

observed at a distance by means of a telescope and scale, in the same manner as observations are made with the magnetometer. Two commutators were also brought into the circuit; the one changed the direction of the current in the wire of the multiplicator, the other allowed the currents of the thermo-elements to pass either so as to strengthen, or so as to oppose each other.

The foregoing experiments were carried out in the Physical Cabinet at Heidelberg, under the direction of Prof. Kirchhoff, to whose advice and assistance I am much indebted.

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*Solar Eclipse of March, 1858.*

M. Quetelet at Brussels, carefully observed two compensating pendulums, in comparison with a chronometer, during the eclipse. The object was to see whether their vibrations were slower, as Professor Zantedeschi thought would be the case. The two pendulums were arranged so as to vibrate, the one parallel, the other perpendicular to the meridian. The one parallel to the meridian showed no change, but the other showed a loss of more than a second and a quarter per hour during the eclipse. The record of observations made several times a day for several days, both before and after the eclipse, show that this was no accidental coincidence; but many more observations will be necessary to establish the connexion of effect and cause between it and the eclipse.

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*On the Fixation of Metallic Sulphurets in Cotton-printing.\** By  
Dr. H. SACC.

The number of metallic colors employed in calico printing is so small, that there is sufficient inducement to seek for new ones, as fashion daily requires patterns of more varied colors and more effect in the coloration.

Hydrated oxide of iron, manganese bistre, oxide of chrome, chromate of lead, ultramarine-blue and green, Schweinfurt-green, copper-iron green, and the sulphurets of arsenic and antimony are probably all the mineral dyes which are employed in calico printing. Their use is, however, very limited, because some of them are difficult of fixation and others furnish unattractive tints; for this reason the reddish yellow, the sea-green from oxide of chrome, and the colors fixed by white of egg are almost the only ones of the above-mentioned group which are still employed. From the circumstance that these colors are fixed with difficulty, the following experiments were made, with the view of fixing metallic colors upon calicoes by means of a current of steam.

Numerous attempts to fix solid, colored metallic sulphurets of characteristic and fine tints upon the fibre proved failures; but satisfactory results were obtained by preparing the hyposulphites of those heavy metals whose sulphurets are not attacked by the weaker acids, such

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as cadmium, nickel, copper, lead, and mercury. Sulphuret of bismuth, protosulphuret and persulphuret of tin, and sulphuret of antimony were not adapted for this process, because the soluble salts of these metals are decomposed immediately when they are brought into contact with an alkaline hyposulphite, and thrown down in the form of perfectly insoluble sulphurets.

It is necessary that the metallic sulphuret should be formed upon the stuff itself, so that it must be employed in the form of a hyposulphite either in solution, or at least suspended; consequently, if the mixtures have been standing too long they become useless, because the metallic sulphuret is then already formed. After many trials the following proportions of the metallic salt and hyposulphite of soda proved to be the best.

It is to be noted preliminarily that the solution of gum contains 1 kilogrm. of gum in the litre of water, and the solution of hyposulphite of soda, 200 grms. of the solid salt in the litre.

*Cadmium-yellow.*— $\frac{1}{4}$  litre of solution of gum is heated with 40 grms. of perchloride of cadmium, and  $\frac{1}{4}$  litre of solution of hyposulphite of soda is added to the solution; the mixture is printed, steamed, and washed. It furnishes a very beautiful, solid, but unfortunately rather expensive yellow, which is but little changed even in the madder-bath.

*Copper-green.*— $\frac{1}{4}$  litre of solution of gum is mixed with 25 grms. of sulphate of copper; the latter is dissolved by the aid of heat, and then  $\frac{1}{4}$  litre of hyposulphite of soda is added. This green is very fine, and may be put into the madder-bath without undergoing any alteration; it is very uniform (when printed on a white ground it is better thickened with leicome than with gum), but it has the disadvantage, that when printed in warm weather it soon fades.

*Nickel-gray.*— $\frac{1}{4}$  litre of solution of gum, 25 grms. of protochloride of nickel, and  $\frac{1}{4}$  litre of hyposulphite of soda.

*Lead-gray.*— $\frac{1}{4}$  litre of solution of gum, 25 grms. of nitrate or 50 grms. of acetate of lead, and  $\frac{1}{4}$  litre of hyposulphite of soda. This gray may also be placed in the madder-bath without injury; the nickel gray acquires a somewhat lilac color by this treatment.

*Mercury-gray.*— $\frac{1}{4}$  litre of solution of gum, 10 grms. of perchloride of mercury, and  $\frac{1}{4}$  litre of hyposulphite of soda; or, to form chlorosulphuret of mercury, 50 grms. of perchloride of mercury instead of 10 grms.

These latter colors are very solid, but not easily prepared. The experiments will be further continued.—*Schweizer, Polytechn. Zeitschrift*, 1857, Bd. II. p. 175.

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Photography on Iron.

M. Van Monchaven introduces with the collodion a proto-salt of iron, which forms in the silver bath a reducing agent, which, by its slow decomposition, gives peculiar rapidity to the process. The plates are very thin; they are simply sheets of Swedish iron varnished by heat with a bituminous mixture. The idea appears to be American, but the merit resides in the perfection of the work.—*Cosmos*.