Cedar blocks six to eight inches in length—the latter is worth more for wear than the increased cost—are the great favorite, in such localities as can obtain them, in competition with pine, and when well grained in the first place and treated to a second coat of coarse gravel after having had a year or two of wear, in order to again restore the stony surface gained by the tramping and rolling in of the stone by the horses and vehicles which first pass over them, and which surface will measurably wear off in a couple of years, it is wood may reasonably be expected to wear out before any material depreciation from decay will be discoverable.—*N. W. Lumberman.*

NEW COLORING MATTERS.

P. GREIFF.

If one part of chloranil is allowed to act upon two parts of dimethylaniline a deep blue coloration is observed, even in the cold. On heating to 50° the reaction is complete, and a bronze-colored melt is obtained, which is insoluble in water, but gives up to alcohol and acetic acid a deep violet blue color of great purity. If instead of dimethylaniline, methyl-diphenylamine is employed, a blue color is obtained, more beautiful than any yet known. The reactions are very complete and the yield is high.

SEPARATION OF FATS AND SOAPS.

JUSTUS WOLFF.

THE mixture of soap and fat is comminuted as far as possible, mixed with from 10 to 20 parts of purified aniline, and digested in the water bath, stirring and crushing continually for half to three-quarters of an hour. The solution is filtered when cold, and the residue is several times treated with aniline. In the residue is found all the soap, whilst the resins and fats are in the solutions. These are poured together, mixed with hydrochloric acid and with 3 or 4 parts of water, and when cold shaken with ether. The ethereal solution on evaporation leaves the unsaponified fats and resins. The aniline must be free from benzol and nitro-benzol.—*Zeitsch. Anal. Chemie.*

STRIPPING COLLODION TRANSFERS.

SINCE the collodion transfer process has become such a popular one for the production of enlargements, we have had on many occasions to answer queries in our correspondence column as to the cause of blisters in the transferred print, or the reason why in stripping the picture some parts show a greater affinity for the glass plate than they do for the paper that is to be its final support, although there is apparently no reason why the collodion should not leave the plate freely. We have also heard complaints that when the transfer has been effected the film adheres so loosely to the paper that it comes off when the color is applied, or that it can be peeled off in flakes by the insertion of the point of a penknife between the film and paper. These troubles invariably arise from a want of knowledge, on the part of the operator, of the properties of the coating on the paper.

The operation of transferring a collodion picture is analogous to that of transferring a carbon print, and the means adopted are precisely similar. At one time the paper that supported the picture was prepared by simply floating Saxe or Rive paper on a plain solution of gelatine and drying it. When required for use a sheet was soaked in cold water and then brought in contact with the picture under water, so as to avoid air bubbles. When the whole was dry the separation was completed. The disadvantage of this mode of procedure is that the pictures take an unduly long time to dry, on account of the large quantity of water absorbed by the gelatine before it becomes sufficiently soft for use, and also that the picture was held to the paper by a substance thought by many to be subject to hygroscopic influences. For these reasons it has been the custom of late years to add to the gelatine solution with which the paper is prepared a certain proportion of chrome alum, so that the coating once dry becomes practically insoluble; yet, when treated with warm water, it becomes sufficiently adhesive to secure the film in such a manner that no fear need be entertained of its ever again being separated.

A good formula for making such a paper, and one that is well adapted for collodion transfers, is to soak three ounces of good colorless gelatine in a quart of cold water until it has swelled and become quite soft, then heating to about 120°. When the gelatine has dissolved, about eight grains of chrome alum dissolved in a couple of ounces of water are added, the solution being briskly stirred while the addition is being made. It is then transferred to a flat dish, placed in a water bath, sustained at a temperature of 110°. Upon this Saxe, Rive, or other fine paper is floated, and afterwards dried.

In the above formula we have not given a definite quantity for the most important item, namely, the chrome alum, nor is it possible to do so with any idea of certainty, inasmuch as it will vary with every kind of gelatine used, some requiring more and some less, so that the exact amount can only be arrived at by direct experiment. The larger the proportion of alum added the more insoluble the coating will be when dry, and, consequently, the hotter the water will have to be to bring it into proper condition for use. The proportions given above will generally be found to work well if the sample of gelatine used be that known as "Nelson's No. 1 photographic." In practice, however, most operators prefer to use the double transfer paper supplied for carbon printing, as they are thereby saved the trouble of preparation, and it also proves much cheaper than the home made.

Now, double transfer paper is simply paper coated with a preparation such as we have described, to which is added a white or colored pigment; this, in a great measure, hides the texture of the paper. We have recently seen some paper that appeared to have been enameled after the manner of the old Brinkhoff paper before the gelatinous coating was applied. By this means the fiber of the paper was completely hidden, which rendered it especially suitable for the production of fine work. Paper prepared in the manner we have directed, although generally described as being insoluble, will still absorb water and swell up, provided the water be heated to 90° or 100°, and will then acquire a slimy feel very similar to that of wash leather that has for a long time been steeped in water. But if the soaking of the paper be long continued, and the water hot enough, in time the whole of the coating will be dissolved off. The proper condition for our present purpose is secured when the coating has become slimy or decidedly gelatinous. If it be allowed to remain in the water long after this stage is reached then there is the danger of the whole being removed, so that no adhesive material is left to cement the collodion film to the paper.

Few failures, however, result from this cause; it is rather in the reverse direction that they arise, namely, from the coating not being rendered soft enough.

It is well known to carbon operators that all gelatine films containing chromic salts become more insoluble the longer they are kept, so that a transfer paper that may only require a temperature of 90° when freshly prepared will perhaps require as much as 110° to bring it into a proper condition for transferring after it has been kept for three months, and after six months' keeping a long immersion in water as hot as 130° will sometimes be necessary to get it into a good state for use. Eventually it will become so leathery and insoluble that long soaking, even in boiling water, will fail to render it serviceable, and it is the want of knowledge of this property that has led to many failures in transferring collodion pictures.

It is the practice, we believe, of some who supply transfer paper to note on each roll or parcel the temperature the water should be to render it fit for use. From what we have said it will be seen that, even when this is done, it will only apply when the material is freshly prepared, and that allowance must always be made by increasing the temperature as it becomes more insoluble by keeping. It has been pointed out by Dr. Eder and others that both heat and moisture have a marked effect in hastening the insolubility of gelatinous compounds when in combination with chromic salts, and we have reason to believe that transfer paper kept in a warm and damp atmosphere acquires insolubility much sooner than if preserved under opposite conditions.

We will here add a hint as to the method of applying the transfer paper. Having been cut into sheets a little less than glass plates, it is then soaked in warm water until the proper condition is arrived at. The collodion film is then flooded with cold water, and the paper gently lowered upon it, avoiding air bubbles, the excess of water being expelled by the aid of a squeegee. The squeegee should not be so hard and firm as those in use by carbon printers. The India rubber tongue should be both broader and softer, which will give more elasticity and consequently less pressure. If too great a force be applied, and the gelatine coating very soft, there is a danger, when the collodion is of an extremely porous character, of its being forced through the film on to the glass, and thereby causing adhesion to it.—*British Journal of Photography.*

PHOTOGRAPHING COLORS.

EVERY photographer is acquainted with the fact that colors which look light will often photograph dark, while some colors that look dark photograph light. But I believe very few are aware of the fact that it is quite possible and practicable to entirely overcome this difficulty where short exposures are not essential.

Such a method is very valuable for copying oil paintings, and I use it to great advantage in making negatives of highly colored prints, and objects for photographs upon wood, where it is important that the details be very fine throughout.

Negatives of natural scenery, made in this way, are indescribably beautiful; the details develop richly throughout everything, whatever the color.

Hoping it may prove as useful to others as it does to myself, I will describe the method which I have perfected.

I place the object to be photographed in a strong light if possible, and use a quick working objective, directly in front of which is placed a lantern tank, having thin plate glass sides nearly half an inch apart. Fill the tank with a solution of bichromate of potash, containing one part of bichromate to 1,000 parts of water. Focus as usual; then prepare a plate with Newton's emulsion (I always manufacture it myself, and find it uniform and perfectly reliable) as follows:

As soon as the emulsion has set pour upon it a little alcoholic solution of chlorophyll (formula below), and float it backwards and forwards for about thirty seconds, after which wash until smooth. Flow with tea organifier (tea half ounce, water ten ounces), rinse, and expose about two and a half times as long as is required with the plain emulsion without the tank of yellow.

Develop with the sal-soda developer. (I make this double the strength recommended by Mr. Newton, and dilute where exposure is suspected.) If the bichromate of potash solution be too intense, blue and green will photograph too dark; if it be too weak, red will photograph too dark. I have given the proportions I find perfectly adapted to my tank, lens, and chemicals.

To prepare the chlorophyll, first extract everything soluble in water from myrtle or tea leaves, by treating with a number of changes of hot water. Then dry the leaves, and the chlorophyll may be extracted at any time by treating about an ounce of leaves with four ounces of hot alcohol.

Myrtle leaves yield the most chlorophyll, the solution of which should be a deep, pure, green color, and will remain good for a long while if kept in the dark. It spoils very soon if exposed to a strong light.

In manufacturing Newton's emulsion I find it advantageous to mix it in the morning. Try a plate once each hour after, and add the chloride as soon as it fogs, which is sometimes within three hours. The emulsion will then be good at once, and remain so. Be careful to give full exposures. Better over than under expose, and judicious development will make perfect.

The lantern tank which I use is a "sciopticon tank," made to order with plate glass sides; it cost \$1.25. Nothing could be better.

I have made two negatives from a highly colored chromolithograph—one by the usual method, the other by the method described above. The difference is wonderful. The effect in the first is hard and unsatisfactory—the graduations of light and shade all wrong. The second is remarkably soft, delicate, and brilliant. The colors photograph harmoniously, and not a detail is lost. The value of this method for making copies of oil paintings will be readily appreciated.—*Fred. E. Ives, in Phil. Phot.*

PHOTOGRAPHY OF THE INVISIBLE.

CAPTAIN ABNEY, R. E., F.R.S., exhibited recently, before the Manchester L. & P. Society, his photographs of the ultra-red portions of the solar spectrum; and, first of all, showed that the light transmitted by ordinary bromide of silver was of an orange tint, showing absorption in the lowest end of the spectrum. He then went on to explain how he had tried to load the molecules comprising this bromide of silver by means of gum resins, and that he had thus been enabled to photograph slightly beyond the lowest limit of the visible spectrum. Further researches proved that bro-

mide of silver could be prepared in two molecular states—one that already shown, and the other in which absorption takes place in the red as well as in the blue. This was found sensitive to every radiation. He pointed out that the blue form of the silver bromide could be converted into the red form by simple friction, and that after friction it was insensitive to the ultra-red radiation.

Captain Abney then threw upon the screen photographs of the prismatic spectrum, in one of which the lowest limit of the prismatic spectrum was reached. He demonstrated this on the blackboard, by setting up as ordinates the wavelengths of the various portions of the photographs as obtained from the photographs of the diffraction spectrum.

THE RECENT TEXTILE DISPLAY.

THE attractive appearance of the third division of the late Grant reception procession, Philadelphia, which was devoted to textile manufacturers, gave universal satisfaction. There was a generous absence of all rivalry of firms. The marshal, Jas. Dobson (of John & James Dobson), rode at the head of the 4,000 forming this division. A remarkably beautiful banner of red silks, relieved by gold and silver tints, which proclaimed in letters of gold the fact that 50,000,000 of dollars is the capital invested in textile manufacture in this city, was indeed an interesting feature. Dobson's men, 500 in number, bearing flags and banners tastefully made of rugs, followed. A large truck, bearing a pyramid covered with carpets of Philadelphia manufacturers, drawn by four gray horses, and another, likewise decorated, with the "Philadelphia Wilton," drawn by four fine black horses, attracted much attention. 2,000 employees followed this, and next came a wagon completely covered with blankets and rugs, accompanied by 225 men of Seville Schofield, of Manayunk; William Schofield, marshal. Thomas Schofield had an omnibus drawn by four horses displaying his carpet yarns from River Road, Manayunk. Among others in line were Heft & Ogle, Joseph R. Davis, George Grobe, James Wallace, James & Davenport, James G. Davis, Charles Spencer, etc. Then followed the Fairmount section, numbering 300 men. Thomas Dolan & Co., manufacturers of cotton, woolen, and worsted goods, made a turn out of 600 men, headed by Gilmore's splendid band, of New York, composed of 65 pieces. The Quaker City Dye Works, of 100 men, was ably led by Mr. Harry H. Green, and presented a very creditable appearance. Clough & Carson, of the Fairmount Dye Works, made a good display. Also Firth Brothers & Co., Providence Dye Works. [We would here say that quite a number of dyers, not understanding there was to be an exhibition of dye-work, did not turn out, a fact which we exceedingly regret.] Conyers, Button & Co., hosiery and knitted goods, had 3 wagons and 150 men; J. & B. Allen, knitted goods, 100 men wearing badges and regalia; McCallum, Crease & Co., had 400 uniformed men; Charles Spencer & Son's knitting mills, 120 men; Schofield & Branson, 150 men, Thomas P. Stokes & Sons, woolen mills; also Joseph Scanlin & Sons, Foster & Williams, and others. Robert J. Walker's Star Finishing Works, with the West Philadelphia Band in advance, and having a wagon handsomely decorated, turned out in force. Shaffner & Stringfellow, wool and knitting cotton manufacturers, had also a tastefully decorated wagon. William Wood, cotton and wool manufacturer, made a creditable turn out. H. W. Butterworth & Sons had on a wagon a drying machine in full operation. This is but a meager notice of the elegant display made on this occasion by our textile friends, but it must be sufficient to say that they have earned a right to be proud of themselves, as Philadelphia must surely be proud of them and their works.—*Textile Colorist.*

ARTIFICIAL DIAMONDS.

AFTER 13 years of experiment, Mr. James MacTear, of the St. Rollox Chemical Works, Glasgow, has succeeded in obtaining "pure crystalline forms of carbon," which, it appears, Prof. Tyndall, Prof. Smyth, and Mr. Maskelyne, of the British Museum, do not doubt to be true diamonds. Even when the results are from an economic aspect inconsiderable, the artificial formation of any substance hitherto known solely as a natural product must always be regarded as a great triumph in organic chemistry. In the laboratory the marvelous chemical discoveries of recent years have in a great measure reduced the production of diamonds to a question of time and patient experiment, but the general certainty of ultimate success does not in any way detract from Mr. MacTear's brilliant discovery in synthetical mineralogy. He is rather to be congratulated on his indubitable claim to priority, for the dual discovery of the planet Neptune, of the metal thallium, of liquid oxygen, and a number of other curious coincidences in the history of scientific research, suggest the possibility, if not the probability, of other alchemists testing with half incredulous delight the tiny crystals which they almost tremble to identify with the natural gem. Chemistry has so widened belief in the magic of the laboratory that antique impossibilities have become modern difficulties, and the synthesis of the diamond in particular seems a feat which one would be justified in regarding as likely enough. Eleven years ago two German chemists produced from gas tar the coloring principle of madder, and the Turkey red which we formerly obtained from the fields of France, Holland, and the Levant we now order from the chemical factory. Last year Prof. Baeyer, of Munich University, succeeded in building up the blue coloring matter of indigo from the comparatively common substance known as phenylacetic acid, and the scientific triumph is none the less because there appears no present hope of artificial indigo taking the place of the vegetable dye. In the previous year, 1877, oxygen, nitrogen, hydrogen, and other so-called permanent gases were liquefied; the very air we breathe was condensed to a liquid jet; hydrogen was shown to be the vapor of a metal and water a true metallic oxide; and the imagination was enabled to add to the terrible picture of a sunless world, with its rivers of ice and its petrified seas, an atmosphere turning, in a state of disintegration, from invisible gases to strange liquids and new metals. The production of artificial, not imitation, rubies in the same year by M. Fremy and Fell seemed especially to herald the production of the diamond. Of all precious stones the ruby is the most valuable. When even of only a moderate size a diamond of equal weight is but one-tenth its worth. Chemically it is pure alumina—the oxide of aluminum, which enters largely into the composition of ordinary clay. Such an aluminate as that of lead when heated with silicious or flinty matter, gives a fused mass, from which on cooling free alumina separates in crystalline forms—true rubies if the chemist shall have added a small proportion of bichromate of potassium; true sapphires, if a trace of the bichromate and a little oxide of cobalt. In specific gravity and in the system of crystallization the