the vessel containing the bromized gelatine, which must be briskly agitated by any convenient means. I use a bottle-brush made with silver wire, which is kept working up and down during the process of mixing, and thus thoroughly incorporates the two solutions. When the whole of the silver solution has been added, a small quantity of the emulsion may be poured on a slip of glass, and examined by the transmitted light of a gas flame; if the flame appear of an orange yellow colour, the emulsion will have been properly mixed; but if of a cold grey or blue tint at this stage, it shows that the operation has been too hurriedly performed, and the result will not be satisfactory.

In this process the sensitiveness, as far as our present knowledge of the subject goes, greatly depends on the state of division in which the silver bromide is formed. If the gelatine be present in too large proportion, or if the solutions be too weak, the molecules of silver bromide will be finer, and no amount of subsequent boiling will give the same degree of rapidity. On the other hand, if a smaller quantity of gelatine be used, or if the solutions be too strong, the resulting bromide will be too coarse, and fog will ensue. The quality of the gelatine, too, has a marked effect on the subsequent sensitiveness of the emulsion.

The thin but smooth emulsion may now be transferred to a stoneware bottle, and the whole placed in a saucepan of boiling water, where it should be kept boiling for thirty minutes. It is then strengthened up by the addition of 250 grains more gelatine (which has been previously soaked in water and drained), and filtered into a dish to set. With regard to the gelatine to be used, it is necessary, especially in warm weather, to select a moderately strong sample. Nelson's photographic I have found to be too soluble, unless mixed with a firmer kind, such as "Coignet's Gold Medal." On the whole, I have found the French gelatine, sold in sheets, answer best. When thoroughly set, the pellicle is broken up into pieces, and passed through a syringe, having a disc at the end pierced with holes, into a hair sieve standing in a vessel of clean water, which is kept running during six hours. The washed emulsion having been remelted, and filtered through swansdown calico, the plates may be coated without warming, and the addition of alcohol is generally found to be unnecessary, unless the emulsion has to be kept before use; but in any case it is best used fresh.

It is convenient, after the plates have been allowed to get thoroughly set on a level plate of glass, to transfer them to a closet, and dry them by a current of warm air, or they may be put direct into the drying cupboard on levelled bars; but the heat will be liable to induce frilling during development, unless a small proportion of chrome alum, two drops of a sixteen-grain solution to each ounce of the washed emulsion, has been added previous to coating. Chrome alum must, however, always be added sparingly, as otherwise it renders the films impervious to solutions.

These plates, if successfully prepared, are extremely rapid, an ordinary landscape subject, with lens aperture $\frac{f}{15}$ requiring less than one second's exposure. Portraits may be taken in the studio in the fraction of a second.

For development, I generally use alkaline pyrogallic, though the recently introduced modification of the ferrous oxalate developer gives equally good results if the exposure be correctly timed.

A convenient formula for pyrogallic development is the following:—

No. 1.

Pyrogallic acid	...	...	60 grains
Nitric acid	...	...	8 minims
Water	...	...	20 ounces

No. 2.

Ammonia ·880	...	...	2 drams
Ammonium bromide	...	...	75 grains
Water	...	...	20 ounces

These two solutions will keep good for a considerable time, and should be mixed, immediately before flowing over the plate, in equal parts, or the proportions may be varied to suit the exposure.

If intensification should be required, it may readily be effected by Dr. Van Monckhoven's method, which consists of treatment with bromide of mercury followed by a dilute solution of pure cyanide of potassium saturated with cyanide of silver. This process, in my hands, has given excellent results, and great promise of permanence.

I conclude by expressing the hope that any who may be induced to give the above a fair trial may succeed in producing uniformly satisfactory results. Constant improvements are being made by those who are working in this direction, and it is only fair to believe that each one who continues the work may contribute something, however small, towards perfecting a process which seems destined, sooner or later, to eclipse all its predecessors.

The Topic for next week will be "The Nitrate Bath—How to Make and Keep it in Order," by Mr. Valentine Blanchard.

SIGNALS BY SUNSHINE.

The solar ray is getting the better of the electric spark in the conveyance of signals; sunshine is beating the voltaic pile as a fleet and convenient messenger. The news of the last great battle in India comes to us in rays of sunshine, flashed by mirrors across a hostile country, and the heliograph is now as firmly established as the electric telegraph. One of these days we shall have a camera arrangement for recording the light flashes, and thus, with mirrors and photographic apparatus, signals will be capable of being written down and recorded at a distance of fifty miles. General Stewart could not have carried with him electric wires sufficient for a long line of communication, and even if he had established such telegraph communication, military posts at frequent intervals on the road would have been necessary to protect it. The heliograph, on the other hand, does not require the route to be kept open. The line of communication cannot be cut, for the simple reason that the signalling takes place over the heads of the enemy, and the stations required are but few and far between. A ten-inch mirror—and this is the diameter of the ordinary field heliograph—is capable of reflecting the sun's rays in the form of a bright spot, or flare, to a distance of fifty miles, the signal at this interval being recognisable without the aid of a glass; that is to say, two trained Sappers, each provided with a mirror, can readily speak to one another, supposing the sun is shining, with an interval of fifty miles between them, provided their stations are sufficiently high, and no rising ground intervenes to stop the rays. The adjustment of the military heliograph is a very simple matter. An army leaves its base where a heliograph station is located, and after travelling some miles desires to communicate with the stay-at-homes. A hill in the locality is chosen, and a Sapper ascends with his heliograph, which is simply a stand bearing a mirror, swung like the ordinary toilet looking-glass, except that besides swinging horizontally it is also pivoted so as to move vertically as well. Behind the mirror, in the very centre, a little of the quicksilver has been removed, so that the Sapper can go behind his instrument, and look through a tiny hole in it towards the station he desires to signal. Having sighted the station by adjusting the mirror, he next proceeds to set up in front of the heliograph a rod, and upon this rod is a moveable stud. This stud is manipulated like the foresight of a rifle, and the Sapper again, standing behind his instrument, directs the adjustment of this stud until the hole in the mirror, the stud, and the distant station are in a line. The heliograph is then ready to work, and in order to flash signals so that they may be seen at a distance, the Sapper has only to take care that his mirror reflects the sunshine on the