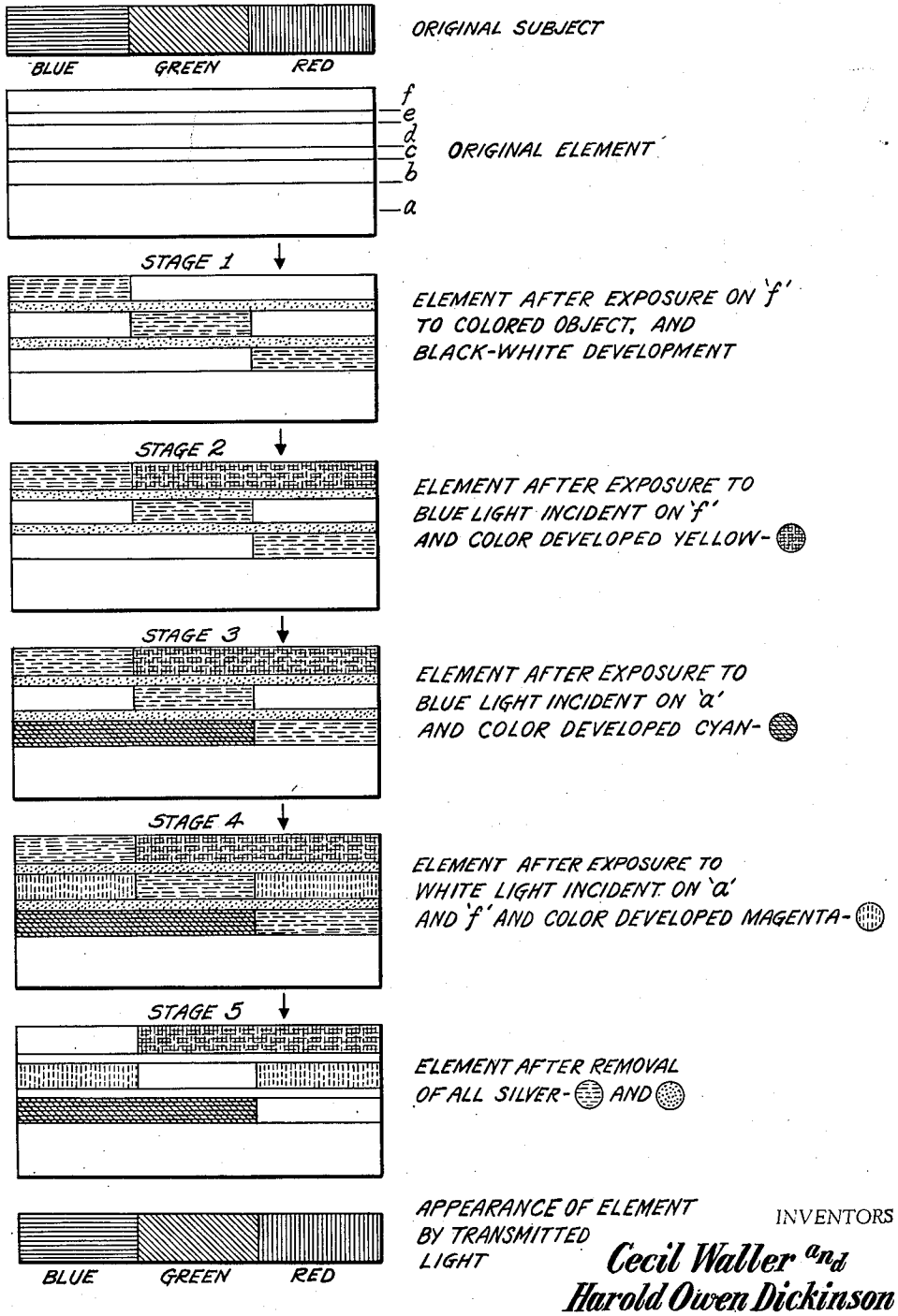
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LIGHT-SENSITIVE PHOTOGRAPHIC ELEMENT AND PROCESS USING IT

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## LIGHT-SENSITIVE PHOTOGRAPHIC ELEMENT AND PROCESS USING IT

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This invention relates to the production of coloured colloid layers and more particularly to the production of multilayer materials for colour photography and to the processing of such materials.

In our co-pending application Serial No. 682,-300 (now U. S. Patent No. 2,609,292) we have described a method of producing coloured colloid layers by treating a substantially colourless colloid layer containing silver sulphide nuclei with a solution of a reducing agent in the presence of silver ions, the said colloid being permeable to such solution. Generally the colloid layer becomes coloured a yellow to red or brown hue.

We have now discovered that silver selenide is as effective as silver sulphide in this process, and according to the present invention therefore coloured colloid layers are produced by treating a substantially colourless colloid layer containing silver selenide nuclei with a solution of a reducing agent in the presence of silver ions, the said colloid being permeable to such solution. As when using silver sulphide the colloid layer becomes coloured a yellow to red or brown hue.

More particularly according to the invention the substantially colourless colloid layer containing silver selenide nuclei also contains a silver compound as a source of silver ions, or is coated adjacent to a second colloid layer which contains a silver compound as a source of silver ions, and the treatment with the reducing agent is effected in the presence of a solvent for the silver compound. A preferred solvent is potassium thiocyanate, but any other solvents, even weak solvents such as sodium sulphide, may be employed.

A useful way of forming the coloured colloid layer is to coat in super-position on a support a colloid layer containing silver selenide nuclei and a colloid layer containing silver halide, and to treat the combination with a reducing agent, e. g. a photographic developer, containing a silver halide solvent.

Alternatively a proportion of silver halide may be included in the colloid layer containing the silver selenide nuclei and the layer treated with a photographic developer containing a silver halide solvent.

Colloid layers containing silver selenide nuclei may be prepared by adding to the colloid a quantity of a selenium compound and a quantity of silver salt, e. g. silver nitrate or silver halide, which will react together to form sufficient silver selenide. Suitable compounds which may be thus employed are selenourea, allyl selenourea and selenosulphates. Some silver sulphide may be formed in addition by reaction between the silver salt and sulphur compounds naturally present in the gelatin. Generally speaking, for a gelatin containing little or no sulphur compounds (a so-called "inert" gelatin) quantities of the

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order of 5 cc. of M/100 silver nitrate and 2.5 cc. of M/100 selenourea per 100 cc. of a 5% solution of the gelatin are found to be suitable. Even where the gelatin contains natural sulphur compounds the quantity of added selenium compound referred to above will generally be 10 to 100 times as great as the quantity of such sulphur compounds.

The formation of the silver selenide nuclei is best effected by heating the gelatin containing the silver compound and the selenium compound for a short period. Temperatures of the order of 120° F. are suitable and the duration of the heating may be from 5 to 60 minutes or more, though the shorter periods of treating are usually adequate. It is preferable that the pH of the solution should be above about 5.8.

Colloid layers thus prepared are substantially colourless since the silver selenide nuclei impart no appreciable colour or opacity to the colloid.

As already indicated, the coloured colloid layers of this invention are of particular value as filter layers in multilayer photographic elements for use in colour photography, and according to a further feature of this invention, therefore, a photographic element comprising a plurality of photographic emulsion layers carried on a support also includes a layer or layers of a substantially colourless colloid containing silver selenide nuclei, such layer or layers containing a silver compound as a source of silver ions or being coated adjacent to a silver halide emulsion layer.

When such a photographic element is developed with a photographic developer containing a silver halide solvent, the said colloid layer containing silver selenide nuclei is developed to a yellow to red or brown hue.

In particular, according to this invention, there is provided a photographic element which comprises the following layers:

(*a*) A transparent, substantially colourless support.

(*b*) A silver halide emulsion layer sensitive to red light.

(*c*) A layer of colourless colloid containing silver selenide nuclei which, on development with a developer containing a silver halide solvent, forms a yellow colour.

(*d*) A silver halide emulsion layer sensitive to green light.

(*e*) A layer of colourless colloid containing silver selenide nuclei which, on development with a developer containing a silver halide solvent, forms a yellow colour, and coloured yellow with a fugitive dyestuff or by inclusion of yellow colloidal silver.

(*f*) A silver halide emulsion layer sensitive to blue light only.

Other layers may also be included, e. g. colloid layers serving to secure good anchorage between the various layers listed, an anti-halation layer and an outer colloid layer to act as an anti-abrasion layer or ultra-violet ray absorbing layer.

Such a photographic element, exposed to record a coloured object, the rays being incident on layer (*f*), acquires latent image records of the blue, green and red aspects of the object in the appropriate emulsion layers. On development with a photographic developer, these are converted to silver image colour separation negative records, and if a fugitive dyestuff is present this is removed. If the photographic developer contains a silver solvent, or if the element is subsequently treated with a photographic developer containing a silver solvent, layers (*c*) and (*e*) become coloured.

The intensity of the developed colour depends on the particular conditions prevailing, i. e. on the nature of the layers (*c*) and (*e*) and on the development conditions. A very intense colouration is usually obtained by including a source of silver ions in the layers (*c*) and (*e*) themselves, for example by including a small proportion of silver halide. In order to keep the transparency of such layers, before development to colour, as high as possible, the added silver halide can usefully be of extremely fine grain. Presumably by reason of the fineness of grain of the silver halide, it is very reactive as a source of silver ions. The nature and quantity of the silver halide added should not be such, however, that any substantial light-sensitivity is imparted to layers (*c*) and (*e*) since these should not give any appreciable black silver image on development.

The emulsion layers of the photographic element obtained by the procedure outlined above can be further selectively processed to colour by making use of the colour layers (*c*) and (*e*) as light-barrier layers. For example, the element may be exposed to blue light through the support and then developed in a solution containing an aromatic primary amino developing agent and a colour-former which combines with the oxidation products of such developing agent, formed during development, to form a blue-green azomethine or quinone-imine dye image in situ with the developed positive record in layer (*b*). The element may then be exposed to blue light incident on layer (*f*) and that layer similarly processed to form a positive yellow image in layer (*f*). Neither of these treatments affects layer (*d*) since the blue exposing light is absorbed by the yellow layers (*c*) and (*e*). Layer (*d*) may then be rendered developable either by exposure to very bright light, adequate to penetrate layer (*c*) or (*e*) or by X-rays or by chemical treatment, e. g. with a 5% aqueous solution of sodium arsenite or hydrogen peroxide or with guanidine thiocyanate. This layer may be similarly developed to form in it a positive magenta image.

On treating the final product with Farmer's reducer all the silver and silver salts are removed, and the colour of layers (*c*) and (*e*) is also removed, leaving a true colour record of the original object.

Many variations may be made in this procedure without departing from the essential features of this invention. For example the layers (*b*) and (*d*) may be transposed and their processing correspondingly varied. Further the layers (*c*) and (*e*) may be adapted to yield red or red-brown images and the colour of the exposing light used for re-exposing the layers correspondingly adjusted to a wavelength, or band of wavelengths, which are absorbed by such layers (*c*) and (*e*).

It is sometimes considered desirable when using a photographic element of the general character referred to above to remove the first-formed "negative" silver records before re-exposing to render the complementary "positive" silver halide records developable. With the types of light-barrier layer which have been prepared in the past, e. g. dyestuffs or black metallic silver layers (formed from pre-fogged silver halide layers as described in British Patent No. 505,099), the removal of the negative silver images has been impracticable since the treatment, usually with acid dichromate or acid permanganate, has also removed the dyestuff or metallic silver from the barrier layer.

It has been found, however, that with the light-barrier layers of the present invention the removal of the original negative silver images before exposure is possible since the silver selenide nuclei are substantially unaffected by the usual acid dichromate bleach baths and a re-development of the element with a developer containing a silver halide solvent results in colouration of the layers.

Accordingly an important feature of the present invention consists in the processing of an element of the general character of that set out above by the following steps:

1. Develop to form original negative records in layers (*b*), (*d*) and (*f*).
2. Bleach out the records formed in (1) by an acid dichromate bleach bath. At this stage the dye in layer (*e*) has been bleached out by the treatments specified, and if colloidal silver is used instead of dye this also is removed.
3. Develop in a developer containing a silver halide solvent.
4. Re-expose through the support (*a*) with light absorbed by the layer (*c*) and colour-develop to form a positive blue-green azomethine or quinone-imine dye image in (*b*).
5. Re-expose with light falling on layer (*f*) and absorbed by layer (*e*) and colour-develop to form a positive yellow azomethine or quinone-imine dye image in (*f*).
6. Treat the assembly to render the silver halide in layer (*d*) developable and colour-develop to form a positive magenta azomethine or quinone-imine dye image in (*d*).
7. Remove silver, silver salts and the colour in layers (*c*) and (*e*) with Farmer's reducer.

Appropriate variations would be made in this process were the layers (*b*) and (*d*) reversed. The following examples will serve to illustrate the production of a coloured colloid layer and of a photographic element and its processing, according to the invention.

*Example 1*

A photographic multilayer element was prepared consisting of the following layers in superposition in the order stated.

(*a*) Transparent colourless film support.

(*b*) Gelatino silver iodobromide emulsion, sensitised to the red region of the spectrum by means of 2,2',8-triethyl-4,4' dichloro-thiacarbocyanine bromide.

(*c*) Gelatin layer containing silver selenide nuclei and silver halide (prepared as described below).

(*d*) Gelatino silver iodobromide emulsion, sensitised to the green region of the spectrum by means of 2,2'-diethyl-pseudocyanine iodide.

(e) Gelatin layer containing silver selenide nuclei and silver halide (prepared as described below) and containing the dyestuff 1-p-sulphophenyl - 3 - methyl - 4 - cinnamylidene - pyrazole-5-one.

(f) Gelatino silver iodobromide emulsion having a natural sensitivity in the blue region of the spectrum and substantially insensitive to the green and red regions of the spectrum.

The layers (c) and (e) were prepared by adding to a 5% solution of gelatin, 5 cc. of M/100 silver nitrate solution and 2.5 cc. of M/100 selenourea solution per 100 cc. of gelatin solution, digesting at 120° F. for 60 minutes, and adding 10 cc. of fine-grain silver iodobromide emulsion (containing 250 mgm. of silver) per 100 cc. of gelatin solution. In the case of layer (e) a quantity of the stated dye equal to 5% on the weight of the gelatin was added.

The element thus prepared was exposed to a coloured object, the light being incident on layer (f) and developed for 3 minutes in a metol-hydroquinone developer to give negative records in silver in layers (b), (d) and (f) corresponding to the blue, green and red aspects of the object.

The element was then washed in running water and then immersed in a bath consisting of 15 gms. of potassium dichromate and 10 cc. of sulphuric acid per 2000 cc. of solution, for five minutes. The element was then washed again in running water and re-developed for 8 minutes in a developer consisting of:

| | | |
|---|---|---|
| Amidol | gms. | 7.5 |
| Sodium sulphite (anhyd.) | gms. | 30 |
| Sodium carbonate (anhyd.) | gms. | 40 |
| Potassium thiocyanate | gm. | 1.0 |
| Potassium bromide | gm. | 1.0 |

Water up to 1000 cc.

At this stage the originally developed silver images had been removed (by the dichromate bath), the dye in layer (e) had been removed (on the original development) and a yellow-red colour had been formed in layers (c) and (e) (by the amidol development).

The element was then exposed to violet light passing through the support (a) and then developed in a developer of the following composition:

| | | |
|---|---|---|
| N.N-diethyl p-phenylene diamine hydrochloride | gm. | 0.4 |
| Ethyl alcohol | cc. | 40 |
| Sodium carbonate ($Na_2CO_3.10H_2O$) 20% solution | cc. | 160 |
| Sodium sulphite ($Na_2SO_3.7H_2O$) 20% solution | cc. | 25 |
| 2,4-dichlor-α-naphthol | gm. | 0.4 |
| Potassium bromide | gm. | 0.1 |

Water to make 400 cc.

This treatment resulted in the formation of a positive silver plus blue-green indophenol dye image in layer (b). The element was then rewashed and exposed to violet light falling on layer (f). It was then re-developed in a developer of the formula given above but containing 2-chloroacetoacetanilide (0.4 gm.) instead of 2,4-dichlor-α-naphthol. By this means a positive silver plus yellow azomethine dye image was formed in layer (f).

The element was then re-washed and exposed to X-rays, rendering the residual silver halide in layer (d) developable. It was then developed in a developer as above but containing 1-p-nitrophenyl-3-methyl-5-pyrazolone (0.4 gm.) instead of the 2,4-dichlor-α-naphthol. This resulted in the formation of a positive silver plus magenta azomethine dye image in layer (d).

The element was then re-washed and bathed in Farmer's reducer, which removed all the silver and silver salts and also the colour from layers (c) and (e), leaving a full-colour image of the original object.

The emulsion included in layers (c) and (e) was too slow to record an image during the various exposure operations.

The process described above and exemplified in the foregoing example may be modified in various ways. For example, the exposed positive silver halide records may be processed to colour by methods other than colour-development, e. g. by dye toning or chemical toning.

Moreover, one or more of the emulsion layers may contain colour-formers; the following is an example of such a process:

*Example 2*

A photographic multilayer element was prepared consisting of the following layers in superposition in the order stated, as illustrated in the accompanying drawing:

(a) Transparent colourless film support.

(b) Gelatino silver iodobromide emulsion sensitised to the red region by means of 2,2'8-triethyl-4,4' dichlorothiacarbocyanine bromide and containing 2 parts of 1-hydroxy-2-naphthoyl stearylamide-4-sulphonic acid per 100 parts of emulsion.

(c) Gelatin layer containing silver selenide nuclei and silver halide (prepared as described in Example 1).

(d) Gelatino silver iodobromide emulsion, sensitised to the green region of the spectrum by means of 2,2'-diethyl-pseudocyanine iodide.

(e) Gelatin layer containing silver selenide nuclei and silver halide and yellow colloidal silver as filter medium. The latter is prepared by the reduction of an aqueous solution of silver nitrate in the presence of gelatin by glycine.

(f) Gelatino silver iodobromide emulsion having a natural sensitivity in the blue region of the spectrum and substantially insensitive to the green and red regions of the spectrum.

The layers (c) and (e) were prepared as for the previous example.

The element thus prepared was exposed to a coloured object, the light being incident on layer (f). It was then developed for 8 minutes in a developer of the following formula:

| | Grams |
|---|---|
| Metol | 3 |
| Sodium sulphite (anhydrous) | 50 |
| Hydroquinone | 6 |
| Sodium carbonate (anhydrous) | 37.5 |
| Sodium thiocyanate | 2 |
| Potassium bromide | 2 |

Water to make 1 litre.

This produced negative records in silver in layers (b), (d) and (f) corresponding to the blue, green and red aspects of the object and, in addition, produced a uniform yellow-brown deposit in layers (c) and (e). The element was then washed in running water for 20 minutes, yielding the product identified as stage 1 in the accompanying drawing, and then processed to give a full colour image in the following stages:

1. Exposed to the top layer (f) to blue light, the

exposure being confined to this layer by the barrier layer (*e*).

2. This layer colour-developed in a yellow colour developer of the following composition:

| | |
|---|---|
| N.N-diethyl p-phenylene diamine hydrochloride ---------- gm-- | 0.4 |
| Ethyl alcohol ---------- cc-- | 40 |
| Sodium carbonate ($Na_2CO_3.10H_2O$) 20% solution ---------- cc-- | 160 |
| Sodium sulphite ($Na_2SO_3.7H_2O$) 20% solution ---------- cc-- | 25 |
| 2,4-chloracetoacetanilide ---------- gm-- | 0.4 |
| Potassium bromide ---------- gm-- | 0.1 |
| Water to make 400 cc. | |

3. Washed for 10 minutes. The element was then at stage 2 shown in the drawing.

4. The bottom layer (*b*) exposed to blue light, exposure being confined to this layer by means of the barrier layer (*c*).

5. Colour-developed in a developer of the following composition:

| | |
|---|---|
| N.N-diethyl p-phenylene diamine hydrochloride ---------- gm-- | 0.4 |
| Ethyl alcohol ---------- cc-- | 40 |
| Sodium carbonate ($Na_2CO_3.10H_2O$) 20% solution ---------- cc-- | 160 |
| Sodium sulphite ($Na_2SO_3.7H_2O$) 20% solution ---------- cc-- | 25 |
| Potassium bromide ---------- gm-- | 0.1 |
| Water to make 400 cc. | |

6. Washed for 10 minutes. The element was then at stage 3 shown in the drawing.

7. The middle layer (*d*) exposed from both sides to intense white light. Intense white light will penetrate the barrier layers.

8. This layer colour-developed in a magenta colour developer of the following composition:

| | |
|---|---|
| N.N-diethyl p-phenylene diamine hydrochloride ---------- gm-- | 0.4 |
| Ethyl alcohol ---------- cc-- | 40 |
| Sodium carbonate ($Na_2CO_3.10H_2O$) 20% solution ---------- cc-- | 160 |
| Sodium sulphite ($Na_2SO_3.7H_2O$) 20% solution ---------- cc-- | 25 |
| 1 - p - nitrophenyl - 3 - methyl - 5 - pyrazolone ---------- gm-- | 0.8 |

9. Washed for 20 minutes. The element was then at stage 4 shown in the drawing.

10. Fixed and bleached in Farmer's rducer.

11. Washed for 20 minutes. The element was then at stage 5 shown in the drawing.

The full colour image of the original object was thereby obtained.

Although in this invention it is preferred that the colloid of the coloured colloid layer should be gelatin, other colloids may be employed, e. g. polyvinyl alcohol, hydrophilic cellulose derivatives, or other protein colloids.

What we claim is:

1. A photographic element which comprises a support carrying at least three superimposed layers, the outer ones of which are colloid silver halide photographic emulsion layers and the middle one of which is a layer of a substantially colourless colloid containing silver selenide nuclei, of such particle size and quantity that they impart no colour to the layer, the said colourless colloid containing a quantity of silver compound insufficiently sensitive to light to produce any appreciable image in the said colourless colloid layer on photographic development, but sufficient in quantity to produce, with the aid of said silver selenide nuclei, a layer of silver substantially opaque to blue light on photographic development.

2. A photographic element which comprises (*a*) a transparent substantially colourless support and in superimposition thereon, in order, (*b*) a silver halide emulsion layer sensitive to red light, (*c*) a layer of a colourless colloid containing silver selenide nuclei of such particle size and quantity that they impart no colour to the layer, and a quantity of a silver compound soluble in alkali thiosulphate insufficiently sensitive to light to yield any appreciable image on photographic development but sufficient in quantity to produce, with the aid of said silver selenide nuclei, a layer of silver substantially opaque to blue light on photographic development, (*d*) a silver halide emulsion layer sensitive to green light, (*e*) a layer of colourless colloid containing silver selenide nuclei of such particle size and quantity that they impart no colour to the layer, and a quantity of a silver compound soluble in alkali thiosulphate insufficiently sensitive to light to yield any appreciable image on photographic development but sufficient in quantity to produce, with the aid of said silver selenide nuclei, a layer of silver substantially opaque to blue light on photographic development, and a removable yellow colouring material, and (*f*) a silver halide emulsion sensitive only to blue light.

3. A photographic element which comprises (*a*) a transparent substantially colourless support and in superimposition thereon, in order, (*b*) a silver halide emulsion layer sensitive to red light, (*c*) a layer of a colourless colloid containing silver selenide nuclei of such particle size and quantity that they impart no colour to the layer, and a quantity of silver halide insufficiently sensitive to light to yield any appreciable image on photographic development but sufficient in quantity to produce, with the aid of said silver selenide nuclei, a layer of silver substantially opaque to blue light on photographic development, (*d*) a silver halide emulsion layer sensitive to green light, (*e*) a layer of colourless colloid containing silver selenide nuclei of such particle size and quantity that they impart no colour to the layer, and a quantity of silver halide insufficiently sensitive to light to yield any appreciable image on photographic development but sufficient in quantity to produce, with the aid of said silver selenide nuclei, a layer of silver substantially opaque to blue light on photographic development, and a removable yellow colouring material, and (*f*) a silver halide emulsion sensitive only to blue light.

4. A photographic element which comprises (*a*) a transparent substantially colourless support and in superimposition thereon, in order, (*b*) a silver halide emulsion layer sensitive to red light, (*c*) a layer of a colourless colloid containing silver selenide nuclei of such particle size and quantity that they impart no colour to the layer, and a quantity of an emulsion of silver halide insufficiently sensitive to light to yield any appreciable image on photographic development but sufficient in quantity to produce, with the aid of said silver selenide nuclei, a layer of silver substantially opaque to blue light on photographic development, (*d*) a silver halide emulsion layer sensitive to green light, (*e*) a layer of colourless colloid containing silver selenide nuclei of such particle size and quantity that they impart no colour to the layer, and a quantity of an emulsion of silver halide insufficiently sensitive to light to yield any appreciable image on photographic

development but sufficient in quantity to produce, with the aid of said silver selenide nuclei, a layer of silver substantially opaque to blue light on photographic development, and a removable yellow colouring material, and (*f*) a silver halide emulsion sensitive only to blue light.

5. A photographic element which comprises (*a*) a transparent substantially colourless support and in superimposition thereon, in order, (*b*) a silver halide emulsion layer sensitive to red light, (*c*) a layer of a colourless colloid containing silver selenide nuclei of such particle size and quantity that they impart no colour to the layer, and a quantity of an emulsion of silver halide insufficiently sensitive to light to yield any appreciable image on photographic development but sufficient in quantity to produce, with the aid of said silver selenide nuclei, a layer of silver substantially opaque to blue light on photographic development, (*d*) a silver halide emulsion layer sensitive to green light, (*e*) a layer of colourless colloid containing silver selenide nuclei of such particle size and quantity that they impart no colour to the layer, and a quantity of an emulsion of silver halide insufficiently sensitive to light to yield any appreciable image on photographic development but sufficient in quantity to produce, with the aid of said silver selenide nuclei, a layer of silver substantially opaque to blue light on photographic development, and yellow colloidal silver, and (*f*) a silver halide emulsion sensitive only to blue light.

6. A process of colour photography which includes the step of treating an exposed photographic element which comprises (*a*) a transparent substantially colourless support and in superimposition thereon, in order, (*b*) a silver halide emulsion layer sensitive to red light, (*c*) a layer of a colourless colloid containing silver selenide nuclei of such particle size and quantity that they impart no colour to the layer and a quantity of a silver compound soluble in alkali thiosulphate insufficiently sensitive to light to yield any appreciable image on photographic development but sufficient in quantity to produce, with the aid of said silver selenide nuclei, a layer of silver substantially opaque to blue light on photographic development, (*d*) a silver halide emulsion layer sensitive to green light, (*e*) a layer of colourless colloid containing silver selenide nuclei of such particle size and quantity that they impart no colour to the layer and a quantity of a silver compound soluble in alkali thiosulphate insufficiently sensitive to light to yield any appreciable image on photographic development but sufficient in quantity to produce, with the aid of said silver selenide nuclei, a layer of silver substantially opaque to blue light on photographic development, and a removable yellow colouring material, and (*f*) a silver halide emulsion sensitive only to blue light with a photographic developer containing a solvent for silver halide.

7. A process of colour photography which comprises treating an exposed photographic element which comprises (*a*) a transparent substantially colourless support and in superimposition thereon, in order, (*b*) a silver halide emulsion layer sensitive to red light, (*c*) a layer of a colourless colloid containing silver selenide nuclei of such particle size and quantity that they impart no colour to the layer and a quantity of a silver compound soluble in alkali thiosulphate insufficiently sensitive to light to yield any appreciable image on photographic development but sufficient in quantity to produce, with the aid of said silver selenide nuclei, a layer of silver substantially opaque to blue light on photographic development, (*d*) a silver halide emulsion layer sensitive to green light, (*e*) a layer of colourless colloid containing silver selenide nuclei of such particle size and quantity that they impart no colour to the layer and a quantity of a silver compound soluble in alkali thiosulphate insufficiently sensitive to light to yield any appreciable image on photographic development but sufficient in quantity to produce, with the aid of said silver selenide nuclei, a layer of silver substantially opaque to blue light on photographic development, (*d*) a silver halide emulsion layer sensitive to green light, (*e*) a layer of colourless colloid containing silver selenide nuclei of such particle size and quantity that they impart no colour to the layer and a quantity of a silver compound soluble in alkali thiosulphate insufficiently sensitive to light to yield any appreciable image on photographic development but sufficient in quantity to produce, with the aid of said silver selenide nuclei, a layer of silver substantially opaque to blue light on photographic development, and a removable yellow colouring material, and (*f*) a silver halide emulsion sensitive only to blue light by the following operations: develop in a non-colour-forming developer containing a solvent for silver halide, expose layer (*b*) to blue light passing through layer (*a*), and re-develop layer (*b*) in an aromatic primary amino colour-developing solution containing a blue-green colour-former, expose layer (*f*) to blue light incident on that layer and re-develop layer (*f*) in an aromatic primary amino colour-developing solution containing a yellow colour-former, render layer (*d*) re-developable and re-develop in an aromatic primary amino colour-developing solution containing a magenta colour-former, and treat the final product with Farmer's reducer to remove all silver and silver salts and all colouration from layers (*c*) and (*e*).

8. A process of colour photography which comprises treating an exposed photographic element which comprises (*a*) a transparent substantially colourless support and in superimposition thereon, in order, (*b*) a silver halide emulsion layer sensitive to red light, (*c*) a layer of a colourless colloid containing silver selenide nuclei of such particle size and quantity that they impart no colour to the layer and a quantity of a silver compound soluble in alkali thiosulphate insufficiently sensitive to light to yield any appreciable image on photographic development but sufficient in quantity to produce, with the aid of said silver selenide nuclei, a layer of silver substantially opaque to blue light on photographic development, (*d*) a silver halide emulsion layer sensitive to green light, (*e*) a layer of colourless colloid containing silver selenide nuclei of such particle size and quantity that they impart no colour to the layer and a quantity of a silver compound soluble in alkali thiosulphate insufficiently sensitive to light to yield any appreciable image on photographic development but sufficient in quantity to produce, with the aid of said silver selenide nuclei, a layer of silver substantially opaque to blue light on photographic development, and a removable yellow colouring material, and (*f*) a silver halide emulsion sensitive only to blue light by the following operations: develop in a non-colour-forming developer, bleach out the developed records in layers (*b*), (*d*) and (*f*), develop in a developer containing a silver halide solvent, expose layer (*b*) to blue light passing through layer (*a*) and re-develop layer (*b*) in an aromatic primary amino colour-developing solution containing a blue-green colour-former, expose layer (*f*) to blue light incident on that layer and re-develop layer (*f*) in an aromatic primary amino colour-developing solution containing a yellow colour-former, render layer (*d*) re-developable and re-develop in an aromatic primary amino colour-developing solution containing a magenta colour-former, and treat the final product with Farmer's reducer to remove all silver and silver

salts and all colouration from layers (c) and (e).

CECIL WALLER.
HAROLD OWEN DICKINSON.


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