The Defender Tipster

D. C. Grayson

SALE

THE DEFENDER TIPSTER

A Booklet of
PHOTOGRAPHIC
INFORMATION

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DEFENDER PHOTO SUPPLY CO.
ARGO PARK :: ROCHESTER, N.Y.

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THE DEFENDER GUARANTEE

WE guarantee the quality of all Defender goods delivered in the original packages except papers labeled "Seconds," "Proofs," etc., and will replace without charge any stock showing defects not caused by careless or improper manipulation, if returned to our factory before the expiration of the time stamped on the package. Complaints regarding paper should always be accompanied by a sample print showing the defect, some unexposed sheets securely protected from light, marked with the sender's name or initials, and the emulsion number.

ARGO GASLIGHT PAPER

ARGO is popularly known as a Gaslight Developing Paper because, with proper precautions, the entire process of manipulation, from the time of opening the package of paper to the fixing of the print, may be conducted by gaslight, or any other white light. Developing papers, of which ARGO is a conspicuous example, have now largely supplanted all other processes of making photographic reproductions by printing from negatives held in direct contact with the sensitized medium.

ARGO is easy to work. There is a grade to fit every negative, and such a variety of surfaces that every photographer, amateur and professional, may be suited. The chief advantage derived from the use of this paper, of course, is the facility of printing under all sorts of weather conditions. The professional photographer may deliver orders on time, regardless of the failure of the sun to shine, and the amateur may employ the evening hours in printing to just as good advantage as if he had the entire day at his command.

ARGO is made in three degrees of contrast, designated Hard, Normal and Soft. The particular grade to be selected depends upon the quality of the negative from which prints are to be made. None of the grades possesses very great flexibility as regards contrast and softness. In this respect ARGO is not different from all other developing papers. While it is possible with different developers to slightly modify the degree of contrast in any of the grades, the necessity remains of making the paper in different grades, one of which will be properly adapted to any negative.

Grades and Surfaces of Argo

DEGREE OF CONTRAST	SURFACE
Hard (Blue Seal)	Matte, Gloss, Velours, Rough*
Normal (Red Seal)	Matte, Gloss, Velours, Rough*, Buff*
Soft (Green Seal)	Matte, Gloss, Velours, Rough*, Buff*

*Rough Argo is furnished in single weight only; Buff Argo, in double-weight only. The Matte, Gloss and Velours surfaces are supplied in both single and double-weight. Double-weight costs no more than single-weight.

DIRECTIONS FOR WORKING ARGO PAPER

Argo Paper may be safely handled at a distance of eight or ten feet from the subdued light of an ordinary gas jet or kerosene lamp. If Welsbach Gas Light is used a sheet of red or orange colored paper should be interposed, while with lights such as the electric arc and Cooper-Hewitt it should be kept entirely out of reach of their rays. It does no harm to be a little over cautious as a single flash of strong light is capable of spoiling a great deal of paper.

KINDS OF LIGHT

Argo Paper will print by any light, natural or artificial, which is reasonably strong and is not colored. Because of greater uniformity artificial light is recommended in preference to daylight. With artificial light, unless diffused through tissue paper or similar material the printing frame should be kept in motion during the exposure.

MAKING THE EXPOSURE

Place the paper in printing frame with the film or coating of both negative and paper facing each other, being careful to see that they are in perfect contact. When making prints larger than 4 x 5 or cabinet it is well to lay a piece of felt between the paper and the back of the printing frame. Failure to hold the paper firmly against the negative will result in blurred prints. When exposing, hold the printing frame so that it faces the source of light squarely and see that the light covers the whole of the negative. If the frame is held at a slant the prints are liable to develop with light streaks along the edges, the result of shadows cast by the edge of the frame.

When daylight is used, unless it is well shaded care must be taken not to over expose as its action on the paper is more rapid than the strongest artificial light.

In determining the time necessary for making a satisfactory exposure there are three main points to be considered; density of the negative, the strength of the light and the distance between it and the printing frame.

The correct time may be easily determined by cutting a sheet of paper into narrow strips and using these for test exposures, developing each exposure as soon as made and noting carefully the time given to each until the desired depth of printing is secured.

DEVELOPING THE PRINTS

There is no well defined limit to the number of prints which a given quantity of solution will develop, partly for the reason that some developers retain their strength longer than others and partly because it is possible to practise various little economies which tend to conserve the solution. It may nevertheless be accepted as a fairly accurate basis for calculation that eight ounces of our regular Metol Hydro solution will properly develop from two to three dozen 4x5 or cabinet prints. Hence if it is desired to develop one hundred 4x5 prints put from 24 to 32 ounces of developer in a suitable tray and proceed. By this method uniform results can be obtained and the waste of chemicals is reduced to a minimum as the hundred prints will practically exhaust the active agents in that quantity of developer.

In using our Regular Metol Hydro Developer (formula for which appears on the following page) the image should appear in from four to six seconds and the print should develop completely in from twenty to sixty seconds. No exact figures in regard to the time of development are possible as there are many conditions which affect it one way or the other, but where the image appears in less than two seconds it is a pretty sure indication of overexposure and if it fails to show in six, or at the most, eight seconds, it is safe to conclude that the exposure has not been sufficient.

Prints should not be wet before they are placed in the developer. Immerse with a quick sidewise motion, being careful to see that any air bells attaching themselves to the surface are broken up and that no portions of the print are allowed to protrude above the developer. These are important precautions. Failure to observe them may result in spots or streaks on the finished print.

DEVELOPERS

All of the developers given herewith have been carefully worked out, tried and retried in our laboratories and we have demonstrated conclusively that each is capable of producing the particular results for which it is recommended. Different developers vary widely in their effects and this fact alone we consider sufficient reason for giving a number of formulas, as the results produced by a certain developer while satisfactory to one person might be wholly unsuited to the needs of another.

For all around work there is nothing better than our Regular Metol Hydro solution (De-

veloper No. 1) but when printing glossy or semi-glossy papers Anti-Friction Developer should be used in order to prevent the "Friction Marks" which are nearly always present in these papers.

No. 1—Regular Metol Hydroquinone Developer

Gives Warm Black Tones

Water	**16 ounces**
Metol or Defender Motol	**20 grains**
Hydroquinone	**30 grains**
Sodium Sulphite (dry)	**120 grains**
Sodium Carbonate (dry)	**240 grains**

Dissolve the above in the order given and then add 32 drops of the following solution:

Water	**9 ounces**
Potassium Bromide	**1 ounce**

No. 2—Edinol Hydroquinone Developer

Gives Blue-Black Tones

Water	**16 ounces**
Edinol	**12 grains**
Hydroquinone	**12 grains**
Sodium Sulphite (dry)	**78 grains**
Sodium Carbonate (dry)	**147 grains**
Oxalic Acid (10% Solution)	**1 dram**

Dissolve chemicals in the order given and add 1 dram Potassium Bromide Solution made as in Developer No. 1.

No. 3—Metol Hydroquinone Developer

Recommended for Contrasty Effects
Gives Pure Black Tones

Water	**16 ounces**
Metol or Defender Motol	**10 grains**
Hydroquinone	**40 grains**
Sodium Sulphite (dry)	**160 grains**
Sodium Carbonate (dry)	**267 grains**

Dissolve chemicals in the above order and add 32 drops 10% Potassium Bromide Solution as given in Developer No. 1.

No. 4—Metol-Hydro Anti-Friction Developer

Gives Olive Tones

Water	**16 ounces**
Metol or Defender Motol	**24 grains**
Hydroquinone	**80 grains**
Argo Soda	**480 grains**

This Developer prevents Friction Marks and is also effective in restoring paper which shows

slight chemical fog in the ordinary solutions. It is our standard Anti-Friction formula and has stood the test of time.

No. 5—Monol Developer

Gives Blue-Black Tones

Water	**16 ounces**
Sodium Sulphite (dr.)	**120 grains**
Monol	**40 grains**

When dissolved add 15 to 25 drops of 10% Solution Potassium Bromide.

Note that but one soda is required for No. 5 Developer.

It will be observed that all formulas given call for Dry (or Powdered) Sodas. If crystals are used the quantity in each case should be doubled.

AFTER DEVELOPMENT

When the print is removed from the Developer dip it in water or preferably in acid water made as follows:

Acetic Acid	**4 ounces**
Water	**1 gallon**

This bath stops development and neutralizes the developer with which the print is saturated.

Fixing Bath Formula

Water	**64 ounces**
Hypo	**16 ounces**

Dissolve, then add the following hardening solution:

Water	**5 ounces**
Sodium Sulphite (dry)	**½ ounce**
Commercial Acetic Acid	**3 ounces**
Powdered Alum	**1 ounce**

For amateurs the use of Defender Acid Fixing Powder is recommended. This is inexpensive, and obviates the necessity of mixing one's own fixing bath. Simply dissolve the powder in water, and it is ready for use. Until it becomes exhausted it may be bottled from day to day and will keep indefinitely. A sixteen ounce bath

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will properly fix a half-gross of 4 x 5 or Cabinet prints. Discard the bath when it becomes muddy, milky or frothy in appearance.

If the fixing bath given above is preferred to the prepared Acid Fixing Powder, De-Fen-Co Hardening Solution may be used to advantage. It gives results in every respect as good as those obtained from the hardener made according to the formula, and keeps indefinitely without deterioration. For the amateur it is especially convenient.

FIXING

Place prints in the fixing bath face upward. Stir them around a little at first, see that they are thoroughly immersed and do not allow them to mat together. If the batch is large, continue to move them about or they will lie closely against each other and uneven fixing will result. They will fix thoroughly in from 10 to 15 minutes.

WASHING

After the prints are fixed wash for one-half hour in running water. If running water is not available they should be put through six or eight changes in trays and allowed to soak five or six minutes in each.

MOUNTING

After prints are washed they may be mounted on cardboard in the following manner: Lay them face down on a sheet of clean glass, one on top of another, squeeze out surplus water, apply a thick starch paste to the back of the topmost print, lay print on card and rub down. Wipe the face of the print with a clean, damp sponge, or tuft of cotton, from the center toward the edges to remove foreign substances and surplus paste. Prints can then be put between lintless blotters or laid out on a table, face upwards, to dry.

If it is not desired to mount the prints, after the surplus water has been squeezed from them, lay them face down to dry on a frame covered with cheese-cloth. When dry, straighten the edges by moistening the backs with a damp sponge, drying again between blotters under pressure.

Argo Gloss should be dried on a ferrotype tin, after the prints are thoroughly washed. Place the prints face down on the tin, squeegee into perfect contact, and allow them to remain until they become bone-dry. They may then be peeled off the tin. To secure the desired lustre, the tins should be kept clean with the following:

Benzole ..... **1 ounce**
Beeswax ..... **15 grains**

Allow mixture to stand several hours, and clean the tins with the clear solution, not disturbing the precipitate, with canton flannel, polishing thoroughly with a dry piece of the same material.

SEPIA TONES ON ARGO PAPER

By Bleaching and Re-developing

With the following, as in all other processes for toning prints made on Gaslight Developing Papers, the first requisite is a strong, fully developed print. Flat prints or those made from weak, lifeless negatives will not yield satisfactory sepia colors.

The prints which it is desired to tone must first be developed black and white in the regular way. Care must be exercised not to over-expose the print. The best sepias are those made on prints which have received normal exposure and full development. If prints are over-exposed and removed from the developing solution before development has stopped the tones resulting from re-development will be weak and yellow.

Almost any developer capable of producing strong blacks may be used for the first development, but we especially recommend No. 2 Developer, printed on page 7.

When prints are fully developed rinse in acid water and fix in the Defender Acid Fixing Bath, or in the regular acid fixer, formula for which has heretofore been given. Allow them to remain in this bath about fifteen minutes. When taken out, wash for one hour to remove all traces of hypo.

After washing bleach the prints in the following solution. They should be allowed to soak in it until the blacks wholly disappear and the entire image is but faintly visible. This will require about two minutes.

Water ..... **32 ounces**
Potassium Ferricyanide..... **200 grains**
Potassium Bromide..... **400 grains**
Liquid Ammonia..... **20 drops**

Prints made on rough-surfaced paper should be dried before bleaching.

When thoroughly bleached, wash prints for a few minutes, or until the whites are clear of yellow, and re-develop in the following:

Saturated Solution of Sodium Sulphide (not Sulphite)..... **2 drams**
Saturated Solution of Common Alum **32 ounces**

This bath is good for about 75 5 x 7 prints. It cannot be renewed. At the first sign of weakness discard it and mix fresh bath.

The prints will fully re-develop in a few seconds. They should then be washed until no longer slippery from the Sulphide and may be mounted in the usual way.

Defender Sepia Re-Developer is recommended to those who desire to make sepia prints without the bother of mixing the above bleaching and re-developing formulas. It is supplied in glass tubes, each tube containing the bleaching and re-developing powders, in separate compartments. One tube will make 16 ounces of each solution. The process of toning is similar to that described on the preceding page, and the re-developed prints will possess a rich tone of true Van Dyke shade.

SEPIA TONING

With Hypo Alum Bath

Argo paper tones well in the Hypo Alum bath, made after the following formula:

No. 1

Boiling Water	**128 ounces**
Sodium Hyposulphite	**16 ounces**
Powdered Alum	**4 ounces**

No. 2

Water (cold)	**1 ounce**
Potassium Iodide	**35 grains**

No. 3

Water (cold)	**1 ounce**
Potassium Bromide	**30 grains**

No. 4

Water (cold)	**1 ounce**
Nitrate of Silver	**18 grains**

No. 5

Water (cold)	**1 ounce**
Salt	**25 grains**

Dissolve numbers 1, 2, 3, 4 and 5 separately. Add No. 2 to No. 3 and add the mixture to No. 4, adding the whole to No. 5. Add 5 drops of Aqua Ammonia. When Hypo bath is cooled to 90 degrees, add to it the entire mixture, and heat to 135 degrees.

The prints are placed in the Hypo Alum bath dry (preferably), great care being taken not to allow any air bells upon them. Allow prints to remain in bath until they are evenly toned, which will take from 15 to 20 minutes. It is advisable to handle prints over constantly during toning.

After the prints are toned, remove to wash water and wash as from hypo bath. Have the wash water of about the same temperature as the bath when the prints are placed in it (to prevent blisters), and then gradually change it to cold. Sponge thoroughly while the wash water is still warm.

The shade of tone is controlled in first development. Pure black and white will yield a purple tone; medium or neutral olive a satisfactory brown and too green an olive a yellow tone.

In the prevention of frilling at the edges of the paper, and blistering, greater care is needed in handling all rough papers than papers with a smooth surface.

RELATION OF PAPERS AND NEGATIVES

Definitions of Terms Used and "Tips" Regarding the Selection of Paper

Negatives may in a general way be described as "Contrasty" (or Hard), "Normal," "Soft" and "Flat" (or Weak).

They are also frequently referred to as being "Dense" or "Thin." These terms may, without contradiction, be used in conjunction with those in the foregoing paragraph.

The term "High Lights" as applied to negatives means the parts which have received the impression of the strongest rays of light passing through the lens of the camera at the time of making the exposure. The stronger the light, the greater, of course, the reduction of silver; therefore, these parts develop black or nearly so in the negative and print white or very light colored on the paper.

The term "Deep Shadows" is the opposite of "High Lights." It indicates the parts of the negative least affected by light and which in consequence are nearly transparent upon development. They print black or dark upon the paper.

A Contrasty negative is one in which the demarcation between High Lights and Deep Shadows is sharp and abrupt. To offset this condition it is necessary to use a paper that will provide the softness which the negative lacks and for all such we recommend SOFT ARGO.

A Normal negative is one over which the light at the time of exposure has been properly and evenly distributed and in which the lights and shadows appear much as they do to the eye when looking at the object itself. For this class of negatives we recommend NORMAL ARGO. If it is desired to obtain a bold contrasty print from a Normal negative use HARD ARGO, and if a soft print is required use SOFT ARGO.

A Soft negative is one in which there is a gradual and easy blending of lights and shadows. The choice of paper for such a negative lies be-

tween HARD and NORMAL ARGO, according to the degree of strength preferred in the finished print by individual taste.

A Flat or Weak negative is one which is almost totally lacking in contrast between lights and shadows. As the paper must furnish the strength which the negative does not possess, we recommend for all such the use of HARD ARGO.

Dense negatives are those in which from over-exposure or over-development the maximum reduction of silver has taken place. They appear black or dark in nearly all parts when held to the light. Thin negatives are usually the result of under-development. When held to the light other subjects can readily be seen through them. In a majority of cases, dense negatives incline to contrast and thin ones to softness, but this cannot be accepted as a rule for guidance in the selection of paper, as density may conceal either contrast or a lack of it. **Negatives should be judged by contrast, never by density.**

A negative slightly yellowed from development in Pyro will print with more contrast than one lacking color.

The surface of the paper used, Matte, Gloss, etc., must be determined by personal choice. Glossy papers show slightly more contrast than Matte surfaces coated with the same emulsions. The difference, however, is not enough in any case to render the use of a different grade of paper necessary.

BORDER EFFECTS

Directions for Making Tinted Borders on Portraits Made with Argo Paper

The subject of artistic borders is always one of interest to the progressive photographer who is on the lookout for novel or pleasing effects. These borders necessitate the use of sheets of paper much larger than the negative, but it is a fact not open to controversy that prints will command far better prices when attractively dressed than when plainly mounted. The additional cost of the paper is therefore more than offset by the higher price per dozen.

The instructions below refer to the making of three-tint borders when printing from 5x7 negatives. With proper modifications as to sizes, etc., they may be applied to negatives of any dimensions and to any number of tints.

To make the three-tint border: Take two 11 x 14 printing frames with a clear glass in each. These for convenience may be numbered "1" and "2." In printing frame No. 1 place a 5 x 7 negative, a little above the center, and make it fast to the glass with gummed paper. In printing frame No. 2 insert your masks.

To make these masks, or cut-outs, you must use either ground celluloid or a very fine grained tissue paper, preferably onion skin. Three pieces of celluloid or paper, 11 x 14 each, are necessary. Cut your first opening, a little above center, to the size 4¾ x 6¾. The second opening should be 5¾ x 8½ and the third opening should be 6¾ x 10¼. It must be understood that each of these last two openings are cut so as to allow one-half inch margin on the side, divided so as to make an equal distance between all three on both sides. On the top, each margin should be three-quarters of an inch and on the bottom a one inch margin should be allowed. This gives the panel effect.

Returning to No. 1 printing frame: Make a cut-out, size 4½ x 6½, out of a sheet of 11 x 14 black paper and place it over your 5 x 7 negative. Then take a thin sheet of plain white paper, size 10 x 13, lay it on the cut-out and locate the image of the negative a little above center. In the upper right hand corner paste two strips of gummed paper at right angles to each other along the edge of the sheet of plain white paper. These make your guiding square, or "loading strips," as they are popularly known, for use when you begin to make prints. To make them more accurate paste another strip perpendicularly along the lower right hand side of your white paper. In printing, your sensitized paper is fed into the frame to these gauges, so they should be very accurate.

Now take your thin white paper and hold it against the loading strips firmly to avoid slipping, raising the frame up so that the light will pass through the negative. When the white paper is located accurately against the loading strips, mark the four corners of the cut-out (which is underneath) with pencil on the white paper.

Then take your white paper to frame No. 2 containing the border masks. Lay the white paper on the border masks, hold up to light and adjust it so that the pencil marks come inside the border with an even margin all around. Then, holding it firmly to avoid slipping, put loading strips on this frame in the same manner described for frame No. 1. This completes the fitting up of the two frames for printing. They can be used for any negative without refitting. In the event of the image not registering accurately with the borders, readjust your loading strips.

To print: Place sensitized paper in frame No. 1 (containing your negative) and expose in the ordinary way. Then remove the sensitized paper, place it in frame No. 2 and expose for the border. Do not forget that the exposure on the border must be gauged by the time it will take to print the image, so as to give both image and border their relative values in development. The border always should be subordinate to the image. To diffuse the lines of the border, place an extra glass between the border cut-outs and the paper.

"TIPS" *on* HANDLING ARGO

Fog or Grayish Whites. Paper handled in too strong a light.

Insufficient Potassium Bromide in developer.

Forcing underexposed prints in development.

Paper may be too old.

Muddy, Green Tones. Over-exposure and consequent under-development. Weak or exhausted developer. Too much Potassium Bromide in developer.

Irregular Light Streaks and Blotches are usually caused by uneven development resulting from failure to keep the print fully immersed in the developer. Also caused by over-exposure.

White Spots appearing in clusters or in irregular lines are usually caused by air bells in the developer which attach themselves to the print. Rub the surface with the finger during development to prevent them.

Dark Spots or Patches usually round or oval in shape are caused by air bells forming on the surface of the paper when prints are placed face downward in the fixing bath. Immerse prints in the hypo face upward and move them around for a few seconds to break up the bubbles.

Friction Marks usually appearing in the form of small, irregular, gray streaks and blotches in the lighter portions of the print are an inherent defect in all developing papers. They may be prevented by the use of ARGO SODA in making up the developer. Friction marks occur most frequently in Glossy or Semi-gloss papers.

Blisters are due to a number of causes. Prints may have been buckled or sharply creased in washing. Too much acid in Hypo. Hypo too strong or containing too little alum. Where prints show a tendency to blister from any cause the condition may usually be corrected by immersing for two minutes between development and fixing in the following bath:

Water	**90 ounces**
Common Salt	**4 ounces**
Hardening Solution (See Argo Fixing Bath Formula)	**4 ounces**

In winter, as the temperature of the tap water becomes lower, the amount of Hardener may be reduced; as warm weather approaches it should be increased.

Yellow or Brownish Stains. Forced development following under-exposure. Exposing unfixed prints to white light while saturated with developer. Failure to rinse off developer before placing prints in the fixing bath.

Correctly Exposed Prints will develop to the proper depth only. Unless over-exposed they cannot be over-developed without forcing, accompanied usually by fog or stains.

GENERAL INFORMATION

Dry, powdered sodas are twice as strong as crystals. When the latter are used the quantity should be doubled.

The quantities of Potassium Bromide given in the various developing formulas are approximate and must be varied slightly to suit different conditions. Old paper usually requires more Bromide than new.

The use of an old or muddy fixing bath will often leave a gritty deposit on the prints. To remove it they must be wiped with a bit of cotton while washing. Once allowed to dry it is very difficult to get rid of.

In making up developer which contains both Sodium Sulphite and Carbonate, always dissolve the Sulphite with the developing chemicals, Metol, Hydroquinone, etc., before putting in the Carbonate. Failure to observe this rule is liable to result in a discolored solution.

All retarders such as Salt and Potassium Bromide will increase contrast up to a certain point and then re-act. The maximum contrast obtainable with Potassium Bromide is secured by adding from one-half dram to one dram to each eight ounces of developer. Above one dram will increase softness and is likely to produce undesirable colors.

Do not fix prints too long. It destroys much of the brilliancy.

Too long washing tends to give the prints a muddy appearance.

Contrast can be slightly reduced by adding one ounce Sodium Sulphite to each eight ounces of developer.

We recommend the use of Defender chemicals in all formulas for working Argo and other Defender papers. The formulas given in the Tipster contain the right proportions of the various chemicals, provided Defender chemicals are used.

If in Trouble with Your Prints for which you do not find a remedy in the foregoing, write us, explaining fully the nature of the difficulty. Enclose with your letter a sample print showing the condition referred to and some unexposed sheets of the paper. Place your name or initials on the back of each sheet so that it can be identified after a print has been made on it and see that it is securely packed in black or red paper to protect from light. Finally and most important of all, give us the Emulsion Number which you will find stamped on the package in which you received the paper. Failure to furnish this number often makes an intelligent investigation impossible. When this data is given you may be assured that all complaints will meet with a prompt response.

Directions for Working
MONOX BROMIDE PAPER

Monox, like all other bromide papers, is used chiefly in the making of enlarged photographs by projection. The principle is that of a stereopticon, or "magic lantern," the negative taking the place of a lantern slide.

For printing Monox, any white light may be utilized, although in the case of artificial light a somewhat elaborate outfit, involving the use of condensing lenses (except with Cooper-Hewitt lights), is a practical necessity. When printing with daylight, condensers are not required as its action on the paper is sufficiently rapid without them.

Almost any ordinary view camera may be used for making enlargements and as the process is a simple one, but little experience is required for the production of satisfactory results.

First, a shelf for holding the camera should be built as close as possible to a window, from which all light except that passing through the camera has been excluded by covering with black paper or some other opaque substance. The glass through which the light passes to the camera should be ground glass to diffuse the light and destroy any shadows which may be cast upon it by outside objects. Next, a movable screen or "target" for holding the paper should be constructed in front of the camera. This screen must be covered with white fabric or painted white to enable the operator to see the image clearly while focusing. Then darken the room and everything is in readiness for making the exposure.

Remove the ground glass from the back of the camera and insert the negative in the place provided for receiving the plate holder. Frames, or "kits," as they are called, may be obtained from any manufacturer of cameras for holding negatives of various sizes. Focus the image on the screen by using the rack and pinion in the usual manner. The size of the image is determined by the distance of the screen from the lens. When the correct focus is obtained cover the lens with a piece of green or orange colored glass and pin the sheet of sensitized paper to the screen. The use of the colored glass makes it possible to center the image without fogging the paper. When the paper is properly adjusted remove the colored glass and expose.

The length of time required to properly expose is determined by the strength of the light, the density of the negative and the size to which the object is to be enlarged. The greater the magnification, the longer the time. With a negative of average density, strong daylight and the screen placed three feet from the lens, an exposure of fifteen to twenty seconds will be found somewhere near right. Strips of paper for making test exposures will be found in all packages of Monox. When the exposure is completed. replace the colored glass in front of the lens and remove the print, which is now ready for development.

DEVELOPING THE PRINTS

While Monox Bromide Paper will yield very satisfactory results in almost any of the developers used for Gaslight Papers, we give below two developing formulas which we especially recommend:

No. 6—Metol Hydroquinone Developer

Water	**32 ounces**
Metol, or Defender Motol	**20 grains**
Hydroquinone	**90 grains**
Sodium Sulphite (dry)	**¾ ounce**
Sodium Carbonate (dry)	**1¼ ounces**

Dissolve chemicals in the order given and add 2 drams Potassium Bromide Solution made as in Developer No. 1.

No. 7—Anti-Friction Developer

Water	**32 ounces**
Metol, or Defender Motol	**30 grains**
Hydroquinone	**105 grains**
Argo Soda	**3½ ounces**
Oxalic Acid	**75 grains**

With these developers no clearing solution is necessary; as soon as the print is fully developed rinse off with two or three changes of fresh water, and immediately place in the following:

Fixing Bath

Water	**64 ounces**
Sodium Hyposulphite	**8 ounces**

It is advisable to mix this up several hours before using, or, better still, the night before. The use of a freshly made fixing bath is frequently the cause of blistering.

Experience shows that an acid fixing bath will yield clearer and more brilliant prints than a neutral or alkaline bath; to accomplish this add 5 drops of acetic acid to every ounce of hypo used. Alum may be substituted in place of the acid, as it also serves the purpose of toughening the film; in using the latter, add one-quarter ounce to every two ounces of hypo soda.

The fixing bath recommended for Argo may also be used with Monox Paper, and the ready-prepared Defender Acid Fixing Powder is unreservedly recommended.

SEPIA TONES ON MONOX BROMIDE PAPER

A prime requisite is a negative of at least average strength. Satisfactory sepia colors are an impossibility with flat, or weak negatives.

We give herewith a developing formula which is especially adapted to sepias. (Note that time of development should be as near 3 minutes as possible.)

No. 8—Hydroquinone Developer

Water	**50 ounces**
Hydroquinone	**½ ounce**
Sodium Sulphite (dry)	**1½ ounces**
Sodium Carbonate (dry)	**3 ounces**
Potassium Bromide	**¼ ounce**

Fix prints fifteen minutes in the Regular Acid Fixing Solution, formula for which has appeared under directions for printing and fixing Argo, or else in the prepared Defender Acid Fixing Bath; then wash one hour in running water or in ten or twelve changes in trays. It is of the utmost importance that all of the hypo be eliminated. When washing is completed prints are ready for bleaching.

Bleaching Solution

Water	**32 ounces**
Potassium Ferricyanide	**210 grains**
Potassium Bromide	**90 grains**
Commercial Ammonia	**6 drops**

Leave prints in this solution until bleaching stops, which will be in two or three minutes. Wash in two changes of water and re-develop in the following:

Re-developing Solution

Water	**32 ounces**
Saturated Solution of Sodium Sulphide (not Sulphite)	**1 dram**

When fully re-developed wash in five or six changes of water or about one-half hour in running water and dry in the usual way.

POINTS OF ENLIGHTENMENT

Because of extreme sensitiveness, bromide paper or prints, until fixed, must never be handled in a light that would be unsafe for a dry plate. White light, even though very subdued, is liable to produce fog.

Friction Marks, occurring on bromide paper, may be erased by wiping them off, after fixing, with a piece of cotton dipped in the following mixture:

Saturated Solution of Hypo	**1 ounce**
Saturated Solution of Potassium Ferricyanide	**1 drop**

Be careful to rinse quickly after each application or the Ferricyanide will attack the print as well as the friction marks.

Should stains result, return prints to the fixing bath and they will quickly disappear. Do not preserve this solution. It will not keep from one day to another.

For Other General Information as to causes of failure to secure satisfactory results, refer to **Tips on Handling Argo,** pages 14 and 15, nearly all of which apply equally to Bromide and Gaslight Papers.

SURFACES OF MONOX BROMIDE PAPER

Monox Paper is manufactured in Six Surfaces, numbered and described as follows:

No. 2. Monox Velours, a smooth surface with a slight sheen.

No. 3. Monox Rough, a pure white, heavy stock with a rough surface.

No. 4. Monox Gloss, a medium weight paper with high gloss surface.

No. 5. Monox Matte, a medium weight stock with dead matte surface.

No. 6. Monox Lustre, a semi-matte surface resembling collodion matte printing out paper in the appearance of the finished print.

No. 7. Monox Buff, double weight. Very artistic for either portraits or views especially in sepia color.

No. 8. Same surface as No. 2, but doubleweight.

No. 9. Same surface as No. 5, but doubleweight.

Monox Nos. 3, 5, 7 and 9 will take retouching readily and are therefore well adapted to crayon or air brush work. Monox Nos. 2, 4, 6 and 8 are suitable for prints requiring little or no retouching.

Monox Paper in all surfaces is capable of excellent results from printing in direct contact with the negative, but on account of its extreme sensitiveness and the consequent difficulty of correctly judging the exposure, it is not recommended in preference to Argo for that class of work.

Directions for Working DISCO

Gelatine Printing Out Paper

Disco is a daylight printing paper and like all papers of its kind must be printed deep enough to allow for bleaching in the toning and fixing solutions.

There are two standard methods of toning Disco Paper. The first is to tone and fix in separate baths and the second is the use of a bath in which the toning and fixing chemicals are combined and the whole process is completed in one operation. For quality and absolute permanency of results we recommend the separate baths.

For toning in separate baths, print about one-third deeper than you wish the finished results to appear. That is, if a print reaches the depth you would like to have it when finished in nine minutes, allow it to remain in the light about three minutes longer. A little experience will enable one to judge the depth of printing accurately.

Wash the prints in five or six changes of water, or until water ceases to look milky after standing a few minutes and tone in the following bath, keeping them moving while toning.

Water	**40 ounces**
Chloride of Gold	**1 grain**

Add a sufficient quantity of borax to turn red litmus paper blue. Tone prints to the desired shade and stop, as they will not change in fixing bath.

Fixing bath prepared as follows:

Water	**48 ounces**
Hypo	**2 ounces**

About fifteen minutes in this bath is sufficient. Keep prints separated.

Wash prints thoroughly after fixing. Upon this depends their permanency.

In warm weather it is advisable to add a very little alum to the fixing solution and all baths should be kept as cold as possible; or in lieu of alum add 3 ounces of acid hardener recommended in our Argo Fixing Bath Formula.

COMBINED TONING AND FIXING

Print a deeper shade than would be necessary when using the separate toning process.

For blue-black tones print darker than for warm brown.

In toning place only a few prints in the bath at a time, using enough solution to cover the prints thoroughly. No preliminary washing is required.

Place them in the tray face up, and see that any air bells which adhere to the surface are broken up.

COMBINED BATH

Stock Solution No. 1

Hot Water, 160° F	**64 ounces**
Sodium Hyposulphite	**8 ounces**
Pulverized Alum	**4 ounces**
Borax, pulverized	**2 ounces**
Salt (common)	**1 ounce**

Stock Solution No. 2

Water	**15 ounces**
Chloride of Gold	**15 grains**

Place all the chemicals in stock solution No. 1 in a stone crock, pour the hot water on them and stir until dissolved; let the solution cool and clear, and then decant.

Dissolve ½ ounce of Acetate of Lead in 8 ounces of water, and add 1½ ounces of it to No. 1 after cooling.

Hot water ripens the bath faster than cold. Where chemicals are dissolved in cold water the solution should be allowed to stand at least twenty-four hours before using.

TO TONE: Add 1 ounce No. 2 to each 8 ounces of No. 1 used.

The above will tone about fifty cabinet prints; then discard and make up as at first. Tone prints to desired shade, then place in the following bath for three to five minutes. This will clear them perfectly and insure fixing:

FIXING BATH

Water	**32 ounces**
Hypo	**3 ounces**
Salt	**2 ounces**
Sodium Sulphite (dry)	**60 grains**

WASHING: Wash in running water one hour, or with ten or twelve changes in trays.

Mount as usual and burnish when prints are dry.

Directions for SUN SPOT

Photographic Blue Print Paper

Print until deepest shadows are turned a slight bronze. Be careful not to **over-print,** as over-printing eliminates detail.

Remove the paper from the frame and place it in clear, fresh water in subdued light. Change the first water after five minutes and wash in frequent changes of water for twenty minutes more, and if the prints are not to be mounted, hang up to dry. When the prints are to be mounted, place them between clean blotters until surface is dry, and mount while still damp.

Don't wash the prints for less than twenty minutes, and avoid over-printing, as the paper does not gain its full depth and brilliancy until the prints are thoroughly dry.

The prints do not dry "dead" like prints on ordinary blue print paper, but become more brilliant in color after several hours.

If the print washes down too light after being twenty minutes in water, the exposure must be lengthened. Do not reduce the amount of washing, as the water does not bleach the print, but makes it more permanent if the exposure has been correct.

Don't be afraid of using too much care because it is "only blue print paper," but follow directions, and then expect good results.

Full results can not be seen until paper is thoroughly dry.

Keep unused paper in a **dry place,** under **pressure, if possible.**

Handle always in subdued light, as all printing-out papers are affected by light, heat and dampness, especially in warm weather.

Keep your paper, negative and printing pad dry and it will save you trouble.

We will replace with good paper every package of "SUN SPOT" found defective, or that has become unfit for use when first opened (date stamped on label when guarantee expires). We hold ourselves responsible only for unopened packages.

All complaints should be made direct to us. Enclose several sheets of the defective paper, with your name on back of sheet, also a sample print, with date of package, number of sheets left, and name of dealer where paper was purchased. This applies to all paper properly kept.

VULCAN

Orthochromatic Roll Film

Comparative tests have proved this film to be in every respect equal in quality to any other on the market. To some of the others, indeed, the Vulcan is superior. It is color sensitive to green and yellow, producing negatives in which the wide range of colors in nature are clearly differentiated. It is non-halation and also non-curling. Above all, Vulcan film is uniform,—dependable at all times.

This film is supplied in all the popular sizes, at no advance in price over that of the less satisfactory kind.

DIRECTIONS FOR USE

Precautionary Measures

1.—Neither the front nor back of this film must come in contact with anything while drying.

2.—Like Orthochromatic Dry Plates, VULCAN Films are extremely sensitive to light, and consequently, in order to avoid fogging, a ruby lamp which is known to be safe should give the only light in the dark room during the process of development.

Development in the Strip

Having unrolled the film, detach it from the black paper, making sure not to touch the sensitized side. Pass the film, sensitive side down, back and forth through a tray of cold water, holding one end in each hand. When it is thoroughly wet, pass it through a tray of developer in the same manner. Move the film constantly, so that all portions may be acted upon by the developer. When the position of the exposure can be seen the film may be cut apart, if desirable on account of differences in exposure. However, the development may be completed in the strip, if preferred.

Cutting Films Apart Before Development

Should only be undertaken when the black paper is in its usual position at the back of the film. This will bring the white dividing lines in the right places, so that after the film is developed each exposure will have been properly separated from the rest.

DEVELOPMENT

Defender Tank Developing Powders make a most convenient and reliable developer, for either tank or tray development. The addition of water is all that is required. For tray development use same amount of water as given in the directions printed on the wrapper of each powder for developing machine.

If it is preferred to make a developer according to formula, either of the following will be found excellent. In determining these formulas Defender Chemicals were used, and they are recommended in the preparation of all developers for Vulcan Film.

Pyro-Soda Developer

Pyro Solution

Pyrogallic Acid	**1 ounce**
Oxalic Acid	**8 grains**
Or Potassium Metabisulphite	**80 grains**
Water	**8 ounces**

No. 1

Pyro Solution	**2 ounces**
Water	**18 ounces**

No. 2

Defender Sodium Sulphite (dry)	**1 ounce**
Defender Sodium Carbonate (dry)	**½ ounce**
Water	**20 ounces**

For use take equal parts of No. 1 and No. 2.

For known over-exposure use two parts No. 1 to one part No. 2.

Tank Developer Formula

Solution No. 1	**2 ounces**
Solution No. 2	**2 ounces**

For 15 minute development use 8 ounces water at 65° Fahr.

30 minute development 20 ounces water at 65°.

Acid Fixing Bath

Defender Acid Fixing Powder	**4 ounces**
Water	**16 ounces**

Or, if desired, the bath may be prepared as follows:

No. 1

Hypo	**16 ounces**
Water	**30 ounces**

No. 2

Defender Sodium Sulphite (dry)	**2 ounces**
Chrome Alum	**1 ounce**
Water	**20 ounces**

Add Sulphuric Acid, 1 dram, to Sol. No. 2, stirring thoroughly while adding; then pour No. 2 into No. 1, still stirring them well.

If desired Solution No. 2 may be prepared as follows:

Potassium Metabisulphite	**1 ounce**
Chrome Alum	**1 ounce**
Water	**20 ounces**

When fixing films, always press them well under, so that they are entirely covered by the solution. This prevents stains.

The negatives should remain in the fixing bath for a few minutes after they are apparently fixed.

After the films are fixed, wash in running water for about one hour, or in several changes of clean water, and then pin up to the edge of a shelf to dry, being sure that neither side comes in contact with anything.

Hydro Metol Developer

No. 1

Water	**20 ounces**
Defender Hydroquinone	**50 grains**
Defender Metol or Metol	**25 grains**
Defnder Sodium Sulphite (dry)	**1 ounce**

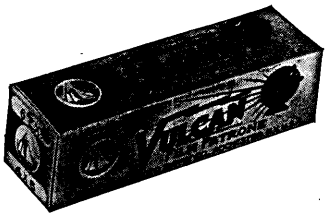
No. 2

Water	**20 ounces**
Defender Sodium Carbonate (dry)	**½ ounce**
Defender Potassium Bromide	**5 grains**

Use equal parts of No. 1 and No. 2.

Dissolve chemicals in the order given. Always keep finished negatives flat, not rolled.

NOTE—In any case of complaint, the emulsion number of the films in question should be given and a film returned showing the defect.



FILM SIZES AND PRICES

No. 204—1½ x 2 in.—Pocket Kodak. 12 exp. 25c.

No. 254—1⅝ x 2½ in.—Vest Pocket Kodak. 8 exp. 20c.

No. 242—1⅝ x 2½ in.—No. O Folding Pocket Kodak, No. O Graphic 6 exp. 15c.

No. 234—2¼ x 2¼ in.—No. 1 Brownie 6 exp. 15c.

No. 240—2¼ x 3¼ in.—No. 2 Brownie, No. 2 Folding Brownie, No. 2 Buster Brown, No. 3 Buster Brown, No. 1 Folding Buster Brown, No. 2 Scout 6 exp. 20c.

No. 210—2¼ x 3¼ in.—No 1 Folding Pocket Kodak, No. 1 Panoram Kodak, No. 1 Roll Film Seneca. 6 exp. 20c.

No. 232—2½ x 4¼ in.—No. 1A Roll Film Seneca, No. 1A F. P. K. Special, No. 1A F. P. Kodak, Ansco Junior, No. 2A Brownie, No. 1A Graflex, No. 1A Speed Kodak, No. 1A Folding Hawk-Eye, No 2A Buster Brown, No. 2A Folding Brownie, No. 2A Scout 6 exp. 25c., 12 exp. 50c.

No. 236—3¼ x 4¼ in.—No. 3 Roll Film Seneca, No. 3 F. P. K., No. 3 Folding Weno, No. 3 Focusing Weno, Nos. 2, 4 and 6 Ansco, No. 3 Special Kodak, Nos. 1 and 2 Stereo Hawk Eye, No. 5 Weno, No 3 Folding Hawk Eye 6 exp. 35c., 12 exp. 70c.

No. 248—3¼ x 4¼ in.—No. 3 Brownie, No. 3 Folding Brownie, No. 3 Bulls Eye, No. 3 Scout 6 exp. 35c., 12 exp. 70c.

No. 244—3¼ x 5½ in.—No. 3A Roll Film Seneca, No. 3A F. P. K., No. 9 Ansco, No. 10 Ansco, No. 3A F. P. K. Special (No. 3A Graflex), No. 3A Folding Brownie, No. 7 Weno, No. 3A Folding Hawk Eye, No. 3A Folding Ansco 6 exp. 40c., 10 exp. 70c.

No. 250—3¼ x 5½ in.—No. 3B Quick Focus Kodak, Stereo Brownie, No. 3A Ansco, No. 3B Folding Hawk Eye, No. 6 Weno, No. 3A Scout 6 exp. 40c., 10 exp. 70c.

No. 202—3½ x 3½ in.—No. 2 Bullet, No. 2 Bullet Special, No. 2 Bulls Eye, No. 2 Bulls Eye Special, No. 2 F. P. Kodak, No. 1 Ansco, No. 3B Al-Vista, No. 2 Flexo Kodak, No. 2 Stereo Kodak, No. 2 Weno, Nos. 3 and 4 Stereo Hawk Eye 6 exp. 30c., 12 exp. 60c.

No. 206—4 x 5 in.—No. 4 Bullet, No. 4 Bulls Eye, No. 4 Bulls Eye Special, No. 4 Folding Weno, No. 4 Focusing Weno, No. 4B Al-Vista, No. 4 Panoram Kodak, No. 4 Weno, Nos. 3, 5 and 7 Ansco, No. 4 Bullet Special 6 exp. 45c., 10 exp. 75c.

No. 246—4 x 5 in.—No. 4 F. P. K., No. 4 Screen Focus Kodak, No. 4 Folding Hawk Eye 6 exp. 45c., 12 exp. 90c.

No. 238—4¼ x 3¼ in.—No. 3 Cartridge Kodak 6 exp. 35c., 12 exp. 70c.

No. 252—4¼ x 6½ in.—No. 4A F. P. Kodak, No. 4A Special Kodak 6 exp. 65c.

No. 208—5 x 4 in.—No. 4 Cartridge Kodak, No. 5B Al-Vista, No. 5D Al-Vista 6 exp. 45c., 12 exp. 90c.

No. 230—5 x 7 in.—No. 5 Cartridge Kodak, No. 7D Al-Vista, No. 7E Al-Vista 6 exp. 80c.

DRY PLATES

THE VULCAN

This dry plate has established itself on account of its genuine merit. Although moderate in price, it is second to none in good qualities for both indoor and outdoor photography. It is especially intended for all-round work, studio work, and snap shots.

The Vulcan is rapid enough for all the ordinary requirements of the photographer. It does not soften or frill in the hottest of weather; it is clean and exceptionally fine-grained. The last-named quality will be appreciated by all portrait photographers, as it renders unnecessary much of the retouching which ordinary coarse-grained plates require.

DEFENDER ORTHOCHROMATIC

This plate is strongly recommended to all who want a little more fidelity in the rendering of colored objects than the usual plates will give. Used without a color screen, these plates will give a better rendering of all landscape work, foliage, clouds and sky, houses, flowers and portrait work. In the latter class of work Orthochromatic plates are especially useful in reproducing subjects with blue eyes and golden hair.

These plates are made very sensitive to yellow and green and slightly so to red. They may, however, be handled safely under a pure, deep red light. They are as sensitive to colors as it is possible to make plates, unless they are made red-sensitive, when absolute darkness must be used in development, and, as a consequence, the latter plates are not practical for the ordinary photographer.

Although these plates are so sensitive to yellow and green, the full advantage of their sensitiveness is not appreciated unless one uses a yellow ray filter over the lens, when a correct reproduction in monochrome may be obtained from all sorts of colored objects, including red; since the reds in nature contain a very large proportion of yellow.

The beautiful grain in all kinds of finished woods may be reproduced with Defender Orthochromatic plates and a yellow ray filter.

They are invaluable for copying pictures, faded and yellow-stained engravings, photographing flowers, foliage and brightly-colored rugs and upholstering. In landscape and marine work with these plates, there is a wonderful gain in the rendering of blue sky and sea, white clouds and all the varying tints of Spring and Fall colorings of nature.

DEFENDER ORTHOCHROMATIC NON-HALATION

This is the Defender plate De Luxe, possessing all the advantages of the plain Orthochromatic plate and, in addition, prevents halation. The use of this plate enables one to photograph subjects of great contrast without difficulty. It is invaluable for working against the light, making portraits with a window background and for interior work generally.

These plates may be justly considered the universal plate, being fast enough for rapid snapshot work, color-sensitive and anti-halation. They are as near a perfect plate as modern chemical research can produce, a plate "De Luxe" for the beginner, amateur, professional and commercial photographer alike.

DEFENDER SLOW OR PROCESS

These plates are primarily intended for copying line work, when clear, sharp blacks and whites are desired. They have great latitude, considerable density, and very fine grain. They are very suitable for copying photographs and also for photographing machinery, and specimens and samples of various sorts. They are unexcelled for line, screen, and process work generally.

DEFENDER POSTAL PLATES

These plates are manufactured to develop quickly, fix quickly and dry quickly. They are coated with a thin but rich emulsion, and when fixed with the special fixing bath, (formula as shown on another page for treatment of plates at high temperature) softening of the film, and other hot weather troubles are positively obviated. With this fixing bath such plates can be put, for copying purposes, directly into the lantern without drying or other treatment.

PARAGON X-RAY PLATES

The Paragon X-Ray plate is different from any other, since to daylight it is a relatively slow plate, but to X-Rays it is absolutely unequalled for speed, density and detail.

It is a plate of very fine grain and is heavily coated, thus securing detail in the most difficult subjects.

The Paragon X-Ray plate is so fast that it permits exposures of less than half the time required for most plates on the market, which means a great saving in tube expense.

PARAGON X-RAY SCREEN PLATES

These are especially prepared for use when an Intensifying Screen is used, permitting the shortest possible exposures and possessing much greater speed than when the regular X-Ray plate is thus used.

We recommend the Paragon X-Ray plate in preference to the Screen plate for all direct work.

DEFENDER LANTERN SLIDE PLATES

Defender Lantern Plates are made in two varieties:

A.—For contrast work such as announcement slides, and black and white work generally, these plates are quite unequalled for richness of blacks and clearness of whites.

B.—For general picture work, giving a good, soft gradation especially suitable for such work.

CARBUTT LANTERN SLIDE PLATES

Slower than the above and have a longer scale of gradation. These plates give a warmer-toned image than the Defender slides. They have been on the market for over 20 years, and are everywhere recognized as a standard of excellence.

FORMULAS

FOR DEVELOPING AND FIXING VULCAN AND DEFENDER DRY PLATES

Pyro Soda Developer

Stock Pyro Solution:

Pyrogallic Acid	**1 ounce**
Oxalic Acid	**8 grains**
Or Potassium Metabisulphite	**80 grains**
Water	**7½ ounces**

SOLUTION A

Stock Pyro.. 2 ounces Water.... 18 ounces

SOLUTION B

Sodium Carbonate (dry)	**½ ounce**
Sodium Sulphite (dry)	**1 ounce**
Potassium Bromide	**20 grains**
Water	**20 ounces**

Use equal parts of A and B.

For short exposure omit bromide.

For softer negatives omit bromide and dilute with equal quantity of water.

Solution A (above) will keep for several weeks.

For Time or Tank development use the Pyro Soda formula as follows:

Solution A	**2 ounces**
Solution B	**2 ounces**
Water	**8 ounces**

Develop about 15 minutes. If longer time is required use 20 ounces of water instead of 8. This will take about 30 minutes to develop.

Metol Hydroquinone Developer

SOLUTION A

Metol or Defender Motol	**25 grains**
Water	**20 ounces**
Hydroquinone	**50 grains**
Sodium Sulphite (dry)	**1 ounce**

SOLUTION B

Sodium Carbonate (dry)	**½ ounce**
Potassium Bromide	**5 grains**
Water	**20 ounces**

Use equal parts of A and B.

For softer negatives dilute with equal quantity of water.

Keep all Solutions as Nearly as Possible 65 Deg. F.

TROPICAL DEVELOPER

SOLUTION A

Water	**20 ounces**
Monol	**90 grains**
Sodium Sulphite (dry)	**360 grains**

SOLUTION B

Water	**20 ounces**
Ammonium Sulphate	**8 ounces**

At 65 Deg. F., dilute Solution A with equal quantity of water.

At 75 Deg. F., use

Solution A	**2 ounces**
Solution B	**1 ounce**
Water	**1 ounce**
10% Potassium Bromide	**20 minims**

At 85 Deg. F., use

Solution A	**2 ounces**
Solution B	**1½ ounces**
Water	**½ ounce**
10% Potassium Bromide	**40 minims**

At 95 Deg. F., use

Solution A	**2 ounces**
Solution B	**2 ounces**
10% Potassium Bromide	**60 to 80 minims**

Fixing when this developer is used must in all cases be carried out with the Potassium Metabisulphite formula given below.

Fixing Baths

PLAIN HYPO

Hypo.... 16 ounces **Water.... 40 ounces**

ACID ALUM HYPO

(Prevents stains, hardens gelatine.)

A

Hypo.... 16 ounces **Water.... 30 ounces**

B

Water	**20 ounces**
Chrome Alum	**1 ounce**
Sodium Sulphite (dry)	**2 ounces**

Add 1 dram Sulphuric Acid to the water and Chrome Alum before adding the Sulphite, stirring well.

If desired Sol. B may be prepared as follows:

Potassium Metabisulphite	**1 ounce**
Chrome Alum	**1 ounce**
Water	**20 ounces**

Plates fixed in this bath have a very tough film and may be dried by external heat after immersion of five minutes, followed by washing in warm water.

This fixing bath gives the maximum toughness to the film and should be used in preference to all others in hot weather.

The above Potassium Metabisulphite fixing bath is recommended for Defender X-Ray Plates.

Intensifying Solution for Vulcan and Defender Plates

No. 1

Bichloride of Mercury	**60 grains**
Potassium Bromide	**60 grains**
Water	**8 ounces**

No. 2

Sodium Sulphite (dry)	**1 ounce**
Water	**8 ounces**

Immerse negative in solution No. 1 until thoroughly whitened, and after rinsing carefully, place in No. 2, leaving it there until entirely cleared. Wash thoroughly before allowing it to dry.

In case this does not give sufficient intensity, repeat the operation until the desired result is obtained.

Reducing Solution

(Ammonium Persulphate.)

This solution acts more energetically on high lights than on deep shadows. It is therefore recommended for contrasty negatives.

No. 1.

Water	**16 ounces**
Ammonium Persulphate	**16 grains**
Sulphuric Acid (Commercial)	**5 drops**

No. 2.

Water	**16 ounces**
Sodium Sulphite (dry)	**1 ounce**

Be sure that the negative to be reduced is entirely free from hypo and if dried, that it has been thoroughly soaked up. Place in No. 1 until required reduction is reached, rinse and immerse five minutes in No. 2. Wash thoroughly before drying.

Reducing Solution

(Potassium Ferricyanide.)

This solution attacks the shadows or thinner parts of the negative first and is therefore recommended for dense flat negatives.

No. 1.

Water	**16 ounces**
Potassium Ferricyanide	**1 ounce**

No. 2.

Water	**16 ounces**
Hypo	**1 ounce**

Place plate in tray and flood with solution No. 2, sufficient to cover it, then add a small quantity of No. 1, immersing plate well, and watch it carefully. If the reduction proceeds too slowly, add more of solution No. 1.

If only parts of the negative are too dense, it is well to apply the solution to those parts while wet, with a small brush or a tuft of cotton.

Wash the plate at least one-half hour in running water after the proper reduction has been secured.

Formulas for Developing

DEFENDER & CARBUTT LANTERN SLIDE PLATES AND DEFENDER PROCESS PLATES

These plates will produce good results in almost any of the standard developers commonly used for developing Lantern Slides, but to insure clear shadows and perfect detail we recommend the following formulas:

Hydroquinone (One Solution)

Water	**25 ounces**
Sodium Sulphite (dry)	**¾ ounce**
Hydroquinone	**¼ ounce**
Sodium Carbonate (dry)	**1½ ounces**

Dissolve and add 2 drams of 10% solution Potassium Bromide.

Hydroquinone (Two Solutions)

This developer is more energetic and gives colder blacks than the above formula.

No. 1.

Water	**20 ounces**
Sodium Sulphite (dry)	**1 ounce**
Hydroquinone	**140 grains**

No. 2.

Water	**20 ounces**
Caustic Soda	**100 grains**
Potassium Bromide	**50 grains**

Use equal parts of Nos. 1 and 2.

When plates are developed rinse for a few seconds and fix in the ACID ALUM HYPO BATH recommended for Dry plates on page 30.

Do not use Potassium Carbonate or Hydroxide in developing these Lantern Slide Plates.

SENSITIZED POST CARDS

ARGO POST CARDS

Four surfaces, Matte, Gloss, Velours and Buff, three grades of contrast, Hard, Normal and Soft. The several grades are as follows:

Hard Matte Post Cards.
Normal Matte Post Cards.
Soft Matte Post Cards.
Hard Gloss Post Cards.
Normal Gloss Post Cards.
Soft Gloss Post Cards.
Hard Velours Post Cards.
Normal Velours Post Cards.
Soft Velours Post Cards.
Normal Buff Post Cards.
Soft Buff Post Cards.

Price List.

Size, 3½ x 5½, Dozen, 15c. ½ Gross, 75c. Gross, $1.50.
Size, 3½ x 11, Dozen, 35c. ½ Gross, $1.50. Gross, $3.00.
Special net prices to dealers and large consumers on 1000 and 5000 sheet packages, and cards in Ezy Close Boxes.

MONOX (Bromide) POST CARDS

Monox Post Cards are manufactured in two surfaces, Matte and Velours. Owing to extreme sensitiveness they are especially suited to all classes of work demanding quick finishing and delivery of prints. May be used for enlarging from very small negatives.

Price List.

Size, 3½ x 5½, Dozen, 15c. ½ Gross, 75c. Gross, $1.50.
Size, 3½ x 11, Dozen, 35c. ½ Gross, $1.50. Gross, $3.00.
Special net prices to dealers and large consumers on 1000 and 5000 sheet packages.

DISCO (Gloss) POST CARDS

These cards embody all of the superior qualities of Disco Printing Out Paper. Take a beautiful finish when dried on ferrotype plates.

Price List.

Doz. 15c. 2 Doz. (pkg.) 25c. ½ Gro. 75c. Gro. $1.50.

SUN SPOT (Blue Print) POST CARDS

The simplest of all photographic processes. No chemicals required. Print in daylight, wash twenty minutes and dry. Give deep, brilliant blues and pure whites. Packed in sealed tin cans or boxes.

Price List.

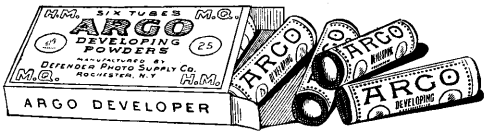
Doz. 15c. 2 Doz. (pkg.) 25c. ½ Gro. 75c. Gro. $1.50.

CHEMICAL PREPARATIONS

PHOTO-PURE
DEFENDER
TESTED

PREPARED DEVELOPERS

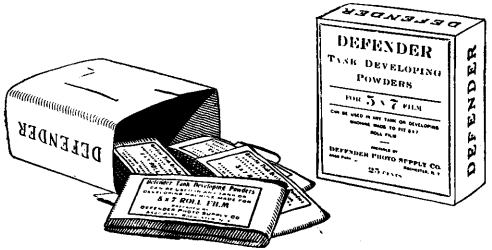
Argo Developing Powders—A Metol-Hydroquinone developer, ready for use upon the addition of water. It is one of the best all-around developers, being adapted for Argo and all other developing papers, Monox and all other bromide papers, films and dry plates. Put up in paraffin-



lined tubes considered by many superior to glass because non-breakable and easy to open by cutting off ends. Six tubes in a box, enough for 24 ounces solution for developing gaslight paper and 48 ounces solution for bromide paper, dry plates and films, 25 cents.

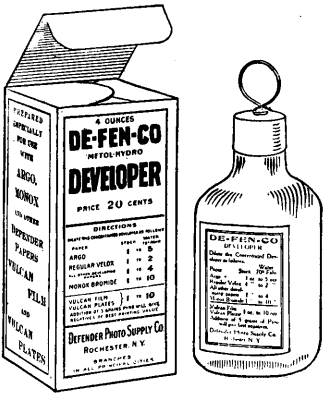
Anti-Friction Developer—Prevents friction or abrasion marks on glossy and semi-glossy developing papers. Especially valuable for post cards and prints with white margins. Produces warm-toned prints of brilliancy and softness. Put up in paraffin-lined tubes (described above under Argo Developing Powders). Six tubes in a box, enough for 24 ounces solution, 25 cents.

Defender Tank Developing Powders—For the development of plates and films, with either tank or tray. Six sets of powders in box, for 2¼ x 3¼ film; 15c; for 3¼ x 5½ film, 20c; for 5 x 7 film, 25c.



Nomet Developing Powders—A clear-working developer for all paper, plates and films. Ready for use upon the addition of water. Glass tube, 5 cents.

De-Fen-Co Liquid Developer—This concentrated liquid preparation will keep indefinitely because the least possible quantity of water has been used in its preparation. Addition of Bromide never required. Four-ounce bottle, 20c; eight-ounce bottle, 35c; sixteen-ounce bottle, 60c.



De-Fen-Co-Developing Powders—Same in result as De-Fen-Co Liquid Developer. Ready for use upon the addition of water. Glass tube, 5c.

DEVELOPING AGENTS

Defender Motol—Identical with Metol, and gives results exactly the same. One-ounce bottle, 40c; four-ounce bottle, $1.40; eight-ounce bottle, $2.65; sixteen-ounce bottle, $5.00.

Metol-Hydro Mixture—Metol and Hydroquinone in the proper proportions for making developer. Convenient for those who desire to make their own developer, in that it obviates the necessity of purchasing Metol and Hydroquinone and weighing out the small quantities required. One-ounce bottle, 35 cents; four-ounce bottle, $1.00; eight-ounce bottle, $1.50; sixteen-ounce bottle, $2.70.

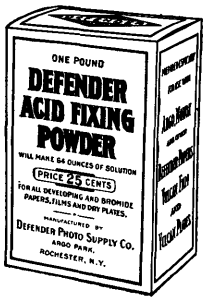
Monol—A non-poisonous developing agent especially recommended for blue-black tones. One-ounce bottle, 40 cents; four-ounce bottle, $1.40; eight-ounce bottle, $2.65; sixteen-ounce bottle, $5.00.

Pyrogallic Acid, Crystals—Pyro in this form is rapidly becoming popular with photographers because it does not fly about the room when can is open, and in solution will oxidize less freely.

One-ounce can, 16c; four-ounce can, 58c; eight-ounce can, $1.15; sixteen-ounce can, $2.25.

Nomet—A clear-working, non-poisonous developing agent. One-ounce bottle, 40c; four-ounce bottle, $1.40; eight-ounce bottle, $2.65; sixteen-ounce bottle, $5.00.

MISCELLANEOUS

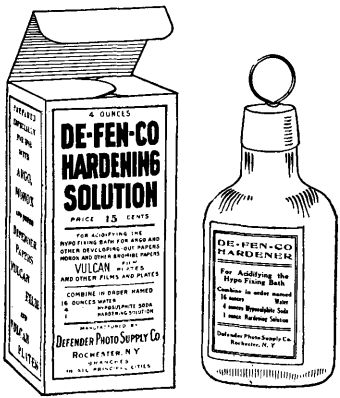


Defender Acid Fixing Powder—A most satisfactory fixing bath for Argo and other developing papers, Monox and all Bromide papers, Vulcan and other film and Vulcan and all other dry plates. One-lb. box, making 64 ozs. solution, 25c. One-half lb. box, making 32 ozs. solution, 15c. One-quarter lb. box, making 16 ozs. solution, 10c.

Anti-Friction Tablets—For rendering developer non-abrasion. Simply dissolve one or two tablets in six ounces of solution. Per glass bottle, containing 25 tablets, 10 cents.

Argo Soda—A preparation for preventing friction marks in the development of glossy and semi-glossy developing papers. Contains all necessary chemicals except Metol and Hydroquinone (or Edinol, if preferred). Put up in one-pound air-tight cans, which will preserve full strength of contents indefinitely. Price 50 cents per pound; one-half pound carton, 25 cents.

De-Fen-Co Hardening Solution—For acidifying the hypo fixing bath. Keeps indefinitely without deterioration. Four-ounce bottle, 15c; eight-ounce bottle, 25c; sixteen-ounce bottle, 40c.



Defender Intensifier—For improving all thin or weak negatives. Builds up the image to greater density and increases contrast. Put up in glass tubes 5 cents.

Defender Reducer—For clearing fogged negatives and reducing the contrast of harsh negatives. For reducing over-dense negatives. For clearing Lantern Slides. Put up in glass tubes, 5c.

Potassium Bromide Tubes—Glass, 5 cents.

Defender Sepia Re-Developer—In glass tubes. Each tube contains, in separate compartments, powders for making sixteen ounces of bleaching and re-developing solution. Price, per tube, 10c.

Combined Toning and Fixing Bath (Includes Chloride of Gold)—For Disco and other gelatine printing out papers. Sufficient to tone and fix thoroughly 75 to 100 cabinet prints if used as directed. Price, 25 cents per box.

PHOTO-PURE CHEMICALS

(Prices subject to change without notice.)

Alum Powdered—One-pound carton, 8 cents; five-pound carton, 36 cents.

Alum Chrome, Granular Crystals—One-pound carton, 13 cents.

Acid Citric, Powdered—One-ounce bottle, 10 cents; four-ounce bottle, 25 cents; eight-ounce bottle, 47 cents; sixteen-ounce bottle, 80 cents.

Acid Oxalic—Four-ounce bottle, 10 cents; eight-ounce bottle, 15 cents; sixteen-ounce bottle, 23 cents.

Acid Acetic 28%—One-pound bottle, 12 cents; five-pound bottle, 48 cents.

Borax—One-pound carton, 11 cents.

Magnesium Powder—One-ounce tin, 20 cents.

Mercury Bichloride—One-ounce bottle, 12c.

Potassium Bromide—One-ounce bottle, 10 cents; four-ounce bottle, 20 cents; eight-ounce bottle, 33 cents; sixteen-ounce bottle, 65 cents.

Potassium Oxalate—One-pound carton, 20c.

Potassium Permanganate—One-ounce bottle, 10 cents; sixteen-ounce bottle, 30 cents.

Potassium Metabisulphite—One-ounce bottle, 10c; four-ounce bottle, 18c; eight-ounce bottle, 29c; sixteen-ounce bottle, 44c.

Potassium Ferricyanide—One-ounce bottle, 10c; four-ounce bottle, 17c; eight-ounce bottle, 33c; sixteen-ounce bottle, 65c.

Potassium Iodide—One-ounce bottle, 35 cents; four-ounce bottle, $1.20; eight-ounce bottle, $2.25; sixteen-ounce bottle, $4.40.

Potassium Carbonate—One-pound bottle, 18c.

Silver Nitrate—Market Price.

Sodium Bicarbonate—One-pound carton, 8c.

Sodium Bisulphite—Four-ounce bottle, 12c; eight-ounce bottle, 18c; sixteen-ounce bottle, 30c.

Sodium Acetate—One-ounce bottle, 10 cents; sixteen-ounce bottle, 35 cents.

Sodium Carbonate—One-pound tin, 15c; five-pound tin, 70c; twenty-five pound tin, $3.40.

Sodium Hyposulphite, Crystals—One-pound carton, 5 cents.

ARGO DEVELOPING PAPER

Price List

(For different degrees of contrast and surfaces, refer to page 3.)

SIZE	Dozen	Gross
2½ x 2½	$ .10	$ 1 00
3½ x 3½	.12	1.20
3¼ x 4¼	.12	1.20
3¼ x 5½	.15	1.50
4 x 5	.15	1.50
3⅞ x 5½ (Cab.)	.15	1.50
4 x 6	.15	1.50
4¼ x 6½	.25	2.50
4¾ x 6½	.25	2.70
5 x 7	.30	3.00
5 x 8	.30	3.30
3½ x 12	.35	3 20
6 x 8	.45	4 50
6½ x 8½	.50	5.00
7 x 9	.55	5 80
7½ x 9½	.60	6 30
8 x 10	.60	6 50
9 x 11	.75	8 50
10 x 12	.90	9.70
11 x 14	1.20	13.00
14 x 17	1.90	20.00
16 x 20	2.40	25.80
18 x 22	3.20	34.80
20 x 24	3.60	38.50

Argo is furnished also in half-gross packages at one-half the gross price.

10-foot Rolls, 20 inches wide.....$1.35
10-yard Rolls, 20 inches wide..... 4.00
10-foot Rolls, 40 inches wide..... 2.70
10-yard Rolls, 40 inches wide..... 8.00

Argo Single and Double Weight in Rolls for Prints from Panoramic Negatives

Length	6 inch	6½ inch	8 inch	10 inch	16 inch
25 feet	$1.00	$1.15	$1.35	$1.70	$ 2.70
50 feet	2.00	2.30	2.70	3.40	5 40
100 feet	4.00	4.60	5 40	6.80	10.80

See page 33 for price list of Argo Post Cards

MONOX BROMIDE PAPER

Price List

(For different grades and surfaces, refer to page 19.)

SIZE	½ Dozen	Dozen	½ Gross	Gross
3½ x 3½		$ .15	$ .65	$1.30
3¼ x 4¼		.15	.65	1.30
3¼ x 5½		.20	.80	1.60
4 x 5		.20	.90	1.80
3⅞ x 5½ (Cabt.)		.20	.90	1.80
4 x 6		.20	.90	1.80
4¼ x 6½		.25	1.25	2.50
4¾ x 6½		.25	1.35	2.70
5 x 7		.30	1.50	3.00
5 x 8		.35	1.75	3.50
6 x 8		.50	2.50	5.00
6½ x 8½		.55	2.75	5.50
7 x 9		.60	3.00	6.00
7½ x 9½		.65	3.25	6.50
8 x 10		.70	3.50	7.00
9 x 11		.90	4.50	9.00
10 x 12		1.10	5.50	11.00
11 x 14	$ .75	1.40	7.00	14.00
14 x 17	1.10	2.15	10.75	21.50
16 x 20	1.50	2.80	14.00	28.00
18 x 22	1.85	3.50	17 50	35.00
20 x 24	2.20	4.20	21.00	42.00

In Rolls

10-ft., 20 in. wide $1.70
10-ft., 40 in. wide 3.40
10-yd., 20 in. wide..... 5.00
10-yd., 40 in. wide.....10.00

See page 33 for price list of Monox Post Cards.

DISCO PRINTING OUT PAPER

(Gloss)

Price List

SIZE	Dozen	2 Dozen	Gross
2½ x 2½	$ .10	$ .18	$ .80
3½ x 3½	.10	.18	1.05
3¼ x 4¼	.10	.18	1.05
3¼ x 5½	.12	.22	1.10
4 x 5	.12	.22	1.10
3⅞ x 5½ (Cab.)	.18		1.25
4 x 6	.18		1.25
4¾ x 6½	.25	⅛ Gross	2.20
5 x 7	.27	1.45	2.40
5 x 8	.27	1.60	2.70
6 x 8	.36	2.00	3.60
6½ x 8½	.40	2.15	3.80
7 x 9	.45	2.50	4.50
7½ x 9½	.50	3.00	5.25
8 x 10	.54	3.15	5.85
9 x 11	.68	4.05	7.20
10 x 12	.81	4.75	9.00
11 x 14	1.08	6.30	11.70
14 x 17	1.62	9.45	18.00
16 x 20	2.16	12.60	24.30
20 x 24	3.15	18.45	36.00

10-foot Rolls, 20 inches wide..... $1.10
10-yard Rolls, 20 inches wide 3.20

4 x 5 Seconds, per gross..... $ .90
Cabinet Seconds, per gross..... 1.00

See page 33 for price list of Disco Post Cards.

SUN SPOT BLUE PRINT PAPER

Price List

SIZE	2 Dozen	SIZE	2 Dozen
2½ x 2½	$ .15	6½ x 8½	$ .50
3½ x 3½	.16	7 x 9	.60
3¼ x 4¼	.16	7½ x 9½	.70
3¼ x 5½	.20	8 x 10	.75
4 x 5	.20	9 x 11	.90
3⅞ x 5½	.25		
4 x 6	.25	10 x 12	1.00
4¾ x 6½	.30	11 x 14	1.25
5 x 7	.35	14 x 17	.90 (1 Doz.)
5 x 8	.40	16 x 20	1.00 (1 Doz.)
6 x 8	.45	20 x 24	1.50 (1 Doz.)

GELATINE BACKING PAPER

(UNSENSITIZED)

Gloss and Matte for Backing Prints

Price List

SIZE	Gross
8 x 10	$2.40
9 x 11	2.90
10 x 12	3.60
11 x 14	4.70
14 x 17	6.40
16 x 20	9.75
20 x 24	14.40

In Rolls

10-foot, 20 inches wide..... $ .40
10-foot, 40 inches wide..... .80
10-yard, 20 inches wide..... 1.20
10-yard, 40 inches wide..... 2.40

VULCAN DRY PLATES
AND
DEFENDER PROCESS OR SLOW PLATES

Price List

SIZE	Price per Dozen	Dozen in Case	Weight of Case (about) pounds
2½ x 2½	$ .30	30 or 36	18 or 22
2½ x 4	.35	30	26
3½ x 3½	.40	30	31
3¼ x 4¼	.45	30	38
4¼ x 4¼	.60	30	48
3¼ x 5½	.65	30	48
4 x 5	.65	30	52
4¼ x 5½	.75	30	62
4¼ x 6½	.90	30	72
4¾ x 6½	.90	30	78
5 x 7	1.10	20	61
5 x 8	1.25	20	69
6½ x 8½	1.65	12	57
7 x 10	2.10	10	60
8 x 10	2.40	10	69
10 x 12	4 20	4	75
11 x 14	6.00	4	88
14 x 17	9 00	3	102
16 x 20	13 25	2	95
17 x 20	14.00	2	101
18 x 22	16.50	1½	90
20 x 24	20.00	1	72

4½ x 6 centimeters, $ .30 per doz. 30 doz. in case
6½ x 9 centimeters, .40 per doz. 30 doz. in case
9 x 12 centimeters, .60 per doz. 30 doz. in case
13 x 18 centimeters, 1.10 per doz. 20 doz. in case

(Other sizes supplied to order)

DEFENDER POSTAL PLATES

Price List

SIZE	Price per Dozen	Dozen in Case	Weight of Case (about) pounds
2½ x 2½	$ .25	30 or 100	18 or 65
3½ x 3½	.40	30	31
3¼ x 4¼	.45	36	31 or 36
4 x 5	.65	30	52
3¼ x 5½	.65	30	48
4¼ x 6½	.90	30	72

DEFENDER ORTHOCHROMATIC DRY PLATES

Price List

SIZE	Price per Dozen	Dozen in Case	Weight of Case (about) pounds
2½ x 2½	$ .30	30 or 36	18 or 22
3½ x 3½	.40	30	31
3¼ x 4¼	.45	30	38
3¼ x 5½	.65	30	48
4 x 5	.65	30	52
4¼ x 5½	.75	30	62
4¼ x 6½	.90	30	72
4¾ x 6½	.90	30	78
5 x 7	1.10	20	61
5 x 8	1.25	20	69
6½ x 8½	1.65	12	57
8 x 10	2.40	10	69
10 x 12	4.20	4	75
11 x 14	6 00	4	88
14 x 17	9.00	3	102
16 x 20	13.25	2	95
17 x 20	14.00	2	101
18 x 22	16.50	1½	90
20 x 24	20 00	1	72
Centimeters			
4½ x 6	.30	30	12
9 x 12	.65	30	37
13 x 18	1.10	20	66

(Other sizes supplied to order)

DEFENDER ORTHO NON-HALATION PLATES

Price List

SIZE	Price per Dozen	Dozen in Case	Weight of Case (about) pounds
2½ x 2½	$ .35	30 or 36	18 or 22
3½ x 3½	.50	30	31
3¼ x 4¼	.55	30	38
4¼ x 4¼	.75	30	48
3¼ x 5½	.80	30	48
4 x 5	.80	30	52
4¼ x 5½	.95	30	62
4¼ x 6½	1.10	30	72
4¾ x 6½	1.20	30	78
5 x 7	1.40	20	61
5 x 8	1.55	20	69
6½ x 8½	2.10	12	57
8 x 10	3.00	10	69
10 x 12	5.15	4	75
11 x 14	7.25	4	88
14 x 17	11.25	3	102
16 x 20	16.40	2	95
17 x 20	17.25	2	101
18 x 22	20.40	1½	90
20 x 24	24 65	1	72
Centimeters 4½ x 6	.35	30	18

(Other sizes supplied to order)

LANTERN SLIDE PLATES

(Defender or Carbutt)

Price List

SIZE	Per Dozen	Dozen in Case
6½ x 8	$2.00	30
3¼ x 4	.55	30
3¼ x 3¼	.50	30

Cover Glass

3¼ x 4.....$ .25 per dozen
3¼ x 3¼..... .20 per dozen
1108 sheets 3¼ x 4.....$11.70

PARAGON X-RAY PLATES

Price List

SIZE	Price per Dozen	Dozen in Case	Weight of Case (about) pounds
5 x 7	$1.40	20	61
6½ x 8½	2 10	12	57
8 x 10	3.00	10	69
10 x 12	5.15	4	75
11 x 14	7.25	4	88
14 x 17	11.25	3	102
16 x 20	16.40	2	95
20 x 24	24.65	1	72

(Other sizes supplied to order)

PARAGON X-RAY SCREEN PLATES

Price List

SIZE	Price per Dozen	Dozen in Case	Weight of Case (about) pounds
5 x 7	$1.10	20	61
6½ x 8½	1.65	12	57
8 x 10	2.40	10	69
10 x 12	4.20	4	75
11 x 14	6.00	4	88
14 x 17	9 00	3	102
16 x 20	13.25	2	95
20 x 24	20.00	1	72

(Other sizes supplied to order)

DEFENDER X-RAY ENVELOPES

Price List

SIZE	* Per dozen sets
5 x 7	$ 30
6½ x 8½	.45
8 x 10	.60
10 x 12	.95
11 x 14	1.25
14 x 17	2.25

* Each set consists of one black and one orange envelope.

TABLE OF WEIGHTS AND MEASURES

AVOIRDUPOIS

(Chemicals are sold in this weight.)

27 grains	1 dram
437½ grains	1 ounce
16 drams	1 ounce
7000 grains	1 pound
16 ounces	1 pound

APOTHECARIES WEIGHT

(Our formulae are based on this weight.)

20 grains	1 scruple
3 scruples	1 dram
60 grains	1 ounce
8 drams	1 ounce
480 grains	1 pound
12 ounces	1 pound

FLUID MEASURE

(Our formulae are based on this table.)

60 minims	1 fluid dram
8 drams	1 fluid ounce
16 ounces	1 pint
8 pints	1 gallon

EQUIVALENTS

1 minim=1 drop.
1 cc=17 minims.
1000 cc=1 liter=34 fluid ounces=2 1-8 pints.
1 gram=15 2-5 grains.
28 grams=1 avoirdupois ounce.
31 grams=1 apothecaries' ounce.
29 6-10 cc=1 fluid ounce.
1 pound, avoirdupois=453 6-10 grams.
1 pound, apothecaries'=373 2-10 grams.

cc—Abbreviation for cubic centimeters.

INDEX

We have grouped General Heads separately and below each we have placed in alphabetical order all matter relating thereto.

INDEX—*Continued*