HISTORY OF THE HELIOGRAPHIC ART IN EUROPE AND AMERICA.

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(Concluded from our last number.)

It will fall next in the order of this historic summary to give some account of several variations of heliography on paper, which closely followed and may be supposed to have been suggested by Talbot's discovery. I have space merely to name these, with their discoverers, leaving to the reader to seek their description elsewhere.

1. The Chrysotype process was communicated to the Royal Society, June, 1842, by Sir John Herschel.

2. The Cyauotype was also a discovery of Herschel's. He describes several varieties of this process, which it is hardly worth the while to introduce here.

3. The Chromotype was, substantially, a discovery of the French *savans*, Pontin and Becquerel. Under this specific name, however, it appears to have been first announced to the British Association, in 1843, by Robert Hunt.

4. The Catalissotype was communicated, in 1844, to the British Association by Dr. Thos. Woods, of Dublin.

5. The Amphitype is another of Herschel's discoveries. Its name, "double sketch," is derived from the fact that two pictures are produced by the same action of light, with different subsequent manipulations.

6. The Anthotype seems to have been a joint production of Herschel, Chevrieul and Robert Hunt. Its nature is defined by its etymology, "flower sketch," the juices of various flowers, bruised and treated with small portions of alcohol, being used for washing the paper instead of mineral solutions.

7. The Gaudinotype takes its name from its French discoverer, Gaudin.

8. The Energiatype was a discovery of Robert Hunt and made public through the Atheneum. I suppose it was thus named from the sensitiveness of its impressible surface and the consequent energy with which the sunbeam acts upon it.

9. Thermography means, etymologically, "heat sketching." The process—a very curious one—was discovered by Moser, of Koningsberg, in Prussian Poland.

The above variations of the Talbotype are not known to be much used, or ever to have been, by professional heliographers. They have, however, subserved a good purpose by enlarging our knowledge of the materials, the agencies and the methods of operation pertaining to the general art.

10. The waxed-paper process has been and still is much more in vogue than either of the above. Its invention is generally ascribed to Le Gray; though some hold that its first announcement to the public was due to Fabre. A peculiarity of this process is, that the first step is to saturate the paper with pure white wax. A great advantage of paper thus prepared is, that it may be used some time after excitement, and that even the hottest weather does not impair its capacity for use. For this reason it is very serviceable to excursionists and travelers. This process has been very successfully practiced by several eminent photographers, among whom Mr. Fenton has been one of the most successful.

11. Sir John Herschel is said to have first suggested glass plates for heliographic uses. M. Niepce de St. Victor, nephew of Niepce de St. Victor, nephew of Niepce, the associate of Daguerre, published in 1848 a mode devised by himself, for applying Albumen to such plates. Blanquart Everard followed, and albumen, gelatine, serum and other substances were successively recommended for application to glass. Albumen, however, employed according to Le Gray's directions, is found to answer better than any other of these. The methods of Mayall and Negretti are also good.

12. Collodion, at present, is put by general consent at the head of all heliographic agents. It is prepared from gun cotton. Gun cotton, according to an English authority was discovered by Schönbein, a German professor in the Swiss University of Berne, in 1841. He made it by dissolving cotton in a mixture of nitric and sulphuric acids. The German's claim has been somewhat contested, but the matter is unimportant. Collodion—a name taken from the Greek and signifying "to adhere"—is made by dissolving gun cotton in ether mixed with alcohol. The best authorities make Dr. Parker Maynard, of Boston, Mass., the discoverer of it, early in 1848. The first use of it was its application to wounds, in place of the ordinary bandages. An attempt was made, in Philadelphia, in 1848, to use collodion for heliographic purposes, by Frederic Langenheim, at the suggestion of Dr. Chas. S. Rand, of the same city. The attempt failed, and Frederic Scott Archer, of England, is generally accredited as having first used it successfully. He published his process in 1851. Collodion soon came into general use, and numerous variations, greater or less, from his method, became common, to which we shall briefly refer.

The applications of collodion may be ranged under two principal heads. First, the ambrotype, a positive picture made upon a collodion covered plate of glass, upon which is laid a second plate and hermetically fixed thereon by some adhesive substance, so that neither air nor water can reach the impression. Hence the title, derived from the Greek *Ambrotos*, immortal, imperishable. Second, a negative picture is impressed upon a plate, and from this are printed indefinite numbers of positives upon prepared paper. The latter species of picture is at present in most general vogue.

In the waxed-paper process we saw that by means of the wax, papers already excited might be kept for some time before being placed in the camera, and yet answer an equally good purpose, as if used immediately after excitation. This property in prepared heliographic surfaces would obviously be a great convenience for travelers and excursionists, who might desire to take views under circumstances that made it difficult or impossible to sensitize these surfaces at the moment. As it was equally desirable to impart the same property to collodion surfaces, several attempts have been made to this end. Three of these, which have been successful I will briefly mention here:—

1. Messrs. Spiller and Crookes effected this purpose by nitrate of magnesia—a collodion plate sensitized as usual, being dipped in a bath of which that substance forms one of the ingredients.

2. Shadbolt's honey process, in which a sirup, made with pure honey and distilled water in equal parts, takes the place of the nitrate of magnesia in the above process.

3. H. Pollock's glycerized collodion process, wherein glycerine, an ingredient of several neutral fats and oils, subserves the purpose of nitrate of magnesia and of honey in the two processes above named.

4. Dr. Taupenot's collodio-albumen process, which consists in first coating a plate with collodion and exciting it, and then putting upon this a coating of albumen and exciting it; after which the plate is ready for the camera. This two-fold coating serves the two purposes of keeping the plates sensitive for a considerable time, and of increasing the rapidity of their action. This is thought by some to transcend all other processes in the quality of its results.

5. Gutta percha, as a sensitized medium, as a substitute for glass, &c. It is not settled whether the discovery of the heliographic capabilities of this substance is due to Mr. Archer or Rev. J. B. Reade.

It is used in three ways. First, you coat a glass plate with gutta percha; upon this you put a collodion coating and produce a picture in the ordinary way, and the gutta-percha basis being then detached from the glass, you have a substitute for the latter, which is as tough as leather, while flexible and portable. Second, you may iodize a sheet of gutta percha, and take pictures upon it without using collodion at all. Third, you can employ a mixture of gutta percha and collodion in the same way. Fourth, you prepare a glass plate with collodion, and conduct the process in the usual mode. The picture being completed, you pour over it the gutta percha solution. The latter being cold, the united films are separated from the glass in a single sheet.

The ivorytype is an invention of Mr. Mayall, of Regent street, London. These pictures are taken upon an artificial ivory, a compound of barytes and vegetable albumen. A plate made of this substance is treated substantially as you treat the paper in producing the Talbotype; and the result, especially if touched up with a skillful pencil, is a picture exhibiting all the delicate beauties of the finest miniature painting upon ivory.

The dry collodion process is commonly regarded as the invention of Fothergill, but has been varied more or less by Muller, Neville, Norris, Mayall and many others, so that we shall not attempt to decide whose process is the best. Probably some may prefer one and some another. What is common to most is to coat the first thinly with albumen, which being dried slowly, a coating of collodion is then put on, and the plate is treated in the same manner as in the wet process. Muller varies the process of the others, by first collodionizing and sensitizing the plate, and then pouring on a mixture of two liquids—the first composed of white of egg, creosote and distilled water, and the second of honey, animal charcoal and water. The advantage of the dry collodion process is, that the plates may be used long after being first prepared.

Cultivation of Clover.

The Canadian *Agriculturist* says:—Although clover is generally a more certain crop on this side of the Atlantic than in the old countries of Europe, still even here of late years it has become somewhat precarious on land that has been long under tillage in the ordinary way; and either special manures, or rest—that is, repeating the crop at longer intervals,—must be given, in order to bring about the former state of productiveness. Much injury is often done the cultivated grasses as well as grains, by the foul state in which the former are often sown. Clean seed is a matter of the utmost importance. Farmers in general are quite unaware of the extent of the mischief which they thus suffer. In a single pint of red clover as many as 1,600 seeds of plantation have been found; and in a pint of white clover have been detected by careful observation by means of the microscope, 11,200 small seeds of various kinds of weeds! It thus becomes easy to account for the dirty state into which much of our pasture as well as arable land has fallen.

When land is not what is called "clover sick," that is from exhaustion not capable of producing a healthy crop at all, the produce of clover may frequently be increased by top-dressings of manure containing potash, gypsum, and super-phosphate of lime; but the high price of salts of potash, and the uncertainty of the action of manures upon the crop, render the application of artificial manures for clover a practice of doubtful economy. On land termed "clover sick, some of the ordinary manures, whether "artificial" or natural, can be much relied upon to secure a crop. So far as our present knowledge goes, the only means of ensuring a good crop of red clover is to allow some years to elapse before repeating the crop upon the same land.

CORN GRIDDLE CAKES.—Almost every one is interested in knowing how to make corn cakes most palatable since so much of it will be used in these straightened times. The following is said to be an excellent receipt:—Scald at night half the quantity of meal you are going to use, mix the other with cold water, having it the consistency of thick batter; add a little salt; and set it to rise; it will need no yeast. In the morning the cakes will be light and crisp. Skimmings, where meat has been boiled, is best for frying them with. Fry slowly.

PRIZE CORN BREAD RECIPE.—The prize of $10 offered by Orange Judd, the publisher of the *American Agriculturist*, for the best corn bread loaf, was awarded to Mrs. James O'Brien, of Carrick, Pa. The recipe for making the bread is as follows:—To two quarts of meal add one pint of bread sponge; water sufficient to wet the whole; add half a pint of flour and a tablespoonful of salt; let it rise; then knead well for the second time, and place the dough in the oven, and allow it to bake an hour and a half.

A VERY good substitute for tracing paper may be manufactured with ordinary paper by the help of a little benzole. A sheet of ordinary Bath post, moistened with this oil, renders the material perfectly transparent; the tracing may then be effected, and within a short time the volatile fluid has evaporated and left the paper perfectly opaque and clear as before. The drawing sustains no detriment by the operation.

WOMAN SUPERIOR TO MAN.—When Agassiz received his degree of doctor in medicine at Munich, he maintained the superiority of woman in a Latin dissertation upon the thesis, "*femina humana superior mari.*"

Improved Tile-Laying Machine.

The accompanying engraving illustrates a machine for digging ditches and laying down tiles in them at one operation, invented by B. P. Foster and Wm. H. Chaffee, of Flint, Michigan. Its construction and operation will be understood by examining the cut.

1 1 is the frame of the machine; 2 2′ 2″ are the buckets composing an endless chain. The first of these buckets 2 is armed with teeth at the edge which comes in contact with the ground; the next succeeding bucket 2′ has its teeth so placed as to follow the interstices between the teeth of the bucket 2, which precedes it. These two buckets having passed over the ground, and having with their teeth thoroughly broken it up, the scraper on bucket 2″ follows them, and takes whatever of the loose dirt the others have left. This chain of buckets is hung on two sprocket wheels, 3 3, the lower one being hung on a shaft 4, which has its supports in the lower end of the hanger 5, the upper shaft 7 being hung in the adjustable frame 6. This frame is made adjustable for the purpose of regulating the depth to which the ditch shall be dug; as the endless chain is supported by it, the depth to which the said chain digs is determined by the hight at which the frame 6 is secured. This adjustment is also used when the machine first begins to dig the ditch, the buckets being allowed to descend gradually till they have reached the required depth. This adjustment is accomplished by means of the windless, 8, and the ropes or chains, 9, which wind on it, the said windless being turned by means of the crank, and prevented from running back by a ratchet wheel and pawl. The swinging frame 5 is secured in adjustment and supported in the desired angular position by means of the brace 28 attached at one end to said swinging frame or hanger 5, and at the other secured by a pin to the frame 6, in such a position as to secure the proper action of the parts under the circumstances of the particular case in which it may be used for the time being, said brace 28 being provided with several holes at intervals, as shown, to allow the proper or desired adjustment.

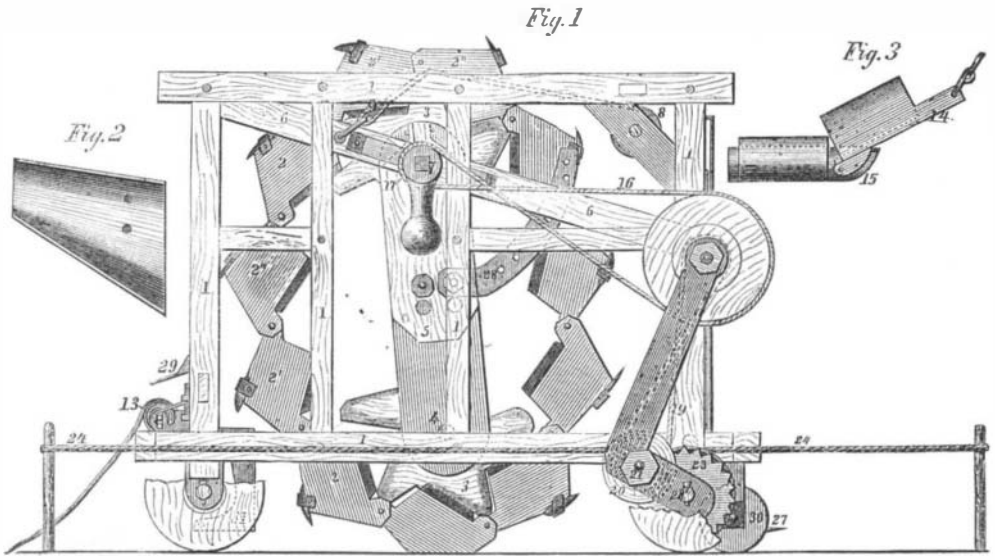
In the rear end of the machine is a reel 13, on which a roll of cloth is wound. This cloth is allowed to unwind as the machine advances, covering the tiles and protecting the joints from the entrance of the loose dirt. By the time the cloth will have rotted, the dirt will have become so compact as to leave no danger of inconvenience from that source. The tiles are laid on a slide or guide 14, represented in detail in figure 3, on which they slide down and take their position in the ditch; the lower part 15 of the guide, being just large enough for the tile to slip over it easily, will hold them in their places laterally, while the pressure exerted by those above will force them together longitudinally. This guide is fastened to the brackets on the under side of the machine, which are shown at 31.

The machine is driven ahead by means of a feeding apparatus connecting with the main driving shaft 7, and acting on ropes secured to the ground at each end by means of stakes, and passing once around a windlass attached to the machine. 16 is the band or cord leading from the pulley 17 on the main shaft 7, and drives the intermediate pulley, 18, which, by means of the belt or cord 19, drives the pulley 20 on the shaft 21. On the said shaft 21 are two gear wheels or pinions which mesh into the wheels 23. These two wheels 23 are upon the shaft 24′, which serves as the forward axle of the machine, and around which the ropes 24 24 are passed in a groove on pulleys provided for that purpose. At the forward end of the machine are two vertical circular knives or cutters 27 which cut the sod on each side of the proper width for the ditch, so that the horizontal cutter 28 may remove the strip and throw it to one side, leaving the earth bare, ready for the operation of the diggers. Should it be desirable to make a ditch simply, the spout or conveyer shown in figure 2 is put on in the place of the spout 29, which is otherwise used, and which is shown attached to the machine.

The machine is designed to have a platform on each side of it for the men to stand upon to operate the cranks. It may run upon a truck to overcome the inequalities of the ground, and keep the ditch on a regular grade.

As there is but little soil moved by this machine, it takes but little power to work it. The inventors think that two men with a boy to feed, on the tiles, can ditch one hundred rods per day, and do the work in a very perfect manner.

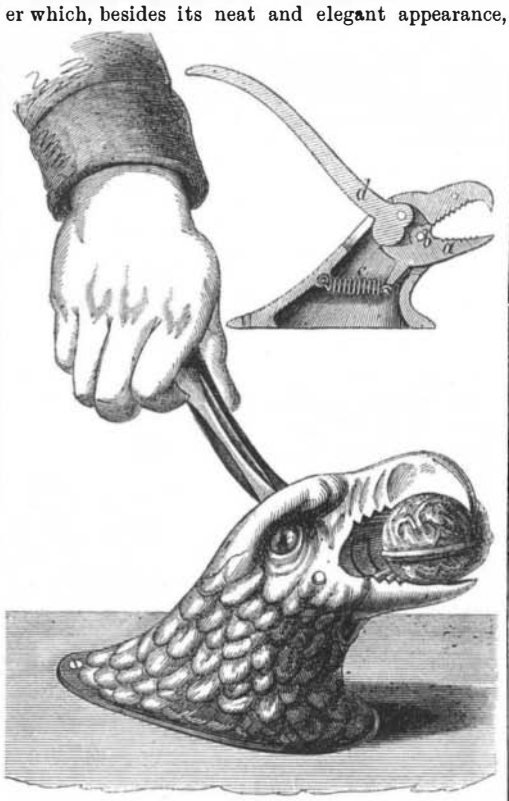
The patent for this invention was granted Oct. 15, 1861, and further information in relation to it may be obtained by addressing Wm. H. Chaffee, who is owner of the patent, at Flint, Mich.



FOSTER AND CHAFFEE'S DITCHING AND TILE-LAYING MACHINE.

SMITH'S PATENT NUT CRACKER.

The accompanying engraving represents a nut cracker which, besides its neat and elegant appearance,



possesses extraordinary power. It is made of hollow cast iron in the form of a bird's head, the lower bill forming the movable or pivoted lever.

The construction is represented in Fig. 2. The bill, *a*, is pivoted at *b*, as shown, and is actuated by a cam on the long lever, *d*. It will be seen that this multiplies the power many fold, giving a very short motion to the bill for a long motion to the lever, *d*. The bill is drawn back and the jaws opened by the spiral spring, *c*.

The form of the jaws enables nuts of any size to be grasped between them, and their peculiar configuration prevents shells from falling into the joint to obstruct their motion. They are serrated upon their inner surfaces to prevent the nuts from slipping. This nut cracker stands securely upon its broad base, and is portable, not being required to be secured to the table, or it may be readily secured by a single screw if it is to be constantly used in one position.

This invention is secured by two patents, one for the mechanical construction and one for the design, both procured through the Scientific American Patent Agency, and further information in relation to it may be obtained by addressing the inventor, S. J. Smith, at 18 Pell street, New York.

Salt and Horse's Feet.

Lucius A. White, Superintendent of the horses of the Avenue A stage line has testified before the Commissioners of Health in this city that out of 136 horses used last winter from 20 to 30 were laid up with frozen feet when the streets were salted. Some of them became perfectly useless, and the feet of one fell off. No salt has been used on the road this winter, and all the horses have been in good condition. Thomas Murphy, superintendent of the horses on the Hudson River Railroad testified that during last winter he had over 70 lame horses, caused by the use of salt on the road. Fifteen died, four had to be killed, and the feet of three fell off. No salt being used this winter, the horses have been in good condition. This practical testimony is quite contrary in ts character to that published in the Scientific American of two weeks since, as given by physicians in Philadelphia, and is in exact accordance with the settled principles of science, as pointed out by us in an editorial on page 41 Vol. II. (new series) of our journal.

The French Ocean Mail Steamers.

It is understood that the Messageries Imperiales Company have just concluded a contract with an English firm for the construction, for £1,000,000 sterling, of eight first-class iron steam vessels for packet service, three to be built on the Clyde and five in ports of France, under the superintendence of the firm. The first English built one is to be completed within 19 months, and the others at successive intervals of two months from the expiration of that term. With respect to the company's operations in connection with India, the three vessels intended for that service are now lying in the harbor of Marseilles completely ready for sea, in regard to equipment and furniture. They are the *Imperatrice*, the *Donau*, and the *Camboge*, all screw vessels of 2,300 tuns burden each, and 500-horse power, and fitted entirely for first-class passengers and their servants. These ships are to leave Marseilles for Calcutta within two months from the present date, and are intended to run between that port and Suez.

Catalogue of Steam Pumps.

We have before us an illustrated catalogue of steam pumps, manufactured by Messrs. Guild, Garrison & Co., of Williamsburgh, New York. It contains well-executed engravings, dimensions, capacity and price of five different varieties which are used for feeding boilers, cleaning mines, draining, supplying locomotive, sugar houses and manufactories. One form is especially designed for evaporation on a large scale, as in the manufacture of sugar, camphene, coal oil, &c. Another form is designed for lifting large quantities of water to slight elevations, with but little attention, and cannot be choked by dirt and sand. This firm work for reputation as well as for money, and furnish a good machine in every respect.