

longer exposure, and I have also found, in the case of restless birds, that it is of advantage to have a shutter which makes a slight 'click' when open, for, however disposed the bird may be to move about, on hearing the opening of the shutter it will remain still to listen. Thus the shutter may be kept open as long as the bird stands still, or until the necessary exposure is given." Space will not permit of further extracts from this delightful book, which will be warmly welcomed, we have no doubt, not only by the special class of naturalists, but by all who love birds and their haunts.

#### Flower Photography.

A different type of nature photography is treated of by Mr. Step in Vol. 1 of his "Wild Flowers Month by Month," and although not so exciting or exacting as bird photography, is nevertheless quite as interesting, and, moreover, calls for an equal amount of skill and enthusiasm. And Mr. Step is an enthusiast. He revels in his descriptions of the beauties of the wild flowers he pictures so cleverly, and although the present volume only deals with the months of March, April, May, and June, he manages to fill 200 closely-printed pages with word pictures of the flora that blossoms during that period. In the chapter "April in the Lanes" he says:—"Dandelion in full beauty is the first thing to strike our attention here, one of the most beautiful flowers that grow; but alas! so common that few see its beauty. The incapacity for seeing beauty in common things is a great deprivation. If we could only get one of those purblind individuals to sit between us on this stone-heap and 'hold him with our glittering eye,' as did the Ancient Mariner with the wedding guest, we might in an hour's chat show him something of the perfect form and cunning workmanship, such as no artificer in the precious metal could excel, bestowed on this condemned plant. We would pluck one of these flower-stalks and show him how a slender column to support a massive capital may be contrived of little solid material, and yet be strong enough to bear the

strain at the top, to bend before the wind without breaking. We would show him how the beauty of the capital as a whole was not achieved by sacrificing beauty and exquisite finish in the parts whereof it is composed; and we would compel him to understand the marvel of that "clock" or "puff," and the important work it performs in a perfect manner."

The photo-botanist will find a plethora of good things between the covers of this book; the illustrations of which are as good as they are lavish. Not much in the way of practical hints for flower photography is given, but the value of photography to the botanist is acknowledged by the author at every turn. He suggests a stand camera and good lens for the work, as the possessor of a hand camera cannot hope to accomplish much in the direction of wild-flower photography. Comparatively long exposures are necessitated by the yellow, red, and green of his subjects, and by the dim light of woods. In the open, upon colonies of plants, the hand camera may be useful; but at close quarters, on the individual plant, it will rarely give good results. Orthochromatic plates are absolutely necessary, and a yellow screen of medium tint should be used. Altogether, this book can be regarded as opening up new ground for photographers, who will not fail to derive considerable instruction and pleasure from a careful perusal of its contents.

#### "Wild Birds at Home."

The third nature-book that we have to consider is unlike the other two, inasmuch as it is composed entirely of pictures, is much smaller in size, and costs but 6d. This last fact is, perhaps, more astonishing than the wonder that will be created on inspecting the really beautiful illustrations. These fully bear out the title of the book—"Wild Birds at Home"—and, as specimens of nature-photography and high-class printing, would be hard to beat. They are all by Charles Kirk, and some of them are very beautiful little pictures, apart from their undoubted value as nature-photographs.

## ONE-PLATE COLOUR PHOTOGRAPHY.

HERR SCHINZEL describes, in the current number of the "Photographisches Wochenblatt," the following process for producing photographs in natural colours, which, he states, differs from all previous processes, in that separate component pictures are not required, but that with one plate a single exposure is made, and on this one plate the multi-coloured image is produced.

The plate is coated with a number of coloured gelatino-bromide films, which are separated by films of plain gelatine. The individual films are so coloured that a part of the incident light is absorbed in each film, and by the addition of suitable sensitisers the absorption of the coloured rays is made as perfect as possible. For example, in using three films, the top one will be coloured yellow or orange, and obviously be sensitised for the blue violet rays; the middle one will be coloured blue or blue-green, and be sensitised for reddish orange; whilst the bottom one will be coloured red and sensitised for yellowish green. If a plate thus prepared is exposed on any subject, a part of the rays will be absorbed by each film, and by development and fixing the corresponding component parts of the picture will be produced.\*

The development of the polychromatic picture is founded on the catalytic property of metallic silver. If a developed and fixed plate is immersed in a 2 per cent. aqueous solution of hydrogen peroxide, this will be decomposed where there is metallic silver, and oxygen set free. If, now, such dyes have been chosen for colouring the gelatino-bromide films, that they, by oxidation, are easily converted into colourless compounds, they will be bleached out where there is metallic silver. It is easy to conceive that after the removal of the silver, coloured pictures will be obtained, which will be not complimentary to, but according to, the colours of Nature.

\*The preparation of the plates here described naturally recalls the "three-colour plate" of Dr. Smith, of Zurich (see B.J.P., May 5, 1905).—EBS. R.J.P.

Moreover, it is not essential that the oxidation products of the dyes should be colourless. It will be quite enough if the power of the pigments to stain the gelatine is destroyed by the oxidation, and that they become soluble in water. Hence it would be possible to use comparatively stable dyes, so that the coloured images would bleach with difficulty in sun or daylight.

The polychrome image can be printed from the plate on to a sheet of white paper, prepared in the same way, but the picture will appear less brilliant than when observed as a transparency.

As regards the practical working of the process, it should be noted that the gelatino-bromide of silver films must be "wasserecht" stained—that is to say, that the dyes must not be soluble in water—and that they must not be affected by development and fixation, or, if this the case, they must be reformed before the treatment with the peroxide. At the same time, any sensitisers that may be used which will not bleach, and whose colour does not agree with that of the films, can be removed.

The films of plain gelatine between the individual coloured films have the effect of preventing the action of the nascent oxygen developed in one film from acting on the others, and of confining the gas as far as possible to the requisite coloured film. For this last reason the top film is also coated with a transparent gelatine film.

It is advisable, before treating the gelatine with peroxide, to harden it, but not so that the diffusion of the peroxide solution is rendered too difficult. It is well known that peroxide has the property of dissolving metallic silver, and that the oxidation would be brought to a premature stop. This disadvantage is obviated by the addition of a small quantity of soda to the peroxide solution. As, however, many dyes are altered by the alkalinity of this solution, it is necessary to regenerate them by immersion in an acid solution

Briefly, the essential advantages of this process are that only one exposure is made, and the printable and more or less true-to-nature picture is produced on the negative plate. The preparation of the pictures is extremely simple, no more solutions are necessary than in the production of pictures on bromide paper—namely, developer, fixing, and instead of the toning bath the peroxide solution—for if the latter, when the oxidation process has continued long enough, is acidified, the solution of the silver is effected.

This method represents, therefore, a direct process of colour

photography suitable for instantaneous work, and one in which the printable image is produced on the original plate in body colours.

We learn that this process is patented in all civilised countries, and that further details are promised, which, we are sure, will be anxiously awaited. Nevertheless, it is well not to be over-sanguine in regard to the possibilities of such a process in practice. It seems that a composite plate such as that which Herr Schinzel proposes using is necessarily very slow, and instantaneous exposures will be possible only under the very best conditions.

## PHOTOGRAPHS UPON COINS, SPOONS, AND PLATES.

THAT branch of the art of photography by which photographs are produced upon watch cases and dials, can be applied to many other articles for ornamental purposes. An excellent and very profitable business can be made by the production of these miniature photographs for souvenir and other purposes; a specialty might be made of this work to advantage in many places.

### Souvenir Photography.

The cost of material is very small; still determination and carefulness in practice are the essential points to be attended to. The line of souvenir photography is almost unlimited, pictures upon the exteriors of glass bottomed tankards, upon the sides of china cups, china plates, the interiors of the bowls of spoons, and upon one side of silver coins, form only a few of the items that come under heading of souvenir work. Orders are sometimes given for as many as one hundred special prints upon silver quarters to be used as presents to guests and friends in connection with a silver wedding, the date upon the reverse side of the coin indicating the twenty-fifth year of married life, the souvenir being as pretty as it is novel. Just how this class of work is to be carried out successfully and in a thoroughly practical manner is described in an article by A. J. Jarman in the current number of "Wilson's."

### Camera Accessories.

The author says:—In the first place, pictures of this kind are to be made by the carbon process, by the single transfer process. Of course in this case the negative must be made in reverse. To attempt this work by double transfer is almost impracticable, but by single transfer every operation is simplified and brought down to a simple and practicable operation. It will be necessary to secure a small stock of material for general work, which must be kept on hand. If it is the intention to carry on this class of business as a specialty, it will be necessary to procure a prism with attachment to the hood of the lens, this is to enable a reverse negative to be taken of the object or objects desired. A lens of the rectilinear type of about ten to thirteen inches focus is the best suited. The camera need not be larger than is necessary to take a  $6\frac{1}{2} \times 8\frac{1}{2}$  plate, but it must possess considerable length of bellows, capable of extending to about three feet, and closing up to the smallest possible space.

When the prism is used the camera is placed at right angle to the object to be copied. The operator will soon become accustomed to this method of working. The plate holder or dark slide should be one suitable for working the wet plate process, because such a holder enables either wet plates or dry plates to be used; in every instance the shadows in the negative must be clean and clear, otherwise the print when developed upon the metal base will look too dull.

### Chemicals to Order.

Materials required:—One pound of Heinrich's soft gelatine; salicylic acid, one ounce; strong ammonia, one pound; bichromate of potash, one pound; chrome alum, one pound; common alum (powdered), one pound; carbonate of ammonia, half-pound; white granulated sugar, one pound; half a dozen wide-mouth bottles; one

pound of alkaline or crystalline lacquer; half a pound of thinner, one small frying oven, one small gas stove, a one-pound can of potash lye, half a dozen trays for developing and fixing—enamelled iron will do—in sizes from 4 x 5 to 10 x 12, half a pound of glycerine, one six-inch squeegee, one yard of thin indiarubber cloth, one or two dozen pieces of carbon tissue 8 x 10, two or three small glass funnels (6 to 16 ozs.), three glass graduates (2 oz., 4 oz., 16 oz.), one oatmeal kettle two pints (the capacity applies to the inner vessel).

### Sensitising Formulæ.

This list, although long, is not expensive, five or six dollars will cover everything. Should it be desired to purchase the carbon tissue by the roll, the following colours will be found most suitable for the greatest bulk of the work: standard brown, engraving black, and portrait brown. The following solutions for sensitising will be found to work well.

#### No. 1.

Bichromate of potash (cp.).....	1 ounce.
Filtered water .....	25 ounces.
Strong ammonia .....	10 drops.

As soon as the crystals of bichromate are dissolved, filter into a clean, wide-mouth amber bottle.

#### No. 2.

Bichromate of potash (cp.).....	1 ounce.
Carbonate of ammonia .....	20 grains.
Filtered water .....	25 ounces.

As soon as the crystals are completely dissolved the following must be added:—

Salicylic acid .....	20 grains.
Hot water .....	2 ounces.
Glycerine .....	15 drops.

The solutions must be well mixed by the use of a strip of clean glass, and filtered as in the case of No. 1.

### Working from Ordinary Photographs.

Carbon tissue sensitised in this solution will keep longer than if sensitised in No. 1. In every other respect they act the same. To produce the carbon print upon coins proceed as follows:—Having obtained the photographs to be copied, which should be of equal size, and printed upon the same kind of paper or the result will not be satisfactory, cut each print to suitable sized ellipse, draw a circle upon a sheet of white cardboard, and arrange the two prints within the circle, the tops inclining towards each other. A wreath of leaves with the flower forget-me-not, may be entwined around the inner part of the circle, with a floral addition to the spaces between portraits if desired. The portraits should face each other. The painting of this ornamentation may be done with india ink. The arrangement being now completed, several negatives are made, the circle upon the cardboard being a guide so as to enable the reduction to be made within the diameter of the coin. Assuming that there are one hundred silver quarters to be treated, then ten negatives should be made. If a gelatine dry-plate is used it is a good plan