dry bromo-iodized collodion film is thin and too transparent to yield a good printing negative. It is necessary, therefore, to apply to the film a coating of some organic substance, in order to give density to the dark parts of the negative. Many substances have been used for this purpose, viz., gelatine, metagelatine, albumen, various sirups, gum arabic, infusion of malt, tannin, &c., and experimenters have almost without exception, exhausted their ingenuity in varying these preservative coatings, as they are called, instead of seeking in the use of bromide for the true accelerating agent. The preservatives named have not all the same effect, and besides affecting the sensitiveness of the film, they also determine the color of the finished negative; gelatine and gum giving a black, tannin a red, and albumen a yellowish color to the deposit in the dark parts. Much, therefore, depends upon the selection of a proper preservative, when the most exalted sensitiveness is required.

One more difficulty remains to be overcome, and it is this. When a collodion film has once been allowed to get dry, and is wetted a second time, it is very liable to split and leave the glass; or if a preservative has been applied to it, it is very liable to rise in blisters, which spoil the negative. But this may be prevented by giving the glass plate a preliminary coating of india-rubber dissolved in kerosolene.

The operations in the rapid dry process are, therefore, as follows:—

1. Clean the glass plate, dry it thoroughly, and apply to it a solution composed of one grain of india-rubber dissolved in an ounce of kerosolene.

2. Coat the plate thus prepared with bromo-iodized collodion, containing an equal number of atoms of iodine and bromine, added in combination with cadmium. There should be about 5 grains of mixed iodide and bromide of cadmium to the ounce of collodion.

3. Excite the film in a bath composed of 30 grains of pure recrystallized nitrate of silver, slightly acidified with nitric acid.

4. Wash off all the free nitrate of silver, and pour over the film a preservative composed of 25 grains of gum arabic freshly dissolved in an ounce of water. Let it dry spontaneously, and before putting the plate into the dark slide, dry it again thoroughly before a hot flat iron.

5. Give the same exposure as for wet collodion.

6. Develop the picture by first wetting it with distilled water, and then pouring over it a developer consisting of 1 ounce of distilled water, 2 grains of pyrogallic acid, 2 scruples of glacial acetic acid, and a few drops of a weak solution of nitrate of silver. The image appears immediately, and very soon acquires the necessary intensity.

7. Fix the negative in the usual way with a saturated solution of the hyposulphite of soda or lime, and when dry varnish it with spirit varnish.

Negatives taken in this way are equal in every respect to those taken upon wet collodion plates, and the process is as simple as any of those which are now employed for slow dry plates.

Upon the reading of the above paper, Mr. Maxwell F. Lyte made the following remarks :—

"My experience having been somewhat considerable in the use of dry collodion, I venture to make a few remarks on that subject. There is no doubt of the fact that a combination of bromide with the iodide of silver is decidedly advantageous as an accelerator in the case of sensitive dried films of collodion; but that this introduction of bromine should in any way be looked upon as new, when employed in this manner, is a mistake. Bromides have been very long employed in landscape photography, as a useful adjunct. One thing seems certain, that where greens form one of the prevailing colors in the picture, their impression is most decidedly facilitated. The proportion of bromide proposed to be introduced is, in my opinion, rather too large—one part in four of iodide being the proportion which I find to work best. The use of gum arabic as a preservative coating, combined, with a very small portion of honey, was mentioned by me in the journal of the Photographic Society of Paris many years since, but subsequently discarded as giving a tendency to fog; but perhaps my decision in this respect may have been hurried, as I may not have washed the plate thoroughly enough, and certainly the proposed acid nitrate bath in which Mr. Sutton renders his plates sensitive, is likely to diminish this fogging tendency. This fogging it was which induced me to substitute the metagelatine for the gum arabic, which I subsequently did. Now, however, I am led to believe that the following modification of the resin process employed by the Abbe Desprats is the simplest and best process for dry collodion :—Add to the collodion one-fifth per cent of the resin of scammony, that which has been purified and bleached with animal black is to be preferred. Sensitize in a bath of seven per cent nitrate of silver, slightly acidulated with acetic or nitric acid; wash the plate thoroughly in clean rain or distilled water, to which has been added 0·1 per thousand of common salt or chloride of ammonium, and let the plate become dry in a place thoroughly free from dust. The exposure is less than that required with any other dry process with which I am acquainted, and is not above one-half more than that required for moist plates. The development should be performed by first moistening the plate with distilled water, and then pouring on a solution containing one part of pyrogallic acid, ten of acetic acid (glacial), and five hundred of water. Fix with a solution containing about one of cyanide of potassium to a hundred of water. It is not absolutely necessary to employ for the first washing bath distilled or rain water, with an addition of chloride. The second washing should always be performed in water as pure as can be obtained—in distilled water if possible—and especially the presence of any bicarbonates is to be avoided. Gum arabic is the lime salt of a very weak acid. In contact with nitrate of silver it is decomposed, with formation of the gummate of silver; but no such double decomposition takes place when it is placed in contact with the bromide or the iodide of silver. The action of light, however, on these latter compounds is to eliminate their acid element and separate the silver, and the iodide and bromide set free would tend to fix themselves on the lime in the gum. If the washing be not thoroughly performed, however, gummate of silver will form, which blackens in contact with the developer, even without previous exposure to light. It is, therefore, with much propriety that Mr. Sutton insists on a careful washing of the plate after sensitizing and previous to the application of the gum."

THE GRAPE CURE.

Germany is distinguished for originating several curative systems which have become popular "all the world over." Homeopathy and hydropathy are now very generally practiced in the treatment of many diseases to which poor humanity is subject. But there is another system practiced in Germany which has not yet become general, nor is it very widely known, but which deserves attention, as it appears to be based upon common sense principles. One reason for its practice being still limited is owing to the fact, that it cannot well be practiced but in vine-growing districts; still as there are many of these in America, it may be practical in various sections of our country. The system consists in the treatment of patients with grapes, as constituting the most of their diet for a certain period. It is also practiced with a due regard to living in a healthy and beautiful locality, and combining with this pleasant exercise in the open air. Durkheim on the left bank of the Rhine, in the Bavarian Palatinate, is the headquarters of the grape cure in Germany. There are other places where it is also practiced, such as at Vevay and Montreux on the Lake of Geneva, also Meran in the Tyrol, but Durkheim enjoys the most fame. The vine is cultivated to a wonderful extent in that district, but the grapes are principally used for the table, and are not so highly esteemed for making wine as some others. About fifteen different sorts of grapes are cultivated at Durkheim, but those which are most commonly used for the treatment of patients are of two sorts, called the Gutedel and the Austrian. They are both white; their skins are very thin, and they are sweet and well-flavored. The black Burgundy grape, and the small dark-red Framiner grape are also used to a moderate extent. The former is similar to the black Hamburg, which is well known in America; the latter is a sweet aromatic grape, little known among us. The Riessling grape, from which the most celebrated Rhine wines are made, is not used in the cure, as it is not held to be a good table grape. The sweetest grapes are always chosen, as an excess of acid interferes with digestion, and it also affects the teeth and mouth injuriously. The acids in grapes are the tartaric, malic and citric. There are also albumen, gelatine, gum, tannin, the oxide of iron and potash in grapes. Durkheim is a fashionable watering-place, like Saratoga, where persons congregate to partake of the mineral water for the restoration of health. The grape cure season commences about the middle of September and lasts nearly to the end of October. Persons afflicted with bronchitis, pneumonia, a scrofulous constitution and tubercular consumption in its earlier stages, come to Durkheim yearly from all parts of Germany. It is a beautiful place, and at the castle there is a garden where the invalids congregate in the open air and where a band of music plays at the regular hours appointed for eating the grapes. Each invalid with a small basket in his hand goes up to the tables where the grapes are sold and purchases the quantity which he intends to eat. The amount taken daily by persons undergoing the cure varies from three to nine pounds, and they are sold for about five cents per pound. Persons commence with eating about three pounds per day and gradually advance to the limits of their appetite. It is usual to eat them three times a day, namely, at seven in the morning with tea or coffee and some bread for breakfast; at eleven o'clock the greatest quantity is taken; then between five and six in the afternoon the last meal is served up. The skins and seeds are not usually swallowed. Butter, fats, pastry and spiced meats are forbidden to the invalids. A free use of the grape is probably beneficial in the alleviation of many diseases. The action of the vegetable juices upon the human system is but very improperly understood. It is only by experience that the truth can be found out; but the use of the grape—the fruit of fruits—is so natural that the grape cure commends itself to our common sense. As the grape is becoming very extensively cultivated in several sections of America, we expect that at no distant day we will have such villages among us as Durkheim. The first object to secure their success is the cultivation of the right kind of grapes.

A free use of the grape is looked upon with favor by many of the most sensible doctors in Germany. It is customary with them to send many of their patients to the grape cure districts, just as many of our physicians advise consumptive persons to seek more favorable climes in search of health.

Drawing and Rolling Metals.

Dr. Robison, in the *Encyclopædia Britannica*, remarks :—"It is a very curious and inexplicable fact, that by forging a metal, or by frequently drawing it through a smooth hole in a steel plate, its cohesion is greatly increased. This operation undoubtedly deranges the natural situation of the particles. They are squeezed closer together in one direction; but it is not in the direction in which they resist the fracture. In this direction they are rather separated to a greater distance. The general density, however, is augmented in all of them except lead, which grows rather rarer by wire drawing; but its cohesion may be more than tripled by this operation. Gold, silver and brass have their cohesion nearly tripled; copper and iron have it more than doubled. In this operation they also grow much harder. It is proper to heat them to redness after drawing a little. This is called annealing. It softens the metal again, and renders it susceptible of another drawing, without risk of cracking in the operation." Mr. Kirkaldy, of Glasgow, agrees with Dr. Robison as to cohesion and hardness, but avers that he was in error in stating that the general density is augmented. Instead of an increase, there was a proved decrease in the specific gravity of 0.70 per cent. in the bar specimen, and 0·36 per cent. in the plate specimen produced by the process of cold rolling. The most highly-converted steel does not, as some may imagine, possess the greatest density, the hardest steel being only 7·8152, whereas the softest is 7·8220. The specific gravity of puddled steel is less than that of some of the superior kinds of wrought iron.

Mr. Kirkaldy's experiment tallies very nearly with the received formula for the breaking strain of wrought iron. Here is his condensed table :—

	Highest. lbs.	Lowest. lbs.	Mean. lbs.	Tuns.
188 bars, rolled...	68,848	44,584	57,555	25¾
72 angle iron.....	63,715	37,909	54,729	24½
167 plates, lengthways.....	62,544	37,474	50,737	25¼
160 plates, crossways.....	60,756	32,450	46,171	

The breaking strain of 25 tuns for bars and 20 tuns for plates must be considered in reference to the working strain, or the load which can with safety be applied in actual practice. The working strain is estimated at a third to a tenth of the breaking strain. The British Board of Trade limits the strain to five tuns, or 11,200 lbs. per square inch.

A FARMER at Haubaurain, France, has been trying experiments with cod-liver oil in the fattening of calves, pigs and sheep. He gave two ounces to each pig daily, one ounce to each sheep, and an ounce and a half to each calf. The oil was mixed with bran and chopped straw for the calves, with bruised beans for the sheep, and with kitchen refuse for the pigs. In ninety days all the animals thus fed were fattened to a degree far beyond expectation; their meat was white, tender and easy of digestion.

SILVER IN PHOTOGRAPHY.—Mr. Spiller, the superintendent of the Chemical Department at Woolwich, England, states that a full sized sheet of albumenized paper requires 50 grains of the nitrate of silver, but ten grains of it only are expended, and the rest may be recovered from the solutions. The actual cost for silver does not really exceed two or three cents per sheet, and the other chemicals required amount to about the same.

A POOR CORPORATION.—The New York *Evening Post* says :—We understand that the New York Gas Company has privately declared a cash dividend of 100 per cent, as well as a scrip dividend of 33 per cent. This is the concern which alleges that it is too poor to pay the Government tax, and seeks to extort it from the consumers of their gas!