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# BLACK AND WHITE POSITIVE SLIDES

**George Agius/Frank Ventura**

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Photography was always a popular pastime, and with the ever increasing availability of cameras, films and other equipment, more people are taking it up as a hobby. Many are interested enough to do their own developing and printing black and white photographs. A few, even more ambitious than others, have ventured with the printing of coloured photographs. However the production of a photograph involves the use of expensive enlarging equipment, printing paper, and a lengthy and laborious process in a dimly lit or completely dark room. Most people may for various reasons, not want to procure the enlarging equipment and many more are deterred by the time consuming process and by the lack of suitable darkroom facilities.

Alternatively one can make use of slides. These can of course be used for various purposes such as photographing useful or complex diagrams from books or as a means of presenting useful information to an audience during a talk or perhaps in recording a sequence of events. Unfortunately the 'process' colour slides are somewhat expensive if extensive use is to be made of them. With this in mind, we are therefore proposing the use of black and white positive slides. These can be easily produced by a short simple process, using an ordinary negative film, without any special equipment or darkroom facilities. It should be noticed that this process can produce positive slides directly from the negative film in the

camera. In other words there is *no need* to develop a negative and then reexpose another negative to get a positive.

A survey of photographic literature shows that most of the normal negative films can be processed to give black and white positives. However, many references point out that the process is rather difficult and that no generally applicable formula can be used. On experimenting with some of the generally available films it was found that the published processes lacked sufficient details for specific films. Therefore it was decided to work out the necessary details for one particular film ILFORD HP4, which seemed to give the best results during our trials. A general procedure, which is applicable to all negative films, should help in understanding the processes involved.

1. The exposed film is first developed in an energetic developer which ensures that every exposed grain in the emulsion is developed (Fig. 1 and 2).

2. The silver negative image so developed is then dissolved away completely with a suitable silver solvent, normally an oxidizing agent like potassium dichromate (VI) or potassium manganate (VII) (permanganate), without affecting the undeveloped silver halides.

3. The negative is rinsed and treated with sodium sulphate (IV). The emulsion still carries a positive image in the form of undeveloped silver halides. (Fig. 3)

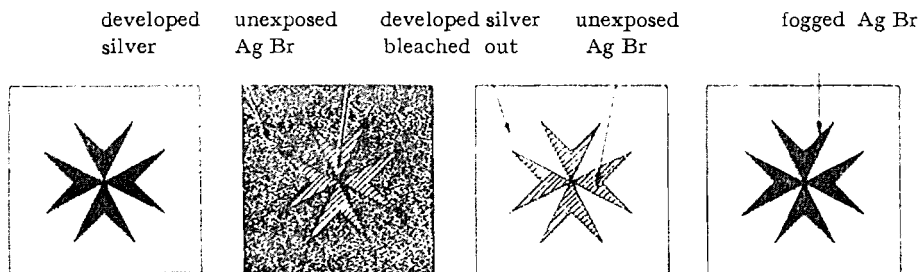


Figure 1. Original image

Figure 2. After first development

Figure 3. After bleach and clear

Figure 4. After fogging, same image as original

4. The silver halides remaining are fogged. This fogging may be carried out either by exposing to light followed by normal developing and fixing, or by chemical means followed by fixing (Fig. 4)

## EXPOSURE

The exposure of the negative is a very important and critical step in obtaining good black and white positives. Ilford HP4 has a film speed rating of ASA400; however for the purposes of black and white reversal it must be assumed that the film has a rating of ASA 25. This is the film speed rating which has to be used in calculating the appropriate aperture and time. If an automatic exposure meter is incorporated in the camera the film speed is set at ASA 25 mark and exposures are then made in the normal way. This limits the speed of the film considerably, so other film speed ratings up to 100 ASA were tried. The results obtained with higher film speed ratings were acceptable but slightly too dense.

## LOADING FILM ON SPIRAL

When the film is exposed it is re-

wound into its cassette in the camera. The film is then transferred from its cassette to the spiral of a developing tank. (The latter can be purchased at a low cost from photographic dealers.) Instructions as how to load the spiral can be found with the tank. The important thing to note here is that this operation must be carried out in total darkness. If no darkroom facilities are available, the loading can be carried out by covering both hands with several layers of thick cloth, thus creating a light-tight compartment. It is best to work in a room with subdued lights. The loaded spiral is placed (always under cloth cover) in the developing tank and the lid put on (the latter two items being initially introduced under the cloth before the spiral loading operation is started). The tank with the lid on is now light-tight and all other operations can then be carried out in full daylight.

## CHEMICAL PROCESSING

The temperature of the various solutions was maintained at 20 + or - 1 C. The agitation method adopted during the process was the so called inversion method, that is, the tank is inverted regularly once every minute

during the processing time except for the water washes.

**Wetting:** The tank is filled with water, agitated for a few seconds and emptied.

**Development:** A general purpose negative developer which can be purchased at low cost from photographic dealers is used at four times normal strength and 5g/l of sodium thiosulphate crystals. One such developer is for example Tental S420. Other developers can of course be used provided (a) they are used at three times normal strength (b) sodium thiosulphate crystals are added and (c) development time is the same as recommended for the negative. For the more enthusiastic we are here reproducing a negative developer formula which we have tried successfully.

	Metol	3.1g
	Hydroquinone	5.9g
	Sodium metabisulphite	2.1g
	Sodium sulphite (anhyd.)	90.0g
	Sodium carbonate	11.5g
	Potassium bromide	1.7g
plus	Sodium thiosulphate crystals	5.0g
	Water	to one litre

The time for this development is 12 minutes.

**Water Wash:** Developer is poured out and the film washed repeatedly with water for three minutes.

**Bleaching:** The film is now treated for five minutes with a solution containing:

	Potassium dichromate	5.0g
	Concentrated sulphuric acid	2.7cm <sup>3</sup> .
	Distilled water	to 1 litre.

**Water Wash:** The film is rinsed

with water for three minutes.

**Clearing:** The film is allowed to soak for 2 minutes in a clearing solution which contains:

	Sodium sulphite	50g
	Sodium hydroxide	1g

**Water Wash:** The film is rinsed with water for three minutes.

**Chemical Fogging:** This method of fogging was preferred to re-exposure of the film to light, because it only involves the addition of a further solution to the tank. Light exposure would have involved the unwinding of the film from the spiral and exposing it evenly to white light of a particular intensity. However chemical fogging produces an image with a slight dark brown tinge. The solution used for chemical fogging is:

	Thiourea	1g
	Sodium hydroxide	4g
	Potassium bromide	40g
	Water	to one litre.

The film was treated with this solution for two minutes. At this stage the positive is ready and the film can be taken out of the tank and checked to see whether it requires further darkening.

**Water Wash:** The film is rinsed repeatedly with water for two minutes.

**Fixing:** The film is fixed (10 minutes) to ensure that no undeveloped silver bromide is left. The fixing solution can be purchased ready weighed to be made up in solution. However, here we are again reproducing a suitable fixer formula:

Sodium thiosulphate crystals  
240g  
Potassium hydrogen sulphite 5g  
Water to 1 litre.

*Final Wash:* The film is rinsed with running water for 15 minutes.

*Drying:* The film is allowed to dry in dust-free atmosphere. The final result is a slide of good definition, with tonal range. The graininess which is usually evident in enlarged prints made from HP 4 negative film, is in the case of projected slides not evident at all.

Finally, it should be mentioned that all the solutions mentioned can be used more than once. The developing, clearing and fixing solutions can be

used about six times. In the case of the developer 1g of sodium thiosulphate should be added each time. The bleaching solution can be used about three times if it is filtered or allowed to settle. The fogging solution can be reused provided that 1g of sodium hydroxide and  $\frac{1}{2}$ g of thiourea are added each time.

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