

1205 Edgewale Rd
Silver Spring Md
20910

September 15, 1977

Dear Miss Gilpin:

I am sending you the information on
platinum printing taken, as you see, from the
"Encyclopedia of Photography" - actually
a 1974 reprint of the 1911 edition. I hope you
find it useful.

My wife, Ruth, and I very much
enjoyed our visit with you and thank you
very much for sparing the time from what is
obviously a busy, productive tempo.

Sincerely,

Adolph B. Amster

ENCYCLOPEDIA OF PHOTOGRAPHY

Edited By
BERNARD E. JONES

Introduction By
PETER C. BUNNELL
Princeton University

ROBERT SOBIESZEK
*International Museum of Photography
at George Eastman House*

WITH A NEW PICTURE PORTFOLIO

ARNO PRESS
A New York Times Company
New York • 1974

Plate Lifter

solutions. A typical pattern is illustrated. (See also "Pneumatic Holder.")

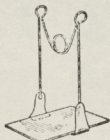


Plate Holder

This term is also often applied to the dark-slide, plate-adaptor, and, indeed, to anything else that contains, holds, or supports plates.

PLATE LIFTER

A kind of lever of metal, ebonite or celluloid, used for raising plates from the developing or other solution, in order that they may be

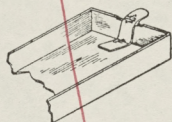


Plate Lifter

examined or removed. Some developing dishes have a lever attached at one side, as illustrated. The device is made in many forms, and the term is also often applied to the plate holder.

PLATE MARK

The indentation made in paper by the metal plate when printing engravings, etc. Some mounts for photographs have a similar impression made upon them. Sometimes a print which has been made from a masked negative so as to show a wide margin of paper has an imitation plate mark made around it by pressing into the paper a sheet of card or metal slightly larger than the print itself. In the case of a photograph such a mark has no real meaning or justification.

PLATE SHEATH (See "Sheath.")

PLATE SPEEDS (See "Sensitometry.")

PLATE TESTING (See "Sensitometry.")

PLATE VICE

A screw vice or clamp used at one time to hold the daguerreotype plate while buffing or polishing, and still sometimes employed when cleaning glass plates previous to coating with collodion in the wet-plate process, and for other purposes. It consists of a square wooden frame with a sliding block adjusted by a screw, usually of beechwood.

PLATE WHIRLER (See "Whirler.")

PLATES, VARIETIES OF (See separate headings; for example, "Albumen Process," "Collodion Process (Wet)," "Ferrotypes Process," "Isochromatic Plates," etc.

Platinotype Process

PLATE-SUNK

A term used to describe a mount made with a depression in imitation of the indentation in the paper caused by the pressure of the metal plate in printing etchings and engravings. (See "Plate Mark.")

PLATINIC CHLORIDE (See "Platinum Perchloride.")

PLATINO-BROMIDE

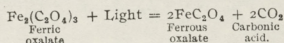
A grade of bromide paper with a matt surface giving an effect intended to resemble platinotype.

PLATINO-MATT

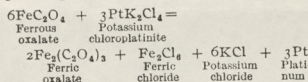
The term applied to the surface of some grades of bromide and gaslight papers which are made to give an effect in imitation of platinotype. (See also "Platinum Paper, Substitutes for.")

PLATINOTYPE PROCESS

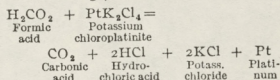
A printing process in which the image is partially printed out and then developed to its full strength, based on the light-sensitiveness of iron salts and not directly upon that of a platinum compound. The ferric salts are reduced by the action of light to the ferrous state, in which condition they partially reduce the platinum salt, the conversion to metallic platinum being completed by the ferrous salt in the "developer." The salt usually employed is ferric oxalate, the light action upon which is shown in the following equation:—



The action occurring during development may be represented by the following equation, which Berkeley (at one time manager of the Platinotype Company) gave in 1882:—



Hübl pointed out (1883) that whilst the above may be taken as the simplest form of equation and practically correct, formic acid probably is produced during exposure of the print to light, and that this acid plays a part in the development of the image, as follows:—



Although the process is based on the sensitiveness of the iron salts and not on that of the platinum compound, the latter certainly undergoes some little change, and assists the decomposition of the ferric salt, since a mixture of the two is undoubtedly more sensitive than the oxalate alone.

The first discovery of the action of light upon a platinum salt is said to have been by Gehlen, about 1804. But the first communication of any importance was by Sir John Herschel before

the Oxford meeting of the British Association, in 1832. Robert Hunt, in 1844, also experimented. The simple platinum process as it is now known is due to W. Willis, who patented it on June 5, 1873 (No. 2011), and who, in 1878, 1880, and 1887, took out further patents for improvements.

Few photographers care to attempt to make their own platinotype paper, as the materials are expensive and extreme care and cleanliness are necessary. However, all necessary instructions for doing so are here given. The late W. J. Warren advocated the following sensitising solution, which must not be acid:—

Potassium chloroplatinite solution (1 in 6)	3 oz.	300 ccs.
Ferric oxalate solution (as below)	2½ "	275 "
Water	2 "	50 "

The ferric oxalate solution consists of oxalic acid 1 part, ferric oxalate 15 parts, water 60 parts.

A strong paper is sized with 15 grs. of arrowroot, which is made into a cream with 1 oz. of water and poured gently into 30 oz. of boiling water, the whole being then boiled for eight minutes. The paper is immersed in the size for three minutes, dried, re-sized, dried again, laid on a sheet of glass, and the sensitising solution applied (in a yellow light) with a tuft of cotton-wool, preferably wrapped with fine silk. The paper is then dried at a temperature of 100° F. (38° C.), for which no variation is allowable, the drying taking only from two to four minutes.

Beanland recommends an arrowroot sizing of 30 grs. in 4 oz. of water, prepared and used as above, and the following sensitising formulae, which, by a little modification, may be used in the preparation of "cold bath" papers for cold tones and "hot bath" paper for sepia tones:—

A. Potassium chloroplatinite	60 grs.	15 grs.
Distilled water	360 mins.	84 ccs.
B. Ferric oxalate	84 grs.	21 grs.
Oxalic acid	8 "	2 "
Distilled water	720 mins.	168 ccs.

For cold bath paper mix A and B and add 60 mins. or 14 ccs. of water. For sepia paper mix A and B and add 60 mins. or 14 ccs. of a five per cent. solution of mercuric chloride. The addition of a few grains of potassium chlorate (one grain to the ounce is advised by Warren) will give increased contrasts to the print when either of the above formulae is used. According to Beanland, 140 to 170 mins. are sufficient to coat a sheet of paper 26 in. by 20 in. The coating and drying are important as before.

The addition of a very small quantity of gold chloride to the sensitising solution is said to be of great advantage, the following sensitising mixture being recommended highly by some American workers:—

Ferric oxalate Chloroplatinite solution (70 grs. per oz.)	90 grs.	90 grs.
Gold chloride solution (5 grs. per oz.)	60 mins.	60 ccs.
Potass. chlorate (saturated solution)	3 "	3 "
	2 "	2 "

Coat the sized paper with this and dry quickly. For thin negatives the quantity of gold may be slightly increased, but too much gold will spoil the bath and precipitate the platinum. The paper is developed on a cold solution of potassium oxalate, but if a hot bath is preferred gold must be omitted.

The following qualities of ready sensitised papers are manufactured by the Platinotype Company:—

For the cold bath process: AA, smooth, medium thickness. KK, smooth thick paper, fine surface, gives bright prints. CC, rough-surfaced, thick and strong, suitable for large work. TT, rough, thick, gives greater contrast than CC. YY, very thick and smooth. ZZ, very thick and slightly rough. *For the hot bath process:* S, smooth, to give rich sepia colour. RS, rough-surfaced for sepia, same substance as CC. The qualities TT, YY, and ZZ can also be coated for sepia. In addition there is a platinotype paper having a hard and resisting surface with an ivory-like sheen, of a brilliant black or sepia, and of a warmer tone than that afforded by the matt papers. These papers are supplied in airtight tins, each containing a piece of calcium chloride to absorb any moisture. The paper should be stored in the original tin with the calcium or transferred to a calcium tube. It is a good plan to place a wide rubber band round the joint between the lid and the tin box. The paper needs careful handling as the sensitive surface when dry is liable to crack; usually the sensitive surface is easily distinguished by its yellow colour, and is rolled outwards. Some workers keep platinotype paper a long time and in a damp condition in order to get certain effects, but technically perfect prints can only be obtained upon paper kept perfectly dry. Should paper become damp it may be dried in a warm oven or by keeping it in a calcium tube.

Platinotype paper is printed in daylight under a negative; the latter may with advantage be warmed, and a piece of vulcanised rubber (also warmed) placed between the paper and the back of the frame. A clear and brilliant negative, free from fog, gives the best results; flat negatives should be avoided.

The depth to which printing needs to be carried can be ascertained only by experience. The paper is more rapid than P.O.P., and prints in approximately about one-third the time. When the paper is sufficiently printed the image will be very faint and of a pale orange or a delicate purple colour on a yellow ground. Owing to this faintness there is a tendency to over-print and over-develop. The rule is to print until all the details can be seen except those in the highest lights, and this applies to both the "cold bath" and "hot bath" papers. After printing and before development the prints should be kept bone dry, as otherwise they will lack vigour, and the purity of the whites may be impaired. The paper should never be roughly torn, as there is a risk of the particles of platinum falling on the paper and causing black spots upon the print.

Cold Bath Process.—This gives black-and-white prints. Development should be conducted in a feeble white light or by gaslight, to avoid

any degradation of the potassium special as "D" are dissolved stock solution part of the A popular Potassium Hot water

For use, The addition of oxalic tends to neutral the black developed.

Potassium Potassium Hot water When the process developed no case 60° F. of the bath exposed

The print is and to it face the as at A along bringing the solution seconds to see v. A correct or not may be reduced generally cut show factory. of the d be skin allowed print. rocked break previous A full placed

Platinotype Process

419

Platinotype Process

any degradation of the whites. The paper makers' special developer, or an ordinary potassium oxalate developer, may be used. The special salts supplied by the makers are known as "D" salts; the contents of one tube (1 lb.) are dissolved in 48 oz. of water, which forms a stock solution. One part of this is mixed with 1 part of water, which then acts as a developer. A popular developer is—

Potassium oxalate	3 oz.	330 g.
Hot water	10 "	1,000 ccs.

For use, mix 1 part with 2 parts of water. The addition of 1 part of a saturated solution of oxalic acid to 20 parts of mixed developer tends to give warmer tones. Use the best neutral potassium oxalate, because if alkaline the blacks will not be good. Another good developer is—

Potassium oxalate	1 oz.	110 g.
Potassium phosphate	$\frac{1}{4}$ "	28 "
Hot water	10 "	1,000 ccs.

When cold it is ready for use. Although the process is known as the "cold bath," the developer may be used warm if desired, and in no case must the temperature be lower than 60° F. (15.5° C.). By raising the temperature of the bath, even to 100° F. (about 38° C.), under-exposed prints may often be saved.



A. Developing Platinotype Print

The correct way to develop a platinotype print is just to fill a flat dish with the developer, and to take the dry print by the ends and hold it face downwards near the surface of the solution as at A; then with one hand draw one end along the surface of the bath (see the arrow), bringing the opposite end on to the surface of the solution gently and evenly so that no air bells form between the two. After a few seconds' treatment turn over the print in order to see whether the solution is working properly. A correctly exposed print may take half a minute or more to develop. Although development may be arrested before all the ferrous oxalate is reduced by the potassium oxalate developer, generally it is found that when development is out short the picture will not be entirely satisfactory. A scum is apt to form on the surface of the developer, and when this happens it should be skimmed off with a stiff piece of paper; if allowed to remain it may cause marks upon the print. The liquid should also be stirred or rocked between each development in order to break up any scum which may be left by a previous print.

A fully developed platinum print must be placed face downwards, and without washing,

into the following bath, which acts both as a clearer and fixer:—

Hydrochloric acid (pure,

sp. gr., 1.16)	1 oz.	16 ccs.
Water	60 "	1,000 "

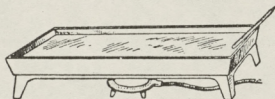
Citric acid (1 oz. per 20 oz. of water) may be used instead. The print remains in a portion of the acid solution for five minutes; the discoloured solution is then poured away and a second portion used, following in the same way with a third, so that the print is immersed in three acid baths for five, ten, and fifteen minutes respectively. The acid bath before use should be perfectly clear, but the effect of introducing a print is to turn it yellow, which fact affords a method of testing whether the print is sufficiently cleared or not. Until the print ceases to give a tint to the acid bath it is safe to conclude that it is not sufficiently cleared. So long as yellowness can be seen, traces of iron (which it is the function of the acid to remove) remain in the paper, and the treatment must be continued.

The print is next washed in four or five changes of water to clear away the acid, and the print dried between clean white blotting-paper. Common soda is sometimes added to the washing water to neutralise the acid, but with proper washing it should be unnecessary.

Sepia Prints by Cold Development.—Baron Von Hübl gives the following particulars for producing a special paper and for working it: "Take 1 gr. of yellow oxide of mercury and 5 grs. of citric acid, add 20 ccs. of water, and dissolve by heat. Filter the colourless fluid. This is kept as a stock solution for addition to the sensitising bath. The paper should be prepared with arrowroot and sensitised with 8 ccs. of normal iron solution, 4 ccs. of platinum solution (1 in 6), 1 to 4 ccs. of citrate of mercury solution. The addition of a little citrate or oxalate of ammonium will keep the high lights pure, and the gradation may be modified by adding sodium chloroplatinate, or bichromate of potash. The paper should be sensitised in the usual manner. The developer should be strongly acidulated with oxalic acid, and the strength of the solution of oxalate of potash may vary between 12½ to 25 per cent. The formula may be stated as follows: Water, 1,000 ccs.; neutral oxalate of potash, 120 to 250 grs.; oxalic acid, 10 grs. The development may take place in a dish in the ordinary way, or a brush may be used. The prints must, however, be at least five minutes in contact with the developer to effect complete reduction, otherwise they will lose considerably in the fixing bath, which should be a 1 per cent. solution of hydrochloric acid. Leave the prints for half an hour in the fixing bath, and then wash thoroughly. The colour and gradation of the image may be modified considerably by the composition of the sensitising solution, the developer, and the peculiarities of the paper used." In Baron Von Hübl's work, "Der Platin-druck," the normal iron solution is given as composed of 20 per cent. of ferric acetate, to each 100 ccs. of which 1 to 2 grs. of crystallised oxalic acid are added.

The Hot Bath Process.—The paper used for the hot bath process gives sepia prints. The paper is sold, stored and printed in the same

way as cold bath paper. The sepia paper is a trifle more sensitive than the black paper, and more easily affected by faint light. The Platinotype Company's "D" salts may be used for developing, in which case the half-pound is dissolved in 32 oz. of water. The stock solution of potassium oxalate is the same as that first given, but for use 10 parts are mixed with 1 part of a saturated solution of oxalic acid; this mixture should be thrown away after use, as it soon loses quality. The solution, in use, should be maintained at a temperature of from 160° F. to 170° F. (71° C. to 77° C.), although good results are obtainable with a cooler bath; the solution can be heated in a porcelain dish, or, more safely, in an enamelled iron vessel supported over a spirit lamp or gas ring (B). A tinplate, asbestos sheet, or sand bath should be interposed between the flame and a porcelain dish in order to prevent cracking. The developing and clearing (fixing) are precisely the same as for cold bath paper. Owing to the temperature of the bath some evaporation takes place and it becomes necessary to add from time to time sufficient water or more solution to bring the liquid up to practically its



B. Heated Developing Dish

original bulk. A cracked enamel dish must not be used, as any exposed iron would cause the prints to be discoloured; the sepia developing bath after use must be kept in the dark and not used for cold bath (black) pictures. As the sepia prints, unlike the black ones, may be affected by light when in the acid bath, and in the developer, they must be manipulated in a very weak light. The black and sepia papers should not be kept together in the same tin, and neither should the two kinds of prints be cleared and fixed together in the same bath, as otherwise the purity of the blacks in the cold bath paper will suffer.

Red Prints by Development.—The *Photo Zeitung* published the following formulae:—

A. Oxalate	potash		
(neutral)	.	1 oz.	120 g.
Water	.	4 oz. 154 mins.	480 ccs.
B. Copper chloride	.	32 grs.	8 g.
Water	.	2 oz. 77 mins.	240 ccs.
C. Mercuric chloride	.	120 grs.	30 g.
Water	.	2 oz. 77 mins.	240 ccs.
D. Lead acetate	.	8 grs.	2 g.
Water	.	1 oz. 33 mins.	120 ccs.

Take 12 parts of A and 4 parts of B, stir together, and add 4 parts of C and 1 part of D; heat until the precipitate is dissolved, filter, and use at a temperature of 185° F. (85° C.). Fix in dilute hydrochloric acid, follow by a weak bath of ammonia, and finally wash in water.

Development with Glycerine.—The addition of glycerine to a developer allows of considerable control of local development. The print is laid flat and the shadow parts coated with

glycerine. Three vessels are filled as follows:—No. 1, with full strength developer; No. 2, with a developer weakened a little, together with an equal quantity of glycerine; and No. 3, with a still weaker developer with glycerine. No. 1 is painted over the portions which are likely to be too light, and then the other parts are rapidly brushed over with the weaker solutions, using strong or weak developer afterwards to get the desired effect. Care should be taken to blend the parts together so as to prevent the occurrence of sharp dividing lines. Where backgrounds are very light it is possible to get effective vignettes simply by not working upon the edges with the developer. Some American workers have paid particular attention to this process, particularly Messrs. Stieglitz and Keiley, who give the following as their method of working:—Using the heavier grades of paper, printing should be carried further than for ordinary development, as far, in fact, as to record the half-tones in the high lights. When printed, the print is laid upon a sheet of glass, a little glycerine being smeared on the glass to keep the print flat and from slipping about. The face of the print is then evenly coated with pure glycerine, and blotting-paper is pressed down upon it; the print is then thinly recoated and developed by means of brushes, two solutions being used, one (A) consisting of equal parts of normal developer and glycerine, and the other (B) pure developer. A is just used on those parts which it is thought desirable to bring up first; B is used where a pronounced shade is required. When development has been carried far enough, the print is blotted at that place, which should be re-covered with glycerine and not again touched. To introduce warm tones and so produce a print in two colours, three additional solutions are required:—(1) A strong solution of mercuric chloride; (2) ordinary developer plus the mercury solution, and (3) glycerine developer plus the mercury solution. The print is treated at one place with mercurised developer and at another with ordinary developer. The mercury tone is more transparent than the ordinary black tone so that development may be carried farther. The work must be carried out in a subdued light, as otherwise the high lights will be discoloured. When development is complete, the prints should be cleared in the ordinary hydrochloric acid bath and washed.

Intensifying and Reducing.—The following method, invented by Hübl in 1895, will give vigour to an under-exposed and pale black print. Make up:—

A. Sodium formate	.	48 grs.	11 g.
Distilled water	.	1 oz.	100 ccs.
B. Platinum per-chloride	.	10 grs.	2½ g.
Distilled water	.	1 oz.	100 ccs.

Add about 15 drops of each to 1 oz. of water, immerse the weak print therein, rock the dish until the picture is dark enough, and then wash and dry. Some processes of intensifying weak platinum prints alter the tone. One worker has advocated an acid mixture of gallic acid and silver nitrate, another an acid hydroquinone and silver intensifier, and another a ferrous oxalate developer to which a few drops of a

chloroplatinic of the tone (which see) is added.

To reduce the tone, immerse the print in a solution of lime, and then to a stop the dry. This is and is recoated.

Toning.—black plate. Both the good (see) and "Dol brown tones. Uranium is tones, but an excellent

A. Uranium
Glacial
Water
B. Potassium
Water
C. Ammonium
Water

For brown to 1 oz. of the print remain in they go red. The dark than the is not want

D. Ammonium
Hydrochloric
Water

Add 12 d. successive Immerse until of thorough

Scale must be added to satisfactory mate, ½ of the of water. to give ½ gr. per results of

PLATINUM
B.

PLATINUM

PLATINUM
Pt. a metal fo It is ve by the soluble finely d forms d

are filled as follows:—
Developer; No. 2, with
little, together with
No. 3, with a
glycerine. No. 1 is
which are likely to be
their parts are rapidly
eaker solutions, using
afterwards to get the
to be taken to blend the
prevent the occurrence

Where backgrounds
sible to get effective
working upon the edges
the American workers
tion to this process,
litz and Keiley, who
method of working:—
paper, printing should
ordinary development,
the half-tones in the
the print is laid upon
lycerine being smeared
print flat and from
of the print is then
lycerine, and blotting-
it; the print is then
veloped by means of

ing used, one (A) con-
normal developer and
(B) pure developer.
its which it is thought
B is used where a
red. When develop-
enough, the print is
should be re-covered
again touched. To
so produce a print
ditional solutions are
solution of mercuric
veloper plus the mer-
cine developer plus
e print is treated at
d developer and at
veloper. The mercury
than the ordinary
ment may be carried
be carried out in a
the high lights will
velopment is complete,
ed in the ordinary
washed.

ing.—The following
in 1895, will give
ed and pale black

48 grs. 11 g.
1 oz. 100 ccs.

10 grs. 2 3/4 g.
1 oz. 100 ccs.

to 1 oz. of water,
erein, rock the dish
ugh, and then wash
of intensifying weak
tone. One worker
ture of gallic acid
acid hydroquinone
another a ferrous
a few drops of a

chloroplatinite solution have been added. Some
of the toning processes (Dolland's, for example,
which see) intensify as well.

To reduce over-printed platinotype prints,
immerse them in a saturated solution of chloride
of lime, and when sufficiently reduced transfer
them to a 5 per cent. solution of sodium sulphite
to stop the action of the lime, then wash and
dry. This reducer causes the paper to deteriorate
and is recommended only in extreme cases.

Toning.—There are many processes for toning
black platinotype prints to other colours.
Both the Packham and Dolland processes are
good (see under the headings "Catechu Toning"
and "Dolland's Process"), the former giving
brown tones and the latter rich black ones.
Uranium is widely used for brown, red, and blue
tones, but does not give very permanent results.
An excellent formula is that advocated by Hübl:

A. Uranium nitrate . . .	96 grs.	28 g.
Glacial acetic acid . . .	96 "	28 "
Water . . .	2 oz.	250 ccs.
B. Potass. ferricyanide . . .	96 grs.	28 g.
Water . . .	2 oz.	250 ccs.
C. Ammonium sulpho- cyanide . . .	1 oz.	138 g.
Water . . .	2 "	250 ccs.

For brown and red tones, add 5 drops of each
to 1 oz. of water. Thoroughly clear and wash
the prints, place in the toner, and allow to
remain until they are of the colour desired;
they go from black to brown, and then to a
red. The process slightly intensifies the print,
the darkest portions gaining more in proportion
than the light ones. For blue tones the A bath
is not wanted, the following being used instead:—

D. Ammonia-iron-alum . . .	96 grs.	28 g.
Hydrochloric acid . . .	96 mins.	25 ccs.
Water . . .	2 oz.	250 "

Add 12 drops of D to 5 oz. of water, then add
successively 5 drops of B and 12 drops of C.
Immerse the print therein and rock the bath
until of the desired tone. The dish must be
thoroughly cleaned before using for brown tones.

Stale Platinum Paper.—When stale paper
must be used, potassium bichromate may be
added to the oxalate developer, but a more
satisfactory salt is the neutral potassium chro-
mate, 1/2 gr. of which should be added to 1 oz.
of the ordinary developer diluted with one-third
water. Paper five years old has been known
to give good bright prints by this treatment.
1/4 gr. per ounce has been known to give good
results on paper two years old.

PLATINOUS CHLORIDE (See "Platinum
Bichloride.")

PLATINOUS POTASSIUM CHLORIDE (See
"Potassium Chloroplatinite.")

PLATINUM (Fr., *Platine*; Ger., *Platin*)

Pt. Atomic weight, 193.4. A white heavy
metal found native in the state of impure ores.
It is very infusible and practically unaffected
by the atmosphere or most acids, but readily
soluble in aqua regia. When deposited in a
finely divided state it is an intense black and
forms the image in the platinotype process.

PLATINUM BICHLORIDE (Fr., *Bichlorure de
platine*; Ger., *Platindichlorid*)

Synonyms, platinum chloride, platinum
dichloride, platinochloride. PtCl₂. Molecular
weight, 264.4. Solubilities, insoluble in water,
soluble in hot hydrochloric acid. A greyish
green or brown powder obtained by reducing
platinum perchloride by heat or sulphurous
acid. It is not used in photography, but it is
used to prepare potassium chloroplatinite.

A solution of this salt in hydrochloric acid
yields chloroplatinous acid H₂PtCl₄ or PtCl₂
2HCl.

PLATINUM PAPER, SUBSTITUTES FOR

Many attempts have been made to produce
on bromide and other papers effects similar to
those given by platinotype. A number of the
platinotype-like prints may be made to produce
platinotype-like prints, but the two can always
be distinguished by applying a drop of a solution
of mercuric chloride as used for intensifying.
The solution bleaches the part of the bromide
print to which it is applied, but has no effect
upon a platinum print.

Special papers have been made for yielding
prints resembling platinum, and of the home-made
kinds, that prepared according to the formula
worked out by Dr. Vollenbach, and published
in the *Deutsche Photo. Zeitung*, is considered one
of the best. It is said to yield rich deep platinum-
like blacks even from weak negatives. Paper
is immersed for four or four minutes in:—

Gelatine . . .	22 grs.	5 g.
Citric acid . . .	13 "	3 "
Chrom. alum (sol. 1:20) . . .	220 mins.	50 ccs.
Aluminium chloride (10% sol.) . . .	44 "	10 "
Distilled water . . .	10 oz.	1,000 "

After immersion hang up to dry. It is sensi-
tised (in yellow light) with:—

A. Gelatine . . .	2 1/2 grs.	1/2 g.
Salicylic acid . . .	4 "	1-10 "
Distilled water . . .	1 oz.	100 ccs.
B. Green ammonia citrate of iron . . .	38 grs.	20 g.
Distilled water . . .	1 oz.	100 ccs.
C. Silver nitrate . . .	55 grs.	12 1/2 g.
Distilled water . . .	1 oz.	100 ccs.
D. Uranium nitrate . . .	38 grs.	20 g.
Distilled water . . .	1 oz.	100 ccs.

By using more of C, softer prints are produced;
more of B gives hard prints; less of D gives
blower tones, and more of D gives blue-black
tones. For greyish-black resembling platinotype,
use 1 part of A and B and 2 parts
of C and D. Mix in the order above given, or
else a precipitate is formed and a muddy solu-
tion results. Pour the solution on the paper,
pinned to a board, in a little pool and then
distribute with a wad of cotton-wool; finally
dry quickly but evenly. Expose the same as
with platinum paper until detail is faintly
visible, and develop with:—

Ferrous sulphate . . .	188 grs.	43 g.
Acetic acid . . .	67 mins.	14 ccs.
Distilled water . . .	10 oz.	1,000 "

When sufficiently developed, place the print in a