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## ONE HAS-DONE-IT BETTER THAN THREE CAN'T-DO-ITS.

In a recent infringement trial in this city, in the U. S. Circuit Court, Judge Blatchford presiding—subject, the manufacture of rosaline colors, Patent 250,247, the defendants claimed that they were not infringing, and that the alleged coloring matter could not be produced by the process set forth in the patent.

In support of this position they presented the evidence of three learned doctors, namely: Prof. Morton, to the effect that the patented color was not made by following the directions of the patent. Professor Chandler was also of the opinion that the new color was not produced in the way directed by the patent. Prof. Eudesmann also said he had found that the improved article could not be made by following the specification. But neither of the doctors informed the court what sort of stuff they could make by practicing the new invention; and they furthermore admitted, tacitly, that the article made by the defendants did not differ from the article claimed by patentee.

On behalf of the inventor, Prof. Seeley produced as an exhibit a specimen of the new color, which he had made by following the process set forth in the patent; he also testified that the infringing substance was identical with the patented article.

It also appeared in evidence that when the inventor applied for the patent, there had been some interference proceedings, in the course of which Professors Morton and Chandler testified at that time that they had not been able to produce the patented article, although they had followed the directions of the patent. Therefore, the Patent Office required the inventor to make an actual demonstration of the practicability of his invention, which he did.

In the presence of the examiner, he carried out practically the method described in his specification, and the result was, the production of a true rosaline salt, as claimed. The Commissioner consequently disregarded the evidence put in by the two professors, and decided the case in favor of the inventor. The Circuit Court now confirms the correctness of the Patent Office decision, and we suppose that the defendants' three professors are at liberty to try the process again.

## MICA.

One of the chief uses of mica at the present time is for stove doors and lanterns, the fire-resisting qualities of the mineral, together with its transparency, rendering it specially adapted for the purpose. But only the very clearest and best sheets of mica can be thus used. Vast beds of the substance exist in various parts of the country, for which, except the finest portions, as above mentioned, there is little demand. New uses will, however, doubtless be discovered and invented, for mica is made up of valuable materials. We notice among the recently granted patents two inventions in this line. One is for the manufacture of journal boxes of cement, ground mica, and flour; the ingredients are mixed, pressed into shape, and then baked. The other is an apparatus for reducing mica to an impalpable powder and preparing it for use as a mixer in starch gloss and oily compositions.

Chemically regarded mica is made of silica, alumina, and potash. Silica is one of the hardest substances in nature, known in its purest and most beautiful form as rock crystal.

Alumina is another exceedingly hard substance. One of its most useful but impure forms is emery or corundum, now so extensively employed for grinding and polishing purposes. The most elegant and purest examples of silica are seen in the well known precious stones, the ruby and the sapphire.

Potash, the remaining ingredient of mica, is familiar to everybody, and is extensively used in the arts. Our commercial supplies of potash chiefly come from the ashes of plants and trees, and their roots take it from the ground, the granite rocks being the original source. Granite is composed of quartz, feldspar, and mica.

## GENERAL INCANDESCENT ELECTRIC LIGHTING IN NEW YORK.

While the lighting of detached buildings by incandescent electric lamps is a familiar sight in this city, the inauguration of a general system of incandescent electric lighting, from a central station, may fairly be regarded as marking the beginning of a new epoch in social economy.

To those who had critically followed the development of the multiple arc system of Mr. Edison there was no apparent cause for doubting its entire practicability when applied to general public lighting. Still to the multitude the final demonstration of actual service throughout a considerable area, under the complex conditions encountered in a city district, covering many streets and blocks of houses, was necessary to give assurance that the whole matter was not more or less speculative.

The great steam dynamos at the central station of the first district were started in concert on the afternoon of Monday, Sept. 4, and from that evening the new system of interior lighting has been one of the established institutions of the city. To a large extent gas light has been supplanted throughout the district, and there is no reason for doubting the extension of the new light to other districts as rapidly as the requisite central stations and systems of electric conductors, lamps, meters, and other appliances, can be produced.

At any rate the new system has passed three of the four essential stages of progress toward commercial permanence and success.

When Mr. Edison first attacked the problem of incandescent electric lighting he was met with the general objection of electrical authorities that a durable incandescent electric lamp could not be made. When he proposed to subdivide the electric current, so as to multiply small lamps economically, he was warned on all sides that he was in pursuit of an impossibility; the thing could not be done. Having produced the desired lamp and subdivided the current experimentally, his critics not less confidently asserted that a laboratory experiment was one thing, the practical application of a theory to a complex system of public service was quite another, and he was bound to fail. It was a question of economy, and admitting that an incandescent electric lighting system could be furnished under the conditions required it would not pay. On this point the company which have furnished the means for the inauguration of the system in the district now lighted by them are probably better qualified to judge than the opponents of the system. It is certainly to be hoped that their expectation of profit in supplying a better light than gas affords, at the same or less cost, will be amply justified.

As the plan of the central station and the general application of the system in the first district have been so recently described in this paper (August 26, 1882), it will not be necessary to dwell upon them here.

Assuming the new light to cost the same as gaslight—and it is not reasonable to expect that those who have assumed the cost and risk attending the development and introduction of the new light will set the price of it below what competition with gas may make necessary—the question is, How are the public to be benefited?

The first and most obvious advantage arises from the quality of the light. It is more nearly like sunlight than any other artificial illuminant. It is free from flickering and unsteadiness—faults which make both the electric arc light and the ordinary gas jet so painful and injurious to the eyes. It does not vitiate the air as gas does, by consuming oxygen and loading the air with products of combustion. Its heating effect is very much less than that of a gas jet of the same illuminating power. It is not a source of peril from fire, the lamp proper being incapable of firing the most combustible fabric; while the low tension of the current makes the formation of arcs and the overheating of conductors altogether unlikely.

Fears as to the continuity of the service have been expressed, but the grounds for them are not apparent after an examination of the plant of the central station. It is true that no system of storage is provided, as in the case of gas. None is needed, since the electricity is supplied by a battery of steam dynamos which deliver their several currents into a circuit common to all, with a large surplus available, so that the stoppage of any of them by accident or for repairs would not diminish the illumination of the district. Of course a general fire about the central station might stop its operation and leave the district in darkness, but the same risk obtains with gas; and after the establishment of two or more centers of distribution this hazard may be obviated by means of connecting mains to be used in such emergencies.

The experience obtained in the running of Station No. 1 will no doubt lead to the introduction of considerable changes in the plan and engineering of subsequent stations; the company are none the less to be congratulated for the wisdom with which they have brought into successful operation an enterprise involving so much of magnitude, complexity, and novelty.

### The Pretsch Process for Making Photo Printing Plates.

A sensitive gelatinous mixture is prepared by dissolving 6 parts of gelatine in 30 parts of water, and 1 part of powdered ammonium bichromate is stirred into the solution. A piece of plate glass, which is all the better for having been previously coated with a collotypic substratum, is now leveled in the drying cupboard—a temperature of about 40° C. being suitable in most cases. When the plate has reached the full temperature of the hot cupboard, some of the gelatine preparation is poured on and spread with a strip of paper, about 30 grains being allowed for each square inch of surface. When the plate is dry it is exposed under a negative, about six times the exposure which would be required for a silver print being given. When the exposed plate is soaked in water, the reticulation and granulation of the gelatine rapidly set in, and in a few minutes an exact reverse of the required printing block will result. The next step is to allow the plate to become partially dry, and to deposit copper on it by the electrotype process so as to form the printing block. It is, perhaps, a more certain proceeding to take an impression from the reticulated film by means of softened gutta-percha, and to send this cast to an electrotyper or a stereotyper to be reproduced in metal.

### Silk Direct from the Worms.

An unsuccessful attempt was made lately before the New York Silk Exchange to reel silk direct from the worms. The idea is a taking one, and if realized it might prove immensely valuable. Success might open a way to utilize the silk of many native worms whose cocoons cannot be unwound.

### The New Scientific Steamer.

The new iron steamer Albatross, lately launched at Wilmington, Del., for the use of the U. S. Fish Commission, will be ready for sea about December 1. Her dimensions are, length 200 feet, beam 27·6 feet, depth 16·9 feet. She will be provided with two large laboratories, one on the upper deck amidships and the other immediately under this. In these laboratories all the microscopic work will be carried out and preparations made. As ornithology enters into the researches of the scientific party who will be carried out on the Albatross, the best arrangements have been made for the use of the taxidermists.

For dredging and trawling the Albatross will carry 8,000 fathoms of $\frac{3}{8}$ inch steel wire rope. The winding engine will be run by two steam engines, and the steel rope will be paid out and wound up by a reeling engine, worked on the lower deck, provided with an automatic arrangement devised by Capt. Z. Tanner, whose experience as commander of the Fish-hawk has made him most proficient in the matter of dredging and trawling. To prevent too great strain an indicator will be used, with apparatus to relieve the tension and to determine at the same time the exact amount of rope in use. The apparatus for deep sea soundings will have some slight improvements on that now in use on the Fish-hawk.

Two Herreshoff steam launches will serve the Albatross as tenders.

One of the launches is of the usual model, the other will carry her propeller amidships in such a way that the screw can be worked either parallel with or at right angles to the keel. These launches will be constructed with bulkheads, so as to serve as life boats, and will be equipped with apparatus for the capture of cetaceans and fur-bearing sea animals. A thirty foot yawl will be carried for use in seining. One novel feature of this vessel for the pursuit of fish will be the use made of the electric light. The two methods employed will be the Brush for surface illumination, and the Edison for lighting up the depths of the sea. Between the Australian fisherman who spears his fish from his canoe, in the bottom of which burns some resinous wood, and a large vessel, illuminating the sea at great depths with the Edison incandescent light, there is all the wide difference between the barbarism of prehistoric time and the civilization of the present. Ventilation will be provided for by a method devised by Mr. G. W. Baird, Passed Assistant Engineer, United States Navy. A No. 6 Sturtevant exhaust is to be run, by which all the foul air is to be drawn out, to be replaced by fresh air.

A distillery apparatus, also invented by Mr. Baird, will supply water. By this process the water is aerated as soon as made, and is potable at once.

The Albatross was designed by Mr. C. W. Copeland, and built by the Pusey & Jones Company, Wilmington, under the inspection of Passed Assistant Engineer G. W. Baird. She will have a brigantine rig, twin screws, will be propelled and worked by a compound engine, steam reversing gear, with flue boilers; is expected to make twelve knots an hour. She will be steered by a steam quarter-master designed by the builders. Her crew will consist of sixty-five men detailed from the Navy. Her chief officer is Lieut.-Commander Z. Tanner. She will carry a lieutenant, surgeon, and ensign officer, and two or three ensigns. Her first extended trip will be to England, to carry to the London Fisheries Exhibition the exhibits of the U. S. Fish Commission.

### Irrigation in Egypt.

The American Consul-General at Cairo states that the tillable land of Egypt consists of the delta of the Nile, and a narrow valley extending from Cairo southward. This valley is generally from one to ten miles wide, though for about one hundred and fifty miles above Cairo it has a width of from ten to thirty miles. Both the delta and the valley, except so far as the former borders on the Mediterranean, are bounded on all sides by mountainous deserts, and for more than two thousand miles from its mouth the river has not the smallest tributary.

It rolls on toward the sea, unlike other rivers, constantly decreasing in volume. As there are no rains of any practical importance, it sustains all vegetation, and all the inhabitants of Egypt and its herds drink of its waters. For two or three months in the year, a considerable portion of the country may be irrigated by the natural rise of the river, but with the exception of certain sections, the water is not permitted to flow freely over the land. It is taken from the river and conducted by canals alongside the fields where it is to be used, and spread over the different parcels of land, if it is sufficiently high, and if not, it is raised by some of the various modes employed for that purpose. Small embankments prevent the water from running on to other lands that may not at the time be in a condition to receive it; in fact, the processes of overflowing the lands, plowing, sowing, and harvesting are often being carried on simultaneously in adjoining fields.

When the land is sufficiently irrigated, the water is shut off, or the pumping discontinued. The process of irrigation is required to be repeated several times before the maturity of the crop, the quantity of the water depending very much upon the kind of product. Rice requires a large amount of water, and wheat, rye, and oats much less. There are in Egypt 8,406 miles of irrigating canals, of which 1,897 are navigable. There are also great dikes along the river and its various delta branches, to prevent their overflow, and innumerable small ditches and embankments everywhere throughout the country. In consequence of the muddiness of the waters of the Nile, the canals require frequent cleansing, and the high waters injure the dikes and render it necessary to repair them each year.

The greatest amount of labor is, however, that required in raising the water from the river and canals to the level of the lands. Dipping, drawing, and pumping are processes going on nearly the whole year, and nearly half of the whole irrigation is done by these means. Its water is raised from one or two feet to twenty, and sometimes more, according to the location of the land and the height of the river. The following is a description of the manner in which water is raised by means of the "shadoof." The "shadoof" is simply a leather basket-shaped bucket attached to a pole, suspended in the same manner as an ordinary well-sweep. The sweep is very short, and the bucket of water is balanced by a mud weight. The instrument is of the rudest character, but by this means water is raised to the height of eight or nine feet with considerable rapidity. If the water is to be raised twenty feet, one man close to the river raises it from four or five feet into a basin made of clay in the side of the bank, and from this point two men, each with a bucket, raise it about eight feet to a similar basin, and two others in the same manner to the required height, whence it is conducted by small earth sluices to the required place, often a considerable distance from the river.

It requires the constant working of these five "shadoofs" for forty-eight hours to water one "feddan" (equivalent to one acre). This, by changing once in four or six hours, would require ten men, each of whom would apply twenty-four hours' labor to the watering of one acre. This process requires repeating at least three times for each crop. Thus the labor required for the irrigation of one acre would be 720 hours, or seventy-two days of ten hours each. The labor is of the most severe kind, and the fellah, with nothing except a cloth round his loins, is compelled to apply himself to his task with all the energy at his command. In the delta, and some parts of Upper Egypt, the water being taken from the river at some distance above the point where it is used, is kept for a considerable portion of the year, on very nearly the same level as the land. If, however, it has to be raised at all, it requires at least fifteen days to the acre. When the water is raised only a few feet, the more ordinary method is that of the "sakia," a rude machine propelled by oxen, cows, and horses, and sometimes camels and donkeys, and which raises the water by means of earthen jars attached to an endless rope chain passing over a vertical wheel.

There are a few steam pumps, but fuel is too expensive, and labor too cheap to permit of their general use. The number employed is about 400, and these are mostly in Lower Egypt. They are used principally on large estates, but in some cases by those who irrigate the lands of the small farmers, at a fixed price per acre. This is generally where cotton is produced, which requires watering once in eight or ten days throughout the season. The water has ordinarily to be raised but a few feet, and the quantity required each time, when the watering is so frequent, is much less. The usual price paid per acre is about 30s., and it is only the low price of farm labor that renders it practicable to cultivate lands requiring so much irrigation.

### Steamboat Boiler Inspection.

Section 4,433 of the Revised Statutes provides that "the working steam pressure allowable on boilers constructed of plates inspected as required by this title, when single-riveted shall not produce a strain to exceed one-sixth of the tensile strength of the iron or steel plates of which such boilers are constructed."

Compare with this plain provision of the law the following rule contained in the "General Rules and Regulations" prescribed by the Board of Supervising Inspectors of Steam-vessels, viz.:

"Multiply one sixth of the lowest tensile strength found stamped on any plate in the cylindrical shell by the thickness—expressed in inches or parts of an inch—of the thinnest plate in the same cylindrical shell, and divide by the radius or half diameter—also expressed in inches—and the sum will be the pressure allowable per square inch of surface for single-riveting."

This rule is supposed to be based on the law quoted above; but it is, in reality, in direct conflict with it; for, as the pressure allowed by this rule will produce a strain corresponding to one-sixth of the tensile strength of the metal in the *solid* parts of the plates, the strain on the metal between the rivet holes of the joints will be $\left(\frac{1}{6\times0\cdot60}\right) = \frac{1}{3\cdot6}$ of that tensile strength, since about 40 per cent of the metal is removed on the pitch line in punching the holes for a single-riveted joint.

In further illustration of the working of this rule we will take at random an example from the elaborate table giving the pressures allowable with cylindrical shells for different diameters, and for iron of different thickness and strength, which forms a part of the "Rules and Regulations." According to this table a cylindrical boiler having a diameter of 40 inches, and made of $\frac{3}{8}$-inch plates, of iron having a tensile strength of 50,000 pounds per square inch, and with a single-riveted lap joint, is allowed a working pressure of 156·24 pounds per square inch. Using $\frac{11}{16}$ inch rivets, with $1\frac{7}{8}$ inch pitch, for the single-riveted lap joint, the sectional area of the plate on the pitch line of the rivet holes will be 60 per cent of the area of an equal length of the solid plate. The strain produced in the least section of metal at the joint by the working pressure (156·24 pounds) would be $\frac{156\cdot24 \times 40}{2\times\frac{3}{8}\times0\cdot60} = 13,888$ pounds per square inch, instead of 8,333 pounds allowed by law.

But matters are still worse. The same rule provides, further, that in testing a boiler "the hydrostatic pressure applied must be in proportion of 150 pounds to the square inch to 100 pounds to the square inch of the steam pressure allowed." Consequently, in the above case, the test pressure will be 234 pounds, and the metal at the joint will experience a strain of 20,832 pounds per square inch; that is to say, the metal will be strained beyond the limit of elasticity in applying the test pressure.

Of course, no reputable boilermaker would build a boiler according to such rules; but the general public should fully understand that boiler inspection under such rules does not avert but invite danger.

C. R. ROELKER.

### Salicylic Acid for Preserving Eggs.

Referring to a recent article in this paper on the preservation of eggs, our correspondent Mr. M. P. Baumann, of Pittsburg, Pa., gives the following method, which in his hands works to perfection.

Having filled a clean keg or barrel with fresh eggs, he covers the eggs with cold salicylic water. The eggs must be kept down by a few small boards floating on the water, and the whole covered with cloth to keep out dust.

If set in a cool place the eggs so packed will keep fresh for months, but they must be used as soon as they are taken out of the brine.

To make the salicylic solution, dissolve salicylic acid (which costs about $3.00 a pound) in boiling water, one tablespoonful of acid to the gallon. It is not necessary to boil all the water, as the acid will dissolve in a less quantity, and the rest may be added to the solution cold. The solution or brine should at no time come in contact with any metal. In a clean, airy cellar one brine is sufficient for three months or more, otherwise it should be renewed oftener. For that purpose the kegs, etc., should be provided with a wooden spigot to draw off the liquid and replenish the vessel.

Butter kneaded in the same solution, and packed tight in clean stone jars, will keep fresh the whole winter, but must be covered with muslin saturated in the water, renewing it sometimes. Cover the jars with blotting paper saturated with glycerine. Salicylic acid is harmless, and yet one of the best and certainly most pleasant disinfectants in existence, with no color, smell, or taste. The water is an excellent toothwash, and the best gargle to prevent diphtheritic contagion.

### The Velocity of Light.

Preparations are nearly completed at the Case School of Applied Sciences, Cleveland, Ohio, for a reinvestigation of the velocity of light, by Professor A. A. Michelson, late of the Naval Academy at Annapolis. The methods and results of Mr. Michelson's measurements in 1879 were described at length in the SCIENTIFIC AMERICAN SUPPLEMENT, No. 193.

The velocity found (186,380 miles a second) differed slightly from that obtained by M. Cornu at the observatory at Paris in 1874, and also, it is said, from that obtained more recently by Professor Newcomb at Washington. The results of the last named observations have not been published. Mr. Michelson has accordingly been requested to repeat his experiments; money for the purpose, about $1,200, having been promised from the Bache scientific fund.

The Cleveland *Leader* says that two small buildings have been erected for the experiments on the grounds of the Case School. The larger of the two, 16 x 45 feet, contains the chief apparatus. Two thousand feet west of it is a smaller building containing a stationary mirror. In the experiments the light traverses the space between the buildings and back again to the apparatus, by whose movement data are obtained upon which the velocity of the light is measured.

### A Simple Method of Removing Sand Bars.

A press dispatch from Portland, Oregon, August 29, describes a promising device for keeping open the channel of the Columbia River, now seriously obstructed by sand bars. The promotor's theory was that the current was strong enough to carry off the sand if it were properly stirred up. Mr. Prescott, Manager of the Oregon Railway and Navigation Company, felt sufficient interest in the experiment to offer the use of the company's steam collier Walla Walla in making it. Under the supervision of Messrs. Gates & Holland, the mechanical engineers of the Oregon Railway and Navigation Company, the steamer was moored on the bar, bow up-stream, the stern at the lower edge of the bar, and loaded so that the keel touched the bottom. In eighteen hours' actual work a channel, 1,000 feet long and 100 feet wide, was deepened from a maximum of 18 feet to from 22 to 24 feet. The steamer is now completing and straightening the channel on the whole length of the bar, and after finishing at St. Helen's she will be sent to Walker's Island for similar work. Mr. Prescott speaks enthusiastically of the success of the experiment, which he regards as having solved the problem of keeping the river clear of obstructions and at a nominal cost.