HISTORY OF THE HELIOGRAPHIC ART IN EUROPE AND AMERICA.

BY M. A. ROOT.

(Continued from our last number.)

The earliest known attempt at fixing images by the chemical influence of light were those of Davy and Wedgwood, the great improver of English porcelain manufacture. In the "Journal of the Royal Institution," of 1803, appeared a paper by the latter with appended comments by the former, entitled "An Account of a Method of Copying Paintings upon Glass, and of Making Profiles by the Agency of Light upon Nitrate of Silver."

White paper, or white leather saturated with a solution of nitrate of silver (instead of the chloride) was selected as the impressible surface. They made numerous experiments with greater or less degrees of success in getting the images of objects. Neither, however, was able to produce a surface sufficiently sensitive to receive proper impressions from the subdued light of the camera. Davy used to better purpose the solar microscope for obtaining images of small objects. He states, moreover, that he found the chloride more sensitive than the nitrate of silver.

Having no agents to fix the images and to prevent the coloring of the white parts by exposure to light, these gentlemen relinquished their experiments. Iodine was not discovered till 1811, and hyposulphite of soda was discovered by Sir John Herschel only in 1819, and without these indispensables to the art heliography could not advance further than Wedgwood and Davy had carried it.

In 1814 Joseph Nicéphore Niepce, a retired business man, residing at Chalons, on the river Soane, directed his attention to the chemical effects of light, with the object of fixing the images of the camera. Having found that the sunbeam would alter the solubility of various resinous substances, he spread a thin layer of asphaltum on a glass or metal plate and placed this in the camera. Five or six hours after he found on the plate a latent image, which became visible by the application of a solvent to the surface of the plate.

Thirteen years later (in 1827) Niepce experimented with the art at Kew, in England. Some of the pictures made there are still left. They somewhat resemble the daguerreotypes, though far inferior to them.

Louis Jacques Maude Daguerre resided about nine miles from Paris, at the town of Brie upon the Marne; was a painter by profession, a member of the French Academy of Fine Arts and other similar institutions, stood high as a scientific man, and was moreover much esteemed for his goodness and geniality of character. In 1824 he began experimenting to fix the images of the camera by various chemical agencies, employing, like Wedgwood, both the chloride and nitrate of silver spread upon paper. In 1826 he became acquainted with Niepce, and from that time forward the two pursued their researches and experiments jointly. In 1829 a copartnery contracted was executed between them for mutually investigating the subject. Niepce had, in 1826, already solved the problem, that had baffled Wedgwood and Davy, and made his copies of objects insensible to the rays of the sun. He called his discovery "Heliography," or sun sketching—a more accurate title than "Photography," or light sketching, since the pictures are not produced by the light rays but by the active rays of the solar orb.

The reader, I think, will be interested in the following anecdote in relation to Daguerre, related by the distinguished French chemist, Dumas. A lady, says he, came up to him at the close of the lecture, in 1825, and said :—"Monsieur Dumas, as a scientific man, I have a question of vital importance to myself to ask you. I am the wife of Daguerre, the painter. For some time he has let the idea seize him, that he can *fix* the image of the camera. Do *you* think it possible? He is always at the thought; he can't sleep at night for it. I am afraid he is out of his mind. Do *you*, as a man of science, think it can ever be done, or is he mad?" "In the present state of knowledge," said Dumas, "it cannot be done; but I cannot say it will always remain impossible, nor set the man down as mad who seeks to do it." If such was Daguerre's mood fourteen years before he had brought his process to a fitness for publication, we may form some conception of what his discovery must have cost him. At any rate he exhibited the true temper of one of the few whom genius predestines to immortality.

In 1829 Daguerre and Niepce, for the first time, employed iodine for blackening the heliographic plate, which had been discovered in 1811 by M. Courtois, of Paris, in the kelp or ashes of seaweed. Niepce died in 1833, and his son Isidore succeeded him as copartner of Daguerre in heliographic researches and experiments.

In January, 1839, Daguerre announced his great invention, which has since, by common consent, borne his name. In the following July the Chamber of Deputies voted to Daguerre an annual pension of 6,000 francs (subsequently increased to 10,000) and one of 4,000 francs to Isidore Niepce, on condition that they should publish to the world a full description of the process by which their pictures were produced, and also make known all the improvements which might, from time to time, be made therein. Reversions of one half these several sums were, by the same law, secured to the widows of Daguerre and Niepce.

At the time the copartnership was formed between Daguerre and the elder Niepce, it appears that both made their experiments chiefly on plates of copper or silver, coated with different kinds of varnishes and essential oils, without the use of either iodine or mercury. Finally, however, after a long course of observations and experiments, Daguerre exposed an iodized plate in the camera, and then over boiling mercury in an iron crucible. At first there was no favorable result, but on repeating the experiments he found, after the exposure of the plate to the mercury, a dim shadow on the outer edge of it, and the thought occurred that here the heat had been less intense. Whereupon he reduced the temperature and obtained a picture. Daguerre remarks that the image is finer on copper, plated with silver, than on silver. If such be the fact, does it not indicate that electricity plays a considerable part in the operation? Daguerre employed only iodine in coating the plate. Since that date, as we shall see further along, great improvements have been made by using accelerating substances and thus rendering the plate far more sensitive to the action of light. Among these accelerators are bromine, chloride of iodine, and finally a compound of the three, of which I shall speak with some detail hereafter.

On the 31st of January, 1839, Henry Fox Talbot communicated to the Royal Society his photographical discoveries, and on the 21st of February following he published a description of his methods of preparing the paper used in his processes. He did this by dipping the paper into a solution of common salt and then applying to the surface a solution of chloride or nitrate of silver—mostly the latter. After getting the image in the camera, he fixed it by again immersing the paper in a strong solution of common salt. He was able to make paper so sensitive as to obtain the picture of an object, under full sunshine, in half a second. The paper here referred to was that used by him for taking copies of objects by means of the solar telescope. Whether Talbot's attention was first turned to heliographic researches by Niepce's communication to the Royal Society, in 1827, or whether he had commenced his investigations before this, I know not. It is understood, however, that he conducted his experiments independently and without even being acquainted with the Frenchman.

On March 14, 1839, Sir John Herschel made a communication to the Royal Society, recommending the use of hyposulphite of soda as a fixing agent. On Feb. 20, 1840, he sent to the Society a paper on the "Chemical Effects of Light in the Solar Spectrum," wherein he recommends using this solution hot in the case of iodide of silver, as this salt is less readily dissolved by the cold solution of the hyposulphite than is chloride of silver.

In 1840, Rev. J. B. Reade used with good effect, the hyposulphite solution to fix, and the infusion of galls to accelerate the formation of the picture. At the same time the former is known to have been habitually employed by Daguerre, Robert Hunt and others, in addition to Herschel.

In the last paper named Herschel also recommended the employment of iodide of potassium to convert the nitrate of silver on the paper into iodide of silver and gave, moreover, the peculiar properties of the iodized paper.

In July, 1841, Robert Hunt read before the British Association at Plymouth, a paper "On the Influence of the yellow ferrocyanide of potassium upon iodide of silver, and on the high sensitiveness of the same, as a photographic preparation," giving also instructions how to prepare the iodized paper. Iodized paper was used likewise by Ryan, Lassaigne and others, and it seems pretty certain that this paper, as prepared according to the instructions given by Herschel Hunt and others, was an article of commerce, before the patent for the calotype of Talbot had been obtained.

I have already stated, that in 1839, Talbot published to the world his photographic discoveries, together with his methods of producing his pictures. From this period he continued his studies and experiments until 1842, when he published and procured a patent for a process, which was a considerable improvement upon his original one, and was called by him the "Calotype," from two Greek words signifying a beautiful sketch. In this country, however, I believe his pictures are oftenest entitled Talbotypes, on the same principle that Daguerre's are called Daguerreotypes. Talbot subsequently obtained a second patent for his calotype process, in which he had introduced still further (supposed) improvements. To what extent the calotype is now in vogue across the water, I know not. I believe, however, that albumen, collodion and some other pictures have to a great degree taken its place.

(To be continued.)

Air, Sunshine and Health.

A New York merchant noticed, in the progress of years, that each successive bookkeeper gradually lost his health, and finally died of consumption, however vigorous and robust he was on entering his service. At length it occurred to him that the little rear-room where the books were kept opened in a backyard, so surrounded by high walls, that no sunshine came into it from one year's end to another. An upper room, well lighted, was immediately prepared, and his clerks had uniform good health ever after.

A familiar case to general readers is derived from medical works, where an entire English family became ill, and all remedies seemed to fail of their usual results, when, accidentally, a window glass of the family room was broken, in cold weather. It was not repaired, and forthwith there was a marked improvement in the health of the inmates. The physician at once traced the connection, discontinued his medicines, and ordered that the window pane should not be replaced.

A French lady became ill. The most eminent physicians of her time were called in, but failed to restore her. At length Dupeytren, the Napoleon of physic, was consulted. He noticed that she lived in a dim room, into which the sun never shone; the house being situated in one of the narrow streets, or rather lanes of Paris. He at once ordered more airy and cheerful apartments, and all her complaints vanished.

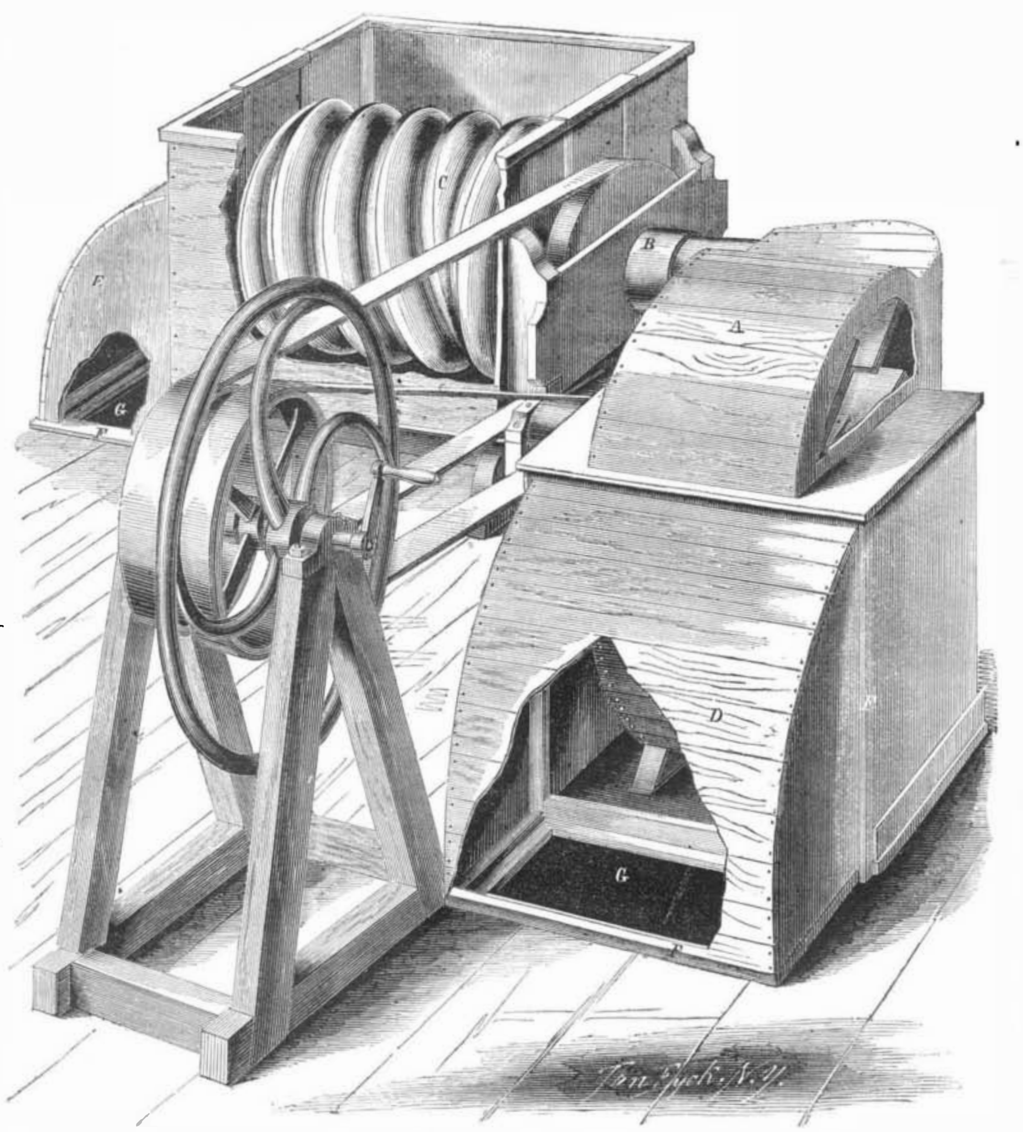
The lungs of a dog become tuberculated (consumptive) in a few weeks, if kept confined in a dark cellar. The most common plant grows spindly, pale and scraggling, if no sunlight falls upon it. The greatest medical names in France, of the last century, regarded sunshine and pure air as equal agents in restoring and maintaining health.

From these facts, which cannot be disputed, the most common mind should conclude that cellars, and rooms on the northern side of buildings, or apartments into which the sun does not immediately shine, should never be occupied as family rooms or chambers or as libraries or studies. Such apartments are only fit for stowage, or purposes which never require persons to remain in them over a few minutes at a time. And every intelligent and humane parent will arrange that the family room and the chambers shall be the most commodious, lightest and brightest apartments in his dwelling.—*Hall's Journal of Health.*

WHITE VARNISH.—Take one ounce of pure Venice turpentine; mix well with two ounces of pure spirits of turpentine; warm in a large bottle. In another bottle put four ounces of best fir balsam (it must be pure), with two ounces of 95 per cent alcohol; shake each bottle well frequently for six hours or more, then mix both preparations in the large bottle. The whole should stand, several days before using, in a warm place.

Apparatus for Ventilating Ships, Hospitals, &c.

It is quite a common practice in hot weather for the proprietors of large hotels to arrange series of fans over the tables in their dining rooms, and connecting them together so that one person at a remote part of the room, or standing just outside of it, can operate the whole by a lever or crank. The object of this is two-fold. First, to keep the guests cool, and, secondly, to rid the table of flies. It is also particularly desirable, in hospitals or sick rooms, to keep the air in the room cool and to supply each patient with a certain quantity of fresh air. But by the ordinary fan neither of these objects can be accomplished, as the warm foul air in the room is merely stirred up, when, by an equal amount of labor properly directed, a fresh and cool current might be passed constantly through the room. We have often wondered that some of our enterprising inventors did not devise a simple and efficient apparatus for this purpose, and thus render a valuable service to the community, and at the same time derive a pecuniary benefit themselves. We have at length the satisfaction of illustrating such an apparatus, represented in the accompanying engraving.



PETELER'S VENTILATING APPARATUS FOR SHIPS, HOSPITALS, DINING ROOMS, &C.

A fan running in the box, A, drives a current of air through the shaft, B, spiral channel, C, around this shaft, and into the room to be ventilated. The worm, C, runs in an ice box, and is surrounded by pounded ice to cool the air in its passage; the channel being made in spiral form to secure a long passage for the air amid the cooling material. The worm is kept constantly turning in order to stir the cooling mixture and constantly change the points of contact.

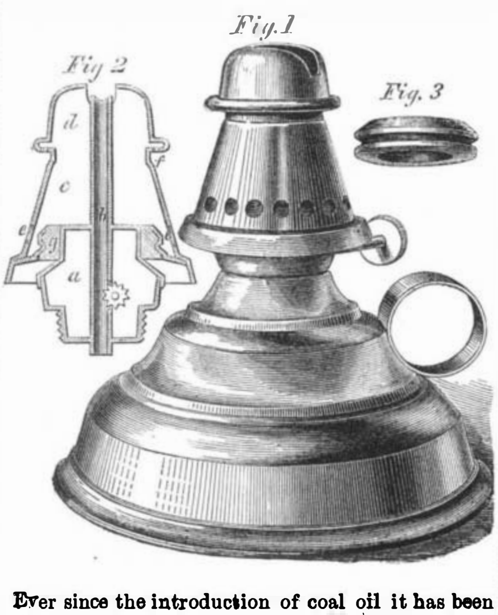
The apparatus is represented in the engraving as designed for ventilating infected ships, especially those infected with yellow fever. It is well known that the virus—whatever it may be—that causes the yellow fever is instantly and completely destroyed by frost or by a reduction of the temperature below the freezing point. Consequently, to eradicate yellow fever from a ship it is only necessary to reduce the temperature of the interior below 32°. It would be impossible to do this by drawing out the air from the hold and supplying its place from the warm atmosphere surrounding the vessel; but the air must be confined and passed repeatedly through the apparatus until it is sufficiently cool. Therefore the boxes, D and E, are placed over hatchways on the deck, and the joints are made air tight by the interposition of the india rubber plates, F F, between the lower edges of the boxes and the deck. The boxes are represented as broken away to show the openings, G G, through the deck. The apparatus being thus arranged, the air is drawn up through one hatchway, passed through the cooling worm, and driven down through the other hatchway; the current being continued till the temperature is sufficiently reduced. The machine may be placed upon a scow or pier and connected with the vessel by means of large tubes. Thus, for the purification of a ship, there is no necessity for any person to even enter the hold or go below the deck to operate the apparatus.

For cooling vessels below the freezing point the box should be filled with ice, or, better still, with a freezing mixture of pounded ice and salt, but for cooling the rooms of hotels a mixture of ice and water is quite sufficient.

The principal ingenuity in this machine is shown in the construction of the spiral channel, C, the difficulty being to form a worm so that it would run easily in the ice box without crowding the ice into one end of the box and packing it so as to obstruct the working of the machine.

The patent for this invention was granted through the Scientific American Patent Agency, April 9, 1861, and further information in relation to it may be obtained by addressing the inventor, Alois Peteler, proprietor of "Peteler's Hotel," at New Brighton, Staten Island, N. Y.

TRITTIN'S COAL OIL LAMP.



Ever since the introduction of coal oil it has been perceived that a lamp which would burn the new illuminating material without smoke or offensive odor, and without the inconvenience of a chimney must be a great desideratum, and many devices to accomplish the result have been tried, and many patents granted, as the columns of our paper testify. Emil Trittin, of Philadelphia, claims to have attained complete success in this effort, and his lamp is illustrated in the accompanying engraving.

The relative position of the tube and deflector is made adjustable, and the heating of the oil is prevented by the interposition of a slow conductor of heat between the wick tube and the deflector.

Fig. 1 is a perspective view of the finished lamp, and Fig. 2 is a vertical section of the burner. The block, *a*, is screwed firmly into the top of the lamp, and has the wick tube, *b*, passing through it so loosely that it may be slipped up or down, and yet sufficiently tight to retain its position. The tube is surrounded by the usual conical case, *c*, which is surrounded by the dome-shaped deflector, *d*; the case, *c*, being perforated with holes, *e e*, and the base of the deflector being also perforated at *f f*. Between the case, *c*, and the block, *a*, is interposed the block, *g*, of wood or other slow conductor of heat, as fully shown in Fig. 3.

As the lighter and more volatile coal oils require more oxygen for their combustion than the heavier grades, when the former are used the wick tube is lowered to admit a thick current of air to impinge against the sides of the flame; but when the heavier oils are burned the tube is raised so that its upper end may be in closer proximity to the walls of the deflector. The block, *g*, prevents the wick tube from becoming heated, and conducting caloric down into the oil, and thus increasing the evaporation. The inventor says this also diminishes the danger of explosion. "In addition to its cheapness and safety as a portable lamp, its great economy of consumption further recommends it to the attention of housekeepers, hotel proprietors, railroad conductors, for lanterns, and for lighting passenger cars. It will burn without sensible diminution of flame so long as there is any oil in the lamp. Half a pint of oil, with the large size ($\frac{5}{8}$-inch wick) at full head, lasting 14 hours, or about equivalent to a cost of one-quarter of a cent per hour; and the flame being regulated by a ratchet, for night or chamber lamp, the amount consumed may be very inconsiderable, by placing it at its minimum capacity."

The patent for this invention was granted through the Scientific American Patent Agency, Dec. 3, 1861, and further information in relation to it may be obtained by addressing the manufacturer, Francis Lightfoot, at No. 127 Walnut street, Philadelphia. See advertisement on another page.

New Locomotive.—M. Baldwin & Co. of Philadelphia continue to employ a large number of men in the construction of locomotives. A number now building are for the Philadelphia, Wilmington and Baltimore Railroad, Pennsylvania, and Northern Central Railroad Companies. This firm have completed an eight-wheeled locomotive for the Guantenamo Railroad, in the southern part of Cuba. It is beautifully finished, and has been called the "Jaibo." A passenger locomotive is also under way, for Cuba.