THE HELIOCHROMOSCOPE.

Although photography in colors is not yet an accomplished fact, and although none of the experiments encourage the hope of its early accomplishment, yet by a very interesting, ingenious method and device invented by Mr. F. E. Ives, of Philadelphia, photographic pictures are shown with all the colors of nature. These wonderful effects are secured by means of photographs taken on orthochromatic plates through selective color screens. Three such pictures are taken on one plate, each one representing one of the primary colors. From the triple negative thus obtained a positive transparency is made by contact, each picture and its several portions having the true color values. The partial images are identical as regards point of view and size; each one, however, being transparent or semi-transparent only in those portions which represent the fundamental color belonging to the partial image. According to the modern theory of color vision, red, green and violet are considered the primary colors; consequently, the three pictures represent these three colors, and when viewed through an instrument provided with red, green and violet colored screens, and furnished with means for blending the three images into one, all the colors of the subject are shown.

The simple instrument by which these pictures are superimposed is shown in Fig. 1, and the arrangement of the internal parts is shown in Fig. 2. In the lower part of Fig. 2 is seen the triple transparency, or "chromogram," as the inventor chooses to call it. Above the three images are arranged three colored screens marked R, G, and V. The image below R is transparent to red, but opaque to other colors, except in so far as it enters into combination with the other colors to produce intermediate tints. The same is true of the image below the colored screen, G, this photographic image being transparent to green and to other colors only as green combines with other colors to produce intermediate shades. The same also applies to the picture under the violet screen, it being transparent to violet and opaque to the other colors.

After passing the colored screens, the images are superimposed by a series of transparent and opaque mirrors. By following the line of the light beam passing through the red color screen, it will be seen to impinge on an opaque mirror near the top of the instrument, whence it is reflected to the upper surface of a transparent mirror, thence upward through the eyepiece. The light passing through the green screen is received on an opaque mirror and reflected to another opaque mirror at the center of the apparatus, from which it is reflected through the two transparent mirrors above it to the eyepiece. The light beam passing through the violet screen is reflected by an opaque mirror to the transparent mirror at the center of the instrument, thence upward through the transparent mirror to the eyepiece. Thus by means of opaque and transparent mirrors the three colored images are superimposed, and by means of the transparent and semi-transparent portions of the picture, the amount of light from each portion of the image requisite for producing the colors and their gradations is thus made to pass through the screens, mirrors and eyepiece to the eye. A reflector is placed underneath each photographic image, so that each receives its quota of light. The effect produced is wonderfully beautiful, giving every color and every possible gradation of light and shade as faithfully as the object itself would do under the most favorable circumstances.

The inventor states that the chromogram is a photograph made in a special camera, with no more operations than are required to make an ordinary photograph, so that we are led to believe that before very long amateurs having the special camera and the instrument through which to view the pictures will be able to show pictures in natural colors as readily as they can now show stereoscopic views.

Mr. Ives, by means of different apparatus, has projected photographs in colors on the screen where they could be viewed by a large number of spectators.

It is an interesting fact that a triple negative placed in the instrument in place of the positive shows colors complementary to those belonging to the object.

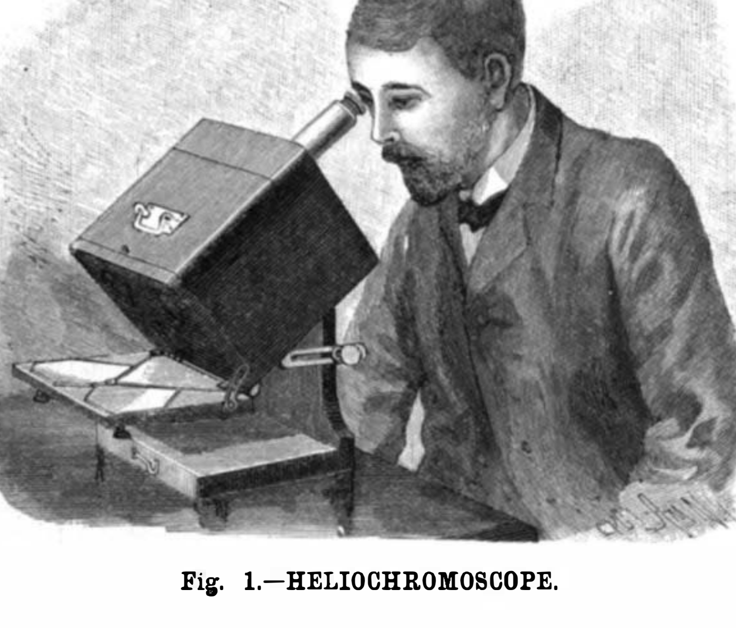

Fig. 1.—HELIOCHROMOSCOPE.

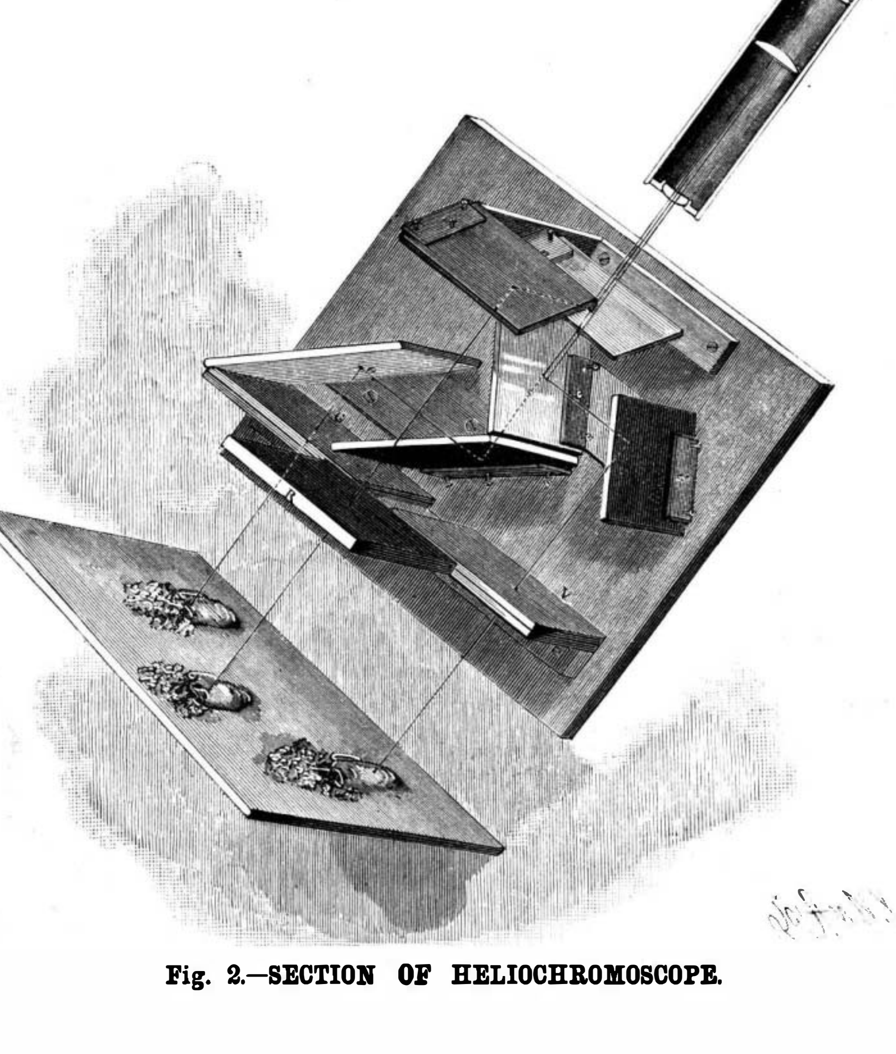

Fig. 2.—SECTION OF HELIOCHROMOSCOPE.

Metallic Sodium.

In the general process for the manufacture of metallic sodium, one of the greatest drawbacks at the present time is the difficulty of expelling the sodium in the form of vapor as quickly as reduced, insomuch that, for a considerable time after a most intense heat has been obtained, on viewing the inside of the converters, large globules of sodium are not unfrequently observed, which are only with difficulty volatilized.

Potassium, on the other hand, although presenting more difficulties than sodium as regards its preparation, melts and volatilizes at a much lower temperature; for instance, if 23 parts by weight of sodium be carefully alloyed with 29 parts of potassium, a fluid amalgam is produced which remains liquid at all ordinary temperatures. If this amalgam is now distilled in a non-oxidizing atmosphere in the first instance, potassium metal distills over, leaving a residue consisting of sodium containing about 5 or 6 per cent of potassium. This alloy, which resembles ordinary sodium in appearance, is much more energetic than that substance itself, taking fire when thrown upon the surface of water the same as potassium, but burning with the characteristic yellow flame of the former. Following these reactions various charges were next operated upon, obtained by the incineration of the alkaline tartrates, sodium tartrate in admixture with a sufficiency of potassium salt, so as to allow the above mentioned percentage of potassium to pass into the distillate, being among the first.

The distillate thus obtained possessed far more energetic properties than pure sodium, melting at a much lower temperature and being considerably more volatile. A series of small converters arranged in groups and containing various percentages of mixed calcined tartrates were thus operated upon, the converters at the termination of each reaction being cut longitudinally, and in no instance could any reduced metal be detected; the alkali metals thus formed having been entirely volatilized, producing the aforesaid alloy.

The calcining of tartrates on a large scale would naturally be entirely out of place; but the introduction of potassium could, as far as can be seen, be brought into play when employing any of the ordinary commercial methods, save that the percentage of the two would probably require a somewhat closer study, in order to obtain concordant results.

H. N. WARREN.

The Corn Cob Pipe Industry.

Corn cobs are not only used as a fuel, but are also manufactured into tobacco pipes by Messrs. H. Tibbe & Son, of Washington, Mo., who have built up a large and novel industry by manufacturing tobacco pipes from corn cobs.

Mr. Henry Tibbe obtained, through Munn & Co., a patent on July 9, 1878, for a pipe made from a corn cob in which the interstices are filled with a plastic, self-hardening cement; and this patent was recently fully sustained by a decision of the United States Circuit Court for the Eastern District of Missouri in the suit of the H. Tibbe & Son Manufacturing Company vs. Lamparter.

In 1882, Mr. Tibbe formed a stock company to manufacture corn cob pipes under his patent, and now receives as a royalty alone $250 per month, and, in addition to this, draws about $10,000 per year as his share of the profits, which latter amount to about $50,000 a year.

The company has the immense advantage of requiring very little money to carry on the business, as the corn cobs are bought directly from the farmers by a St. Louis concern which delivers the cobs to the company and receives all the pipes the factory turns out.

The only difficulty experienced is that they frequently cannot get a sufficient number of cobs to supply the demand for the now very popular corn cob pipes.

The best cobs are the so-called Collier cobs, as they are very large and the grain is not so deeply seated in the cob as in the ordinary corn ears. Good cobs bring about a cent apiece, so that a farmer receives about $30 for a wagon load. The size required is about 1⅝ inches in diameter, and each farmer desiring to supply cobs receives an iron ring of this size to measure the cobs with. Rejected cobs are not usually carted back by the farmer, and furnish a cheap fuel for the boilers of the factory.

The ends of the accepted cobs are cut off by a circular saw, and a good sized cob is, in addition, cut in two pieces for making two pipes from a single cob. Each piece is then bored out by suitable boring machines handled by boys and serving to remove the pith.

Th hollow pieces are then turned on the outside to give the proper shape to the bowl of the pipe. A good turner usually prepares about 3,000 cobs in ten working hours and receives $1 a thousand as compensation.

The interstices in the turned pieces are then filled in with a plastic, self-hardening cement, after which they are dried, sandpapered and shellacked. A barrel of cement is sufficient to fill the interstices of 30,000 pipes and to shellac the same only a single gallon of shellac is necessary.

The present plant of Messrs. Tibbe & Son has a capacity of 350 gross of pipes per week.

A RECENT invention is a cradle which rocks by clockwork mechanism and at the same time plays baby tunes.