THE COLORS OF COAL TAR.

Number II.

The art of dyeing various colors with one principal coloring substance and different reagents, has long been known and practiced in all countries. Thus with cochineal and lac insects, scarlet, red, purple and lilac colors can be dyed by using different reagents, principally metallic salts such as the bichloride of tin, oxides of iron, &c. With madder—a vegetable substance—red, purple, and lilac colors are also dyed by employing such reagents as alum and the acetate of iron. Applying the same well known principles of color chemistry to aniline colors great success has already been obtained. It is indeed one of the most remarkable facts connected with modern chemistry, that, although it is but a very few years since colors have been produced from the products of coal tar, a far greater variety has already been obtained than from any other chief coloring agent. Thus from Perkin's aniline purple, described in our last article on this subject, a blue dye can be made by boiling the insoluble purple for some time in hydrochloric acid diluted at the rate of 10 parts of commercial acid to 100 parts of water.

Aniline Red Dyes.—The beautiful crimson color now called *magenta*, was produced by Dr. Hoffman in September, 1858, and an account of it was then transmitted to the Academy of Sciences. He called it carbo-triphenyl-triamine, a crystalline base formed by the condensation of three molecules of aniline reunited by carbon substituted for hydrogen. It was M. Verguin, of France, however, who first produced this beautiful color in merchantable quantities for dyers, and his mode of preparation was first patented in Europe April, 1859, by MM. Reynard Brothers, in Lyons, France. It is usually prepared as follows :—Into a glazed iron pan 100 parts of aniline and 60 of anhydrous bichloride of tin are placed, and the whole heated to about 392° for about twenty minutes. This produces a dark liquid, which becomes thick and glutinous when it cools. It is then mixed with boiling water and filtered, and to this filtrate is added common salt which precipitates the color called fuchsine. M. Joseph Renard obtained an American patent July 31, 1860, from which the following is an extract :—The preparation of the coloring matter referred to is based upon the discovery that if aniline be heated to a temperature of from 380° to 400° Fah., together with several anhydrous or desiccated compounds, the mixture thus produced will be changed into a substance of such dark color that it appears to be almost black, but which, when applied in layers or diluted, is transparent and of a beautiful red color. The substances or chemical compounds by the treatment of which aniline produces the red coloring matter are quite numerous, but may be classified under the following groups :—

Sulphates of peroxide of iron.
Nitrates of protoxide of mercury.
Chlorates of protoxide of tin.
Bromates of binoxide of mercury.
Iodates of binoxide of tin.

All ferric, mercuric, stannic and uranic compounds, the yellow oxide of uranum, the oxide, chloride, bromide, iodide and fluoride of silver. Many of these compounds being too rare or expensive for practical purposes, M. Renard therefore confines himself to the use of the following :—

Bichloride of tin.
Bichloride of Mercury.
Protosulphate of mercury.
Photonitrate of mercury.
Deutonitrate of mercury.
Sulphate of tin.
Nitrate of peroxide of iron.

The following is the claim of the patent :—

I claim combining with aniline the metallic salts specified, or their equivalents, and treating the same in such a manner as to produce a red in contradistinction to a purple or bluish coloring matter or dye.

Magenta has also been made with the permanganate of potash and the binoxide of lead, and with arsenic acid, as described by Dr. Crace Calvert. Two parts of aniline and one of arsenic acid are heated to about 250°, and when the color becomes red boiling water is added, and the product allowed to cool; common salt is then added, which precipitates the coloring matter, and this is then washed and dissolved in methylated alcohol. This substance is a powerful organic base slightly soluble in water. When solid it is a brittle mass having a beautiful green metallic luster.

Commercial purple and red aniline colors differ in their composition as follows :—Purple, $C_{36}H_{17}N_3O_2$. Red, $C_{36}H_{20}F_4O_4$. The fuchsine, red, dissolves in ammonia and in sulphuric acid, and is discolored with the acid, but the purple is unaffected with these reagents. Silk and wool are dyed with fuchsine by simply adding some of the color to a slightly acidulated bath of water. Its dyeing power is so great that ten grains of it will color two square yards of silk. This beautiful red color of aniline has been called azeleine fuchsine, roseine, magenta, &c. Dr. Hoffman proposed the appropriate name rosaniline for it, as magenta and solferino are flash terms which should be repudiated.

Dying Cordovans.

The following extracts on this subject are taken from the *Shoe and Leather Reporter* :—

Cordovan leather, which takes its name from the city of Cordova, in Spain, and of which the original preparation is attributed to the Moors, is plain, but handsome, with a fine grain, and similar to the morocco, which is ordinarily tanned with oak bark, nut galls, or sumac. The best kinds, especially the yellow cordovans, are brought from the Levant; those of Spain, France and Hungary are also highly esteemed, and in Germany the cities of Dantzic, Lubec and Leipzig, enjoy a reputation for like productions. The material used in the manufacture comprises goat skins (both male and female), dog skins, and even hog skins ; they are produced every color and quality, but those made of he-goat skins are the best.

The skins, after having been cleaned and stretched in water, are placed in lime pits; they are the replaced in water for a space of from eight to fifteen days, care being taken to renew it from time to time, and to work the skins by treading upon them with the feet. After a lapse of a fortnight a bath is applied composed of water and the excrements of dogs ; the temperature not being higher than that of new-drawn milk ; then a second bath, equally composed of water and of wheat bran. Immediately on being taken from the bath the skins are stretched, pressed between two boards, and rubbed with kitchen salt. Then they are immersed in a third bath, prepared of figs and water. Only skins which it is intended to color black are dyed after having been tanned. Black leather is tanned in liquor of the extract of oak bark; that of lighter color must be placed in an ooze made up of water and the extracts of sumac and nut galls.

When the operation of tanning is completed, the leather should be withdrawn, taking with it as little moisture as possible, and spread in the shade, where care should be taken to rub on the bloom with Sesam oil, before the sides can become perfectly dry. After the oil is laid on, the process of drying in the shade may be completed and the skin may be folded on the flesh side. When it is desired to give to the cordovan a rough aspect, the surface may be rubbed up with a dull knife, immediately after spreading.

In many parts of Southern Russia, particularly at Karasubazar, a city of the Crimea, of which the cordovan manufacturers enjoy a high reputation, wormwood (*artimisia amma*) is employed to make fast the colors in the leather. If, for example, it is proposed to dye the leather black, a decoction of wormwood is mixed with pulverized cochineal, and then alum is added.

In the Isle of Cyprus, cordovans are dyed red in the following manner :—The skins, generally about fifty at a time, are placed in a fig bath ; they are then passed into a strong solution of alum heated to a temperature equivalent to that of fresh milk ; they are afterward strung upon poles to drip, and at length stretched, in order to expel as much of the dampness as possible ; finally the skins are extended on a table, and after being uniformly stretched the red color is applied with a cotton rag. The coloring matter is prepared by taking ground cochineal and boiling it in soft water in a well-tinned kettle, and during the ebullition five ounces of powdered alum are added for every five ounces of cochineal and the liquor boiled until it has been reduced one-sixth or one-eighth by evaporation, when it is passed through a filter. The skins are coated four or five times with this preparation, and after being placed in the tanning liquor are submitted to the operation of dressing.

In Hungary and in Transylvania, where the manufacturers of cordovans produce goods which are highly esteemed for their quality, the red color is laid on in a different manner. When the skins have been properly prepared for the process, they are fastened together by couples in the form of bags, care being always taken to place the sides to be colored within and facing each other, and to leave but one opening. Into this opening the warm coloring matter is poured. The mouth of the bag is then tied, and if the color does not readily penetrate all parts of the skins and unite with them, they are agitated or rolled around.

New Atlantic Telegraph.

A few evenings since Mr. Cyrus W. Field gave a short address on the Atlantic Telegraph before the Geographical Society. He claimed that a cable could now be laid down which would avoid all the difficulties that had been fatal to the first. He said that of more than 6,000 miles of wire manufactured and laid down by the Messrs. Glass, Elliott & Co., less than one per cent was now in actual operation. This Company was ready to make and lay down a cable at the bare cost of material and labor, taking their pay for interest on capital and for superintendence in stock after the cable is tested. The wire which they proposed to make had 510 pounds of copper per mile to 93 pounds per mile in the old cable. The conductors were better insulated and protected than before. They had 13 strands of 3 wires each coated with gutta percha, while the 18 wires of the exterior protection of the the old cable were not coated at all. The new cable had double the strength of the old, and at the same time was lighter in the water, a very important matter, as even if broken it could be recovered, as had been done in the Mediterranean.

Mr. Field alluded to the Behring's Straits route, 18,000 miles to London, and the route by way of Iceland and Greenland. Were all laid, he thought there would be business enough for them all. But it was the opinion of Dr. Hayes that no cable could last near Greenland, on account of the ice grinding the bottom of the sea. The difficulties of length of circuit had been overcome, if they were not disposed of by the successful working of the first cable. Could the money be raised soon, the cable could be manufactured so as to be laid down in the summer of 1863. In answer to a question, Mr. Field stated that the two governments had agreed that neither should interfere with the working of the cable. Last December the English government negotiated with manufacturers in regard to a cable, and found that they could have one laid down in July. In case of war the British government would lay down a cable as soon as possible.

[The non-interference with the telegraph by the two governments, here alluded to, amounts almost to a laughable joke. In time of war England would certainly not interfere with the cable. Having both ends under her control she would encourage its operations as much as possible. The government of the United States under such circumstances could not possibly get the slightest benefit from it. In case of war between the two nations all civil and business intercourse would cease, and Uncle Sam would be compelled to give up his right to the use of the cable. —Eds.

Shot for the Big Guns.

Arrangements are being made, says the Pittsburg *Chronicle*, to put the two immense guns at Fortress Monroe—the Rodman, 15-inch smooth bore, and the *Union* 12-inch rifled—in a condition for offensive operations. Rifled projectiles are being made for the *Union*, and huge solid shot for the 15-inch gun, at the Fort Pitt Works. The ball is not exactly solid, but is so cast as to secure even greater strength than if made solid ; the core being but four inches in diameter. This opening is filled with lead, the ball when complete weighing 430 pounds. These balls are not made of the common metal used in other shot and shell, but of the very best quality of gun iron—Bloomfield at that—almost as hard as chilled iron, and nearly as tough as wrought iron.

It is expected that 1,500,000 bales of cotton, 400 pounds each, will be shipped to England from India this year.