Tamarind Technical Papers

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Number 3 / January 1975

AIR BRUSH DRAWINGS WITH POLYMER MATERIALS

by Ben Q. Adams

Air brush techniques in lithography have traditionally employed a greasy lithographic material such as Korn's liquid tusche. At Tamarind a special shop mix consisting of one part asphaltum, one part triple ink, one part lithotine, and three or four drops of oleic acid has also been employed. These lithographic materials are thinned with water (Korn's tusche) or lithotine (Tamarind shop mix) to a consistency appropriate for use in the air brush and are etched according to normal lithographic procedures.

Certain disadvantages are inherent in these methods. Because of the greasy nature of lithographic materials and the tiny dot-size of the grease deposits that are made, air brush drawings are subject to technical problems. Because the amount of greasy drawing material that has been applied to the stone or plate may be greater than is visible to the printer during the etching process, images sometimes darken during the roll up. A heavy air brush drawing with lithographic materials may tend to mount or fill in during the roll up if not properly etched; it may also mount while in storage because of residual grease on the printing element. When made on metal plates, drawings with tusche are susceptible to streaking or burning during etching, and they are hard to control on zinc plates due to the oleophylic nature of this metal.

Because of these technical problems, particularly on metal plates, Tamarind began a series of experiments using a polymer medium as a drawing material.[1] Such a non-lithographic material was soon found to have many advantages over the lithographic materials previously employed, with the result that a polymer medium is now routinely used for air brush drawings at Tamarind.

Found to be most effective is a mixture composed of one part Liquitex Polymer Medium,[2] one part Liquitex black paint, and one part distilled water. After thorough mixing, this medium should be allowed to remain overnight before use. Such a rest period allows a uniform consistency to develop. The mixture should also be strained through a fine-mesh nylon stocking into a clean container.

This mixture is non-lithographic because it does not react chemically with the printing element to form a grease-receptive compound as do lithographic materials when etched. The basic principle is that the non-reactive polymer medium can form a tight physical bond with the printing element and can at the same time be resistant to the etches and solvents normally used to process lithographic images. Equally important, the polymer can be removed only with a high grade lacquer thinner such as Lith-Kem-Ko "C" lacquer solvent or Hancolite glaze cleaner (Handschy Chemical Company), neither of which affects the adsorbed gum film. In effect, the polymer medium acts as a stop out; the printing element remains sensitive beneath it. When the polymer coating is removed with the solvent, the sensitive areas are exposed. When these areas are rubbed up with asphaltum (or a vinyl lacquer) a printing base is established.

The polymer medium can be used in any air brush suitable for commercial work. A brush that is capable of a range of sprays provides greater flexibility. For uniform spraying, the compressor should be capable of maintaining 35 lbs. of pressure and should have a pressure control mechanism. If a smaller, lightweight compressor is used, the spray is harder to control, as the nozzle is the only means to regulate the spray. This usually results in a coarser spray, although smaller compressors can often be used successfully.

The polymer air brush technique can be used equally well on stone, aluminum or zinc. Plates may have an advantage for some artists in that they can easily be placed in a vertical position while the drawing is done. As a stone will usually be flat or only slightly tipped, the spray must thus be lateral.[3]

Because the polymer is not greasy and functions only as a stop out, the hydrophylic nature of aluminum and the oleophylic properties of zinc are irrelevant. This is a distinct advantage.

Ben Q. Adams, Tamarind Master Printer, is a member of the Tamarind Institute Staff.

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The editor acknowledges the assistance of Garo Antreasian, Professor of Art, University of New Mexico, who has made a number of helpful suggestions with respect to the form and content of the technical papers. References to TBL in articles and footnotes are to *The Tamarind Book of Lithography: Art and Techniques* (New York, Abrams, 1971). Unsigned notes and articles are writen by the Editor.

Making the air brush drawing

The artist may wish first to sketch with red conte crayon or make a red chalk tracing from a key drawing. However this is done, once the drawing is placed on the stone or plate the non-image areas must be masked to protect them while the air brush is being used. Gum arabic, contact paper (Con-Tact Brand transparent self-adhesive plastic), tape or paper can all be used to mask the printing element. Contact paper should be used only over a gum mask, as the residual grease in the adhesive may leave an image if directly applied to an open stone. Supplemental use of contact paper to mask large areas (such as the borders of an image) is recommended, because with a gum mask alone the wet polymer spray may bleed through the gum to create faint dots or scum.

For hard edge images it is a good idea to use gum as a mask because the raised edge of tape or contact paper can cause a slight halo effect along the edges. When either tape or contact paper is used it should be well burnished along its edges to assure that firm contact is made.

When all masks are in place and all gum masks are dry, the stone or plate is ready to receive the drawing. If desired, traditional lithographic materials can be used at this point to execute portions of the drawing—prior to application of the polymer medium with the air brush. To avoid later problems, the loaded air brush should be tested on a piece of paper before beginning work on the stone or plate and adjusted as needed. In order to lay down a thick, resistant film, the polymer solution should be as heavy as can be sprayed through the brush without clogging. While spraying the polymer on the printing element, the air brush should be moved in smooth, continuous sweeps across the surface, holding the brush from six to eight inches above the surface and at a slight angle. The distance at which the brush should be held from the surface will depend to some extent upon the type of spray desired. If a fine spray is applied from too great a distance it will dry before reaching the surface and will not adhere firmly. This may not be noticeable until the stone is etched and the spray lifts off. If a fine spray is applied from too close a distance it will rapidly fill the pores of the stone and produce a flat, solid tone when it is rolled up. A coarse spray is easier to control and process simply because it is heavier, more resistant, and open.

Minor corrections are possible during the spraying of the polymer, provided that there is no greasy underdrawing in crayon or tusche and that the areas to be corrected are either isolated or of such a nature that adjacent areas will not be damaged.

It is also possible in the course of work with the air brush to mask additional areas, thus

RICHARD HAAS. The Potter Building [Tamarind 74–160a] A color lithograph for which two aluminum plates, printed in red and blue, were drawn with an air brush, using a Liquitex polymer medium.

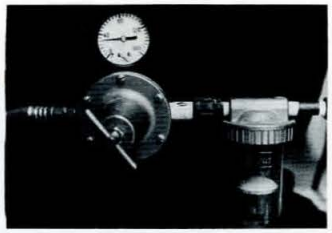
protecting light or middle-value tones which have already been created. Care must be taken in doing this to assure that the polymer spray is thoroughly dry (usually about 15 minutes) before an added mask is put in place. Use of contact paper or tape is risky at this point, as the adhesive can pull off drawing materials beneath it. Care is also essential if there is a lithographic drawing (in tusche or crayon) beneath the polymer spray, for the soft lithographic materials can be easily smeared or damaged.

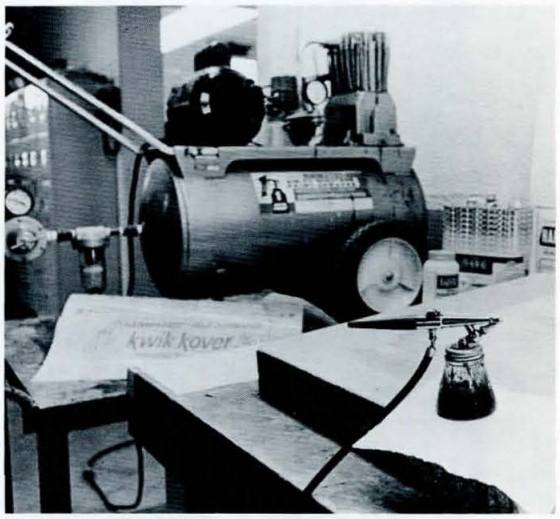
If an area is sprayed too heavily, streaked, or otherwise damaged while using the polymer and air brush, it is possible to remove the polymer with "C" lacquer solvent or Hancolite glaze cleaner, provided that care is exercised.[4] Such areas should be cleaned very thoroughly to remove all residual polymer. If this is done properly, the stone or plate will again receive new spray—a possibility which exists only because the polymer medium is non-lithographic. Its removal thus does not alter the printing element chemically.

After the drawing is completed and all corrections made, the polymer spray should be allowed to dry for 30 minutes. Tape, paper and contact paper masks are removed at this point. Rosin and talc are then applied to the stone (or talc alone to the plate).

Processing the plate or stone

The procedure to be used in etching the printing element will vary according to (1) the element in use—stone, zinc or aluminum, (2) the presence or absence of a greasy lithographic drawing beneath the polymer spray, and (3) the fineness or coarseness of the polymer spray itself. If the polymer spray is heavy and coarse it can withstand a relatively hot etch; if fine, the etch must be correspondingly milder. Gen-





erally speaking, the maximum etch to be used on stone should be between six and ten drops of nitric acid in an ounce of gum. Although hotter etches might be used to etch heavier grease areas, there would be a risk of burning off the polymer spray, particularly on a softer or yellow stone. In the absence of a lithographic (greasy) underdrawing, an acid etch is not needed; a straight gum etch is sufficient.

Tamarind uses a stock solution containing two ounces of phosphoric acid in a gallon of gum as an etch for aluminum plates. This solution has a pH of 2.3 and may be considered a medium etch for aluminum. As the pH is critical in etches for aluminum, litmus paper should be used to test the pH while mixing this solution.[5] Because this stock solution has a tendency to gain strength (i.e., move to a lower pH) over time, it should be tested periodically and adjusted as needed. When etching an aluminum printing element containing both lithographic and non-lithographic drawing materials, one should etch for the lithographic materials, while keeping in mind that any etch stronger than the stock etch (pH 2.3) may burn the polymer. If only polymer materials have been used in drawing, an etch of 1/2 gum arabic to 1/2 stock plate etch is sufficient to desensitize the plate.

The standard etch for zinc plates is cellulose gum (Handschy Chemical Co., Indianapolis). Although acidified cellulose is also used to etch heavy lithographic drawings on zinc, it is too strong an etch for polymer. No etch stronger than straight cellulose should be used when a plate has been drawn with polymer medium. For plates drawn only with polymer, standard etches are 1/3 gum arabic to 2/3 cellulose (for medium to coarse spray) and 1/2 gum arabic to 1/2 cellulose (for fine spray). These etches will desensitize non-image areas without burning the polymer spray.

The processing of the printing element, using the appropriate etch as described above, should proceed in the following manner:

(1) The first etch is applied and buffed tightly down with cheesecloths. The printing element is then allowed to rest for approximately 20 minutes. While the element is resting, the printer may prepare for the roll up. A leather roller should be scraped and rolled out on a clean slab, with only the ink left in the roller to be used for the roll up. The printer will thus gain full control of the image during roll up and prevent filling in. Soft rags, sponges, pans of water and clean cheesecloths will also be put at hand.

(2) A second coat of gum is applied and buffed tightly down. When dry (about five minutes), the printing element is washed out with lithotine to remove any greasy materials that have been used; if only polymer was used in making the drawing, the lithotine washout may be omitted. Next, the printing element is twice washed out with a high grade commercial lacquer thinner. This will wash out any remaining grease and will partially remove the polymer. Either "C"

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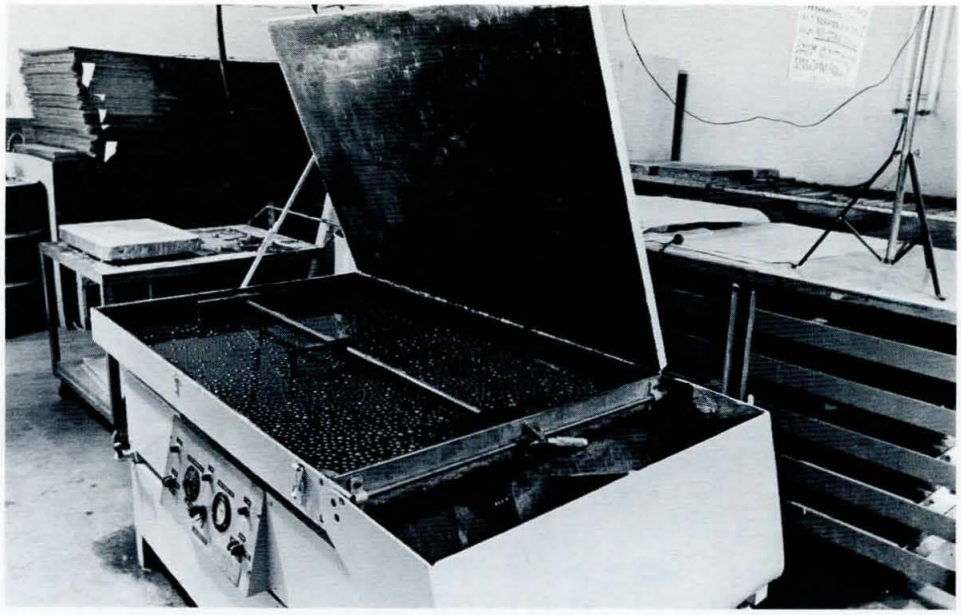

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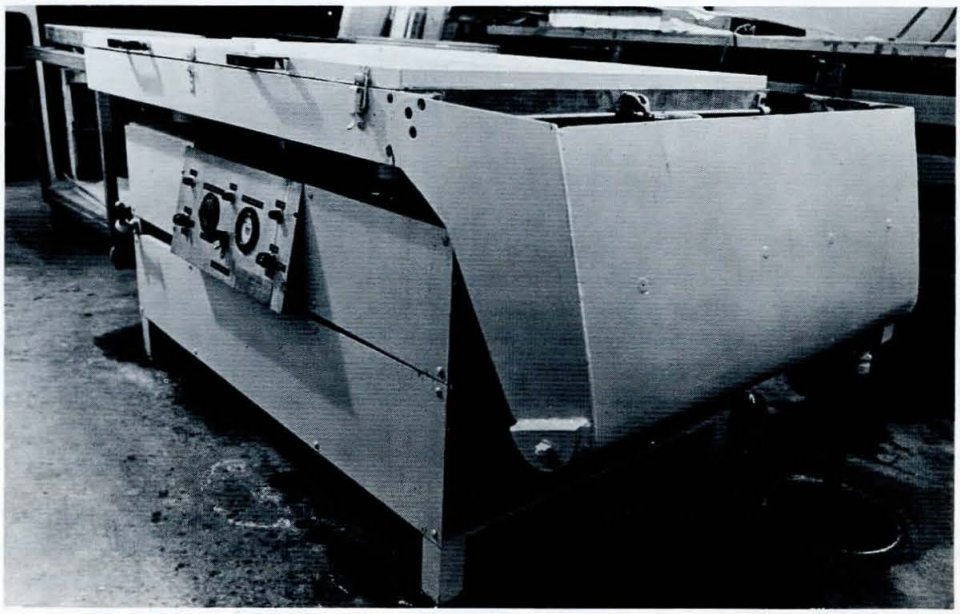

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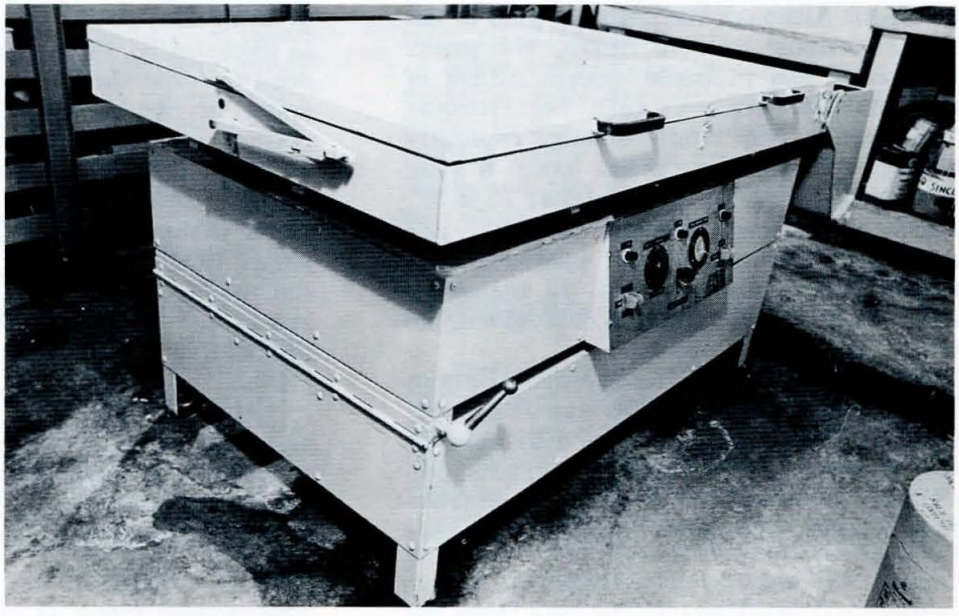

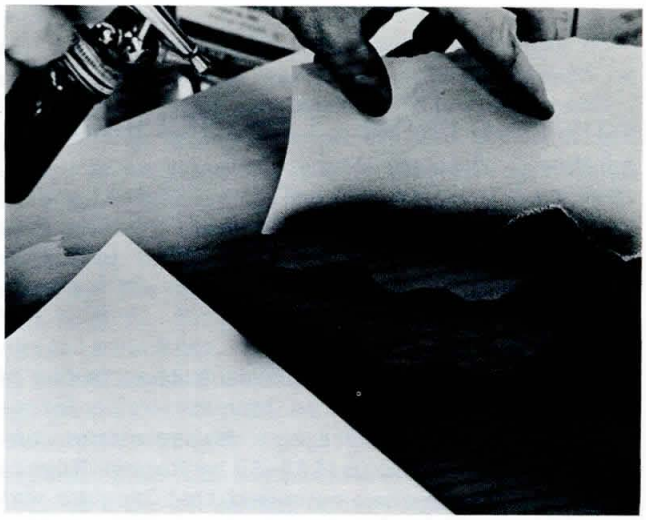

lacquer solvent or Handcolite glaze cleaner is then used for the final wash out. This solvent is applied three times, moving it quickly over the surface until no streaks are visible and the printing element appears chalky or crystalline in the image areas.[6]

(3) At this point, with the polymer removed, the printer must decide whether or not to put the printing element directly into a lacquer base. If only polymer was used in making the drawing, use of a lacquer base will ensure a good roll up.[7] If, however, lithographic washes have been used, it would be advisable not to use a lacquer base at this time, but first to stabilize the image as described below.

(4) A little lithotine is put on the stone or plate and rubbed around with a rag. The thin greasy film thus created will assist in application of an asphaltum base. After application the asphaltum is buffed down smoothly and allowed to dry for five minutes.

(5) The printing element is now ready to be washed off with water. Using a sponge, water is first applied to the non-image areas to loosen the gum film, then to any overlying asphaltum and/or vinyl lacquer. When the non-image areas are clean, the element is quickly sponged preparatory to the roll up.

(6) The image is rolled up. When it is full, the printing element is fanned dry and rosin and talc are applied (talc only in the case of metal plates). The talc is lightly buffed with a soft cloth.

(7) The printing element is now ready for its second etch. If the image rolled up quickly, a slightly stronger second etch may be used to hold back those areas which may have grown darker during the roll up. A slow roll up indicates that the first etch may already have been too strong, and that a weaker second etch should be used in order to prevent further damage to the image. A normal roll up suggests that the first etch was about right and that the second etch should be of about the same strength.

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1. Use of polymer materials for air brush drawings was suggested by previous research with those materials. See TTP No. 2, page 20, notes 3, 4 and 5.
2. Liquitex Polymer Medium, often called "gloss medium," is not interchangeable with the Matte Medium or Matte Varnish. The Polymer Medium forms a tough, resistant film; the black paint is added for visibility.
3. See TBL, page 47, for suggested techniques dependent upon such a lateral spray.
4. This is a risky procedure and should be undertaken only in large or isolated areas. Attempts to remove polymer with solvent in other areas can result in damage to adjacent drawing caused by bleeding or spreading of the solvent.
5. Tamarind uses PHydrion litmus paper (pH range 1.4 to 2.8) which can be purchased from most local chemical or offset supply houses.
6. Volatile solvents such as these should be used only in areas having adequate ventilation. They present a serious health hazard if inhaled.
7. For procedures in printing from a lacquer base, see the following article.

PRINTING FROM A LACQUER BASE
by Ben Q. Adams

The use of a lacquer printing base is one of the most useful offset techniques to be introduced into hand lithography. Experiments conducted at Tamarind in 1968-69 by Robert Rogers and Maurice Sanchez revealed that lacquer was entirely suitable for use in hand lithographic techniques on stone, aluminum and zinc plates. As a result of these experiments, lacquer was soon brought into general use in the workshop.*

Two commercially available lacquers have been used at Tamarind. One generally referred to as "blue lacquer" is a product of the Lith-Kem Corporation of Lynbrook, New York; Chicago; and Santa Ana, California. The brand name for this lacquer is Lith-Kem-Ko Deep Etch Lacquer "C". The second product, Titan Vinyl Lacquer, commonly referred to as "red lacquer," is manufactured by the REP Chemical Corporation of Milwaukee, Wisconsin. While both lacquers are applied in an identical manner, it has been found that the "blue lacquer" is preferable to the "red lacquer" in that it is more resistant to abrasion and holds up better in long runs or when stored for periods of time.

There are both advantages and disadvantages in the use of a lacquer base, and the decision to use it for a particular image is determined by a number of factors. A thorough understanding of what lacquer can and cannot do is necessary if technical problems are to be avoided.

Advantages of printing from a lacquer base

(1) A lacquer base is more resistant to chemical burning and physical abrasion than an asphaltum or ink base. A lacquered image, even if it is in color ink, can withstand a moderate stabilizing etch whereas an unlacquered image would be burned by an etch of the same strength. Because lacquer is resistant to abrasion, it is useful for light crayon work or washes when a large edition is to be printed; without use of lacquer a light drawing might drop out.

(2) Lacquer can be applied over a gum mask to produce even flats without any initial drawing or processing. Putting a flat directly into lacquer is not only economical in terms of time and materials, but also offers protection against burning the image during the roll-up. It should be noted that putting a printing element directly into lacquer without the usual etch and roll up is recommended only for flats. Any other type of image, particularly those on zinc plates, must be completely stabilized prior to lacquering.

(3) Since lacquer resists the chemical action of a counteretch, a lacquered image can be counteretched without fear of burning the light areas. After additions are made the image should be relacquered prior to rolling up the new drawing so that the entire image will have a lacquer base.

Lacquer is also useful when additions have been made to an image that is not in lacquer. Counteretched areas are weak and the drawing occasionally drops out during the roll-up or takes only partially. If the image is lacquered after additions are made, but prior to the first roll up, the lacquer will provide a tenacious base for the new drawing and the chances of the drawing dropping out will be greatly reduced. This is particularly true with light washes and crayon work.

(4) Lacquered elements can be wet washed with little danger of burning the image. This is a distinct advantage during proofing when many color changes suggest wet washing of the image.

Disadvantages of printing from a lacquer base

(1) A slight darkening of the image can result from use of lacquer, although it is hardly noticable with crayon work and light washes. It is, of course, not visible at all with solid areas. This is generally not a problem if the image is stabilized prior to lacquering. An unstable image, however, will often darken considerably, particularly if it is rendered in washes on zinc plates. Because zinc is oleophylic, or grease loving in nature, it is important that lacquering

*Use of lacquer printing bases on metal plates is briefly discussed in TBL, section 15.18, page 398.

an image on zinc be done only after the image is completely stable. It is preferable first to pull several impressions and thus stabilize the printing element before applying lacquer. If lacquering an element results in an unacceptably darkened image, removal of the lacquer will usually assist in returning the image to its original state.

(2) Because lacquer is resistant to physical and chemical abrasion, deletions can be difficult. Honing on stone is difficult because more grain must be removed in order to completely remove the lacquer base. Excessive honing of the stone can cause dry-roll and offset problems in multi-run prints. Chemical deletions are also difficult because lacquer is resistant to most chemicals. It has been found that minor deletions can be made despite these difficulties, but if major deletions are needed the lacquer base should be removed.

Putting the printing element in lacquer

(1) For all images except flats, the necessary first step is to place the image in fresh, black ink. Rosin and talc are applied (talc only in the case of metal plates) and the element is buffed down under a tight gum film. The image should be stable at this point.

(2) The press area must be prepared for the roll-up, as time is of critical importance in applying the lacquer. Water, sponges, soft rags formed into pads, and an ink slab rolled out with roll-up black should all be ready. It is a good idea to have a third sponge for the initial wash off because the lacquer will produce a residue that quickly soils the sponge.

(3) The third step in the process is to wash out the image with lithotine to remove all ink or drawing material from the stone. Lithotine is used first because it is the weaker solvent and will remove the bulk of the grease on the stone. The stone is next twice washed with a commercial grade lacquer thinner using soft rags or felt pads (Webril Wipes) to move the thinner over the printing element. Lacquer thinners such as Lith-Kem-Ko "C" Lacquer Solvent or Hancolite Glaze Cleaner (Handschy Chemical Company) will remove more of the residual grease from the printing element but are not strong enough to clean the image thoroughly. As these solvents are highly volatile and toxic they must be used in well ventilated areas. Rubber gloves should be worn as the solvents dissolve plastic gloves. It should be noted that too vigorous rubbing can abrade the gum film and cause problems in washing off the lacquer film or in interior scumming of image areas. Speed is again required in this cleaning process as the solvent rapidly evaporates. After several cleanings the printing element should be free of all residual grease and streaks. If streaks are present the printing element is not yet completely clean. A properly cleaned stone will appear frosty in the image areas and a properly cleaned plate will have a silver, crystalline look. Streaks must be eliminated as they can result in an uneven application of the lacquer base.

(4) Lacquer is applied to the dry printing element in about the same quantity as would be used in applying asphaltum. Working rapidly, the lacquer is distributed over all parts of the image in an even, horizontal pattern. Next, the lacquer is quickly buffed in a vertical direction. Immediately then, with a new rag, the lacquer is buffed using small circular movements to even out the film. Once the film is smooth it is left to dry. To go back over tacky lacquer can cause streaking. Speed is essential if lacquer is to be applied evenly. The application of the lacquer base should be completed in approximately fifteen seconds. This will vary slightly depending on the temperature and humidity. If despite care streaking occurs and the film cannot be evened out, the printing element must be washed out with lacquer solvent and the process begun again.

(5) The next step in the process is application of an asphaltum base. The lacquer is allowed to dry for one and one-half minutes before applying the asphaltum. This time lapse is necessary so that the lacquer may partially dry, thereby making it receptive to the asphaltum but resistant to streaking or removal from the printing element. The lacquer may be tested by rubbing it gently with a lithotine soaked rag in some area outside the image. If the lithotine does not dissolve the lacquer, asphaltum may be applied and buffed down. The drying time will average about fifteen minutes, depending upon the temperature and humidity. If lacquer is allowed to dry for more than fifteen minutes it will not accept asphaltum and will adhere to the underlying gum film in the non-image areas, making the wash-off very difficult.

(6) After the asphaltum is dry, the printing element can be washed off and rolled up. Using a sponge, water is applied to the non-image areas to dissolve the gum and release the overlying lacquer. The roll-up will be cleaner if the non-image areas are first cleaned of the residual lacquer and gum coat. When these areas are clean, water is applied to the entire printing element. More water is required to loosen the residual lacquer than is usually required to wash off an asphaltum base. Occasionally the lacquer will stubbornly adhere to certain areas of the printing element. This is no cause for concern. If the lacquer does not readily wash off after several passes over the stone with the sponges, proceed with the roll-up. The leather roller will pick up the excess lacquer. After the image is fully rolled up, it can be printed or stored in the same manner as an unlacquered printing element.

AN IMPROVED PLATE GRAINING MACHINE

Regrainable metal plates have an increasing importance in lithography as stones of good quality become ever more high priced, or simply unavailable. Either zinc or aluminum plates may be mechanically regrained with abrasives and water in a power driven oscillating machine containing steel marbles. The machine developed for Tamarind in the late 1960s by Patt and Co., based on earlier research by printer Robert Evermon, is described in TBL, plate 6.2 and section 6.5, pages 125 and 129-34.

The machine discussed below and illustrated on the opposite page is a substantially improved machine developed at the University of New Mexico by engineering technicians David Takach and Wayne Garfield.

Like its predecessors, the Takach/Garfield machine is comprised of an oscillating box mounted on a steel frame and anchored to the floor. The box, constructed of aluminum and lined with neoprene, has a central bar which secures the plates with spring clamps (seen in illustration 1). Circular steel bearing pads, one of which is driven by an electric motor, activate the machine. At one end of the grainer is a metal hopper with a drain (seen on the right in illustration 2). The steel balls and sludge are dumped into this hopper at the end of each graining cycle. The other end of the machine is fitted with a fold-out leveling bar. Illustration 3 shows the correct location of this leveling bar when the machine is ready for operation. The operating switch, located in the center of a side panel, is protected from accidental activation by a cover switch. The other switches, which control timing and positioning of the graining box, are safety-mounted with protective side covers and individually fused.

When graining is begun, the plate to be grained is first placed under the center bar in the box, and the ball hopper is raised. At this time the leveling bar can be removed from its normal position and the graining box lowered, so as to facilitate filling it with the steel balls. Water, tri-sodium phosphate and 220 grit aluminum oxide are used in the graining cycle (for discussion of graining cycles, see TBL, pages 129-34). Illustration 1 shows water, graining material and balls in place to begin a cycle. The length of a cycle is controlled by a timer, equipped with an alarm bell which sounds when the cycle is completed. A screw lift raises the box to a 45 degree angle, so that the steel balls may be dumped into the hopper. An end gate between the box and the hopper can be completely removed for draining and cleaning. A gauge which keeps track of total operating time greatly assists in scheduling maintenance. Experience at Tamarind indicates that such maintenance is minimal. For reasons both of noise and dirt, it is highly desirable that the graining room be isolated from the remainder of the workshop by a closed door.

The Takach/Garfield graining machine can be constructed in any well-equipped machine shop by a competent technician. Detailed construction drawings are available at a cost of $50.00 the set. Inquiries should be directed to Mr. S. Dave Takach and D. R. Garfield, 3207 Morningside Dr., N.E., Albuquerque, NM 87110.

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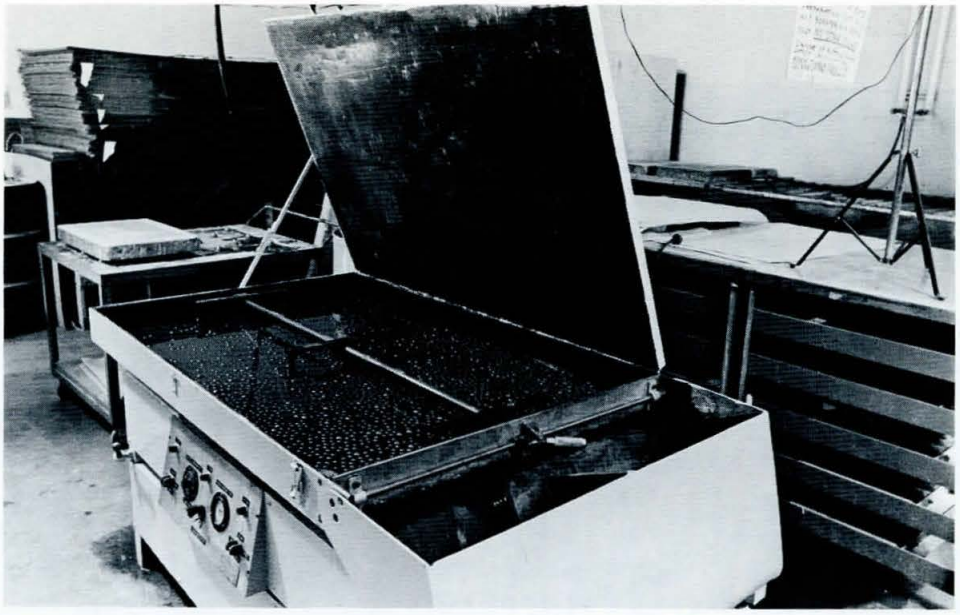

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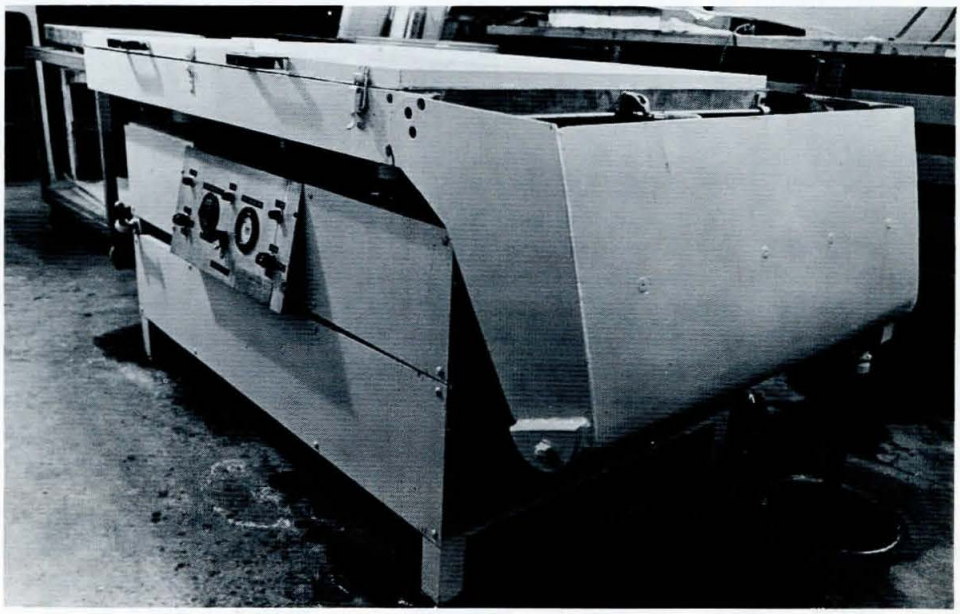

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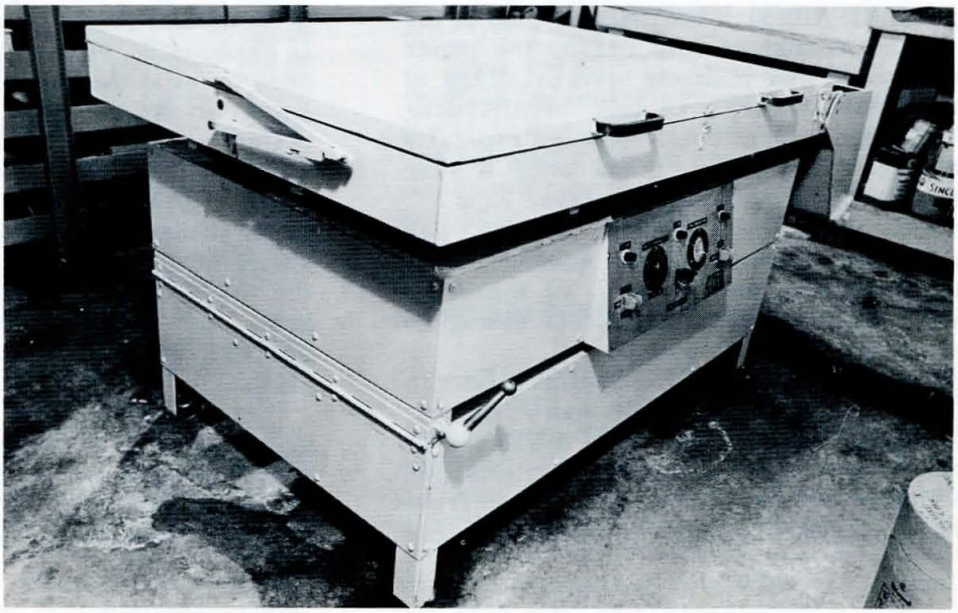


ADDITIONAL FINE PAPERS FOR PRINTING

The Tamarind Book of Lithography includes a chapter devoted entirely to paper, its manufacture, technical characteristics, and suitability for lithographic printing. Section 12.11 (pages 332-37) lists and describes in detail the qualities and specifications of the papers in use at Tamarind prior to 1970.

Six additional papers manufactured in France by Arjomari Prioux are now imported and distributed in the United States by Andrews, Nelson, Whitehead, Inc. These papers are as follows:

Arjomari papers

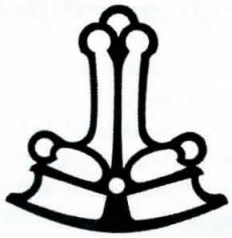
Arches Cover Black. A slightly blueish-black in hue, the color of the paper is stable and light-fast. Although the printing side of the sheet has an almost smooth finish, the paper has good tooth, and multiple overprintings of broken or tonal imagery seat well. Semi-transparent and transparent colors change radically upon drying. The paper, made once a year only, is manufactured in three sizes, 22 x 30" (250 grams per square meter; 120 lbs. per ream), 30 x 42" (260 grams per square meter; 238 lbs. per ream), and in rolls, 42 inches by 260 yards. Half-sized, trimmed four sides, no watermark, pH from 3.5 to 4.0.

Arches Cover White. Manufactured only in the 22 x 30" size at the time TBL was published, Arches Cover White is now also available at size 31-1/2 x 47-1/4 inches (300 grams per square meter; 328 lbs. per ream). Aside from its heavier weight, this paper is in all ways essentially comparable to the smaller sheets long in use. pH; 4.3. Regularly stocked in New York.

Arches White, Roll. Manufactured in rolls, 51 inches by 200 yards; weight, 320 grams per square meter, 243 lbs. per roll. Although still heavier in weight, this paper in other aspects resembles Arches Cover White. It has a similar warm color and surface. Available only on special order, it is normally trimmed at both edges but may be ordered with deckles. Half-sized, pH 4.3.

Rives BFK, Roll. This very smooth, neutral white paper has both a high finish and exceptional dimensional stability. It is very well suited to work which requires tight registration, although due to its finish heavy inking and overprinting may result in surface shine. The paper is essentially without flaws, although when one does occur at the beginning of a roll (next to the spool) it can be impressed into all the paper rolled over it. It is also highly susceptible to damage at the edges of the roll during transportation. Available only on special order, this paper is manufactured in rolls, 42 inches by 100 yards (300 grams per square meter; 69-1/2 lbs. per roll) or 42 inches by 260 yards (300 grams per square meter; 168 lbs. per roll). Unsized, trimmed both sides, no watermark, pH 6.2.

Uncalendered Rives BFK, Unsized. A luxurious paper in both appearance and feel, it has excellent tooth and absorptive qualities, allowing ink to seat well. Overprintings dry without shine. Erases well. Full inking and firm pres-



sure are necessary in printing. A middle white in color, Uncalendered Rives BFK is not dimensionally stable. The contrasting characteristics of Roll Rives (described above) and this paper suggest their use for quite different purposes. Unsized, four deckles (those along the width are slightly fuller), watermarks BFK (left bottom) and RIVES (right bottom), pH 6.7. Available only on special order.

Calendered Rives BFK, Unsized. This cool white paper has a pleasing textural surface between that of the smooth Roll Rives and the Uncalendered Rives described above. It prints tonal and wash passages with full fidelity. Flat areas of color require full inking and pressure. Although some inks may overprint well, others may dry with a shine. If pre-stretched at the press it has good dimensional stability (although not comparable to Roll Rives). Manufactured in two sizes: 22 x 30" (240 grams per square meter, 125 lbs. per ream) and 29 x 41" (280 grams per square meter; 240 lbs. per ream). Unsized, lightly calendered, four deckles, watermark BFK RIVES FRANCE (left bottom). Available only on special order.

Handmade papers from Twinrocker, Inc.

A relatively new source for fine papers is Twinrocker, Inc., a mill in Brookston, Indiana, owned and operated by Howard and Kathryn Clark. Twinrocker papers are handmade papers of character, expressiveness and quality. Made entirely from cotton and linen rags to a neutral pH, they are available on custom order in any size or shape, provided only that the sheet is not larger than 35 x 48 inches. The thickness may vary from a tissue thinness to a weight suitable for embossment; the sizing may be adjusted according to the paper's intended use; color may be specified through a wide range of cool and warm whites, creams, tans or grays. Personalized watermarks may be designed. With each custom order Twinrocker provides complete documentation of the paper and its manufacture. Like all handmade papers, individual sheets may be expected to differ slightly one from another.*

In addition to their manufacture of handmade papers, the Clarks maintain a program for the training of apprentices in the art of papermaking. Two recent grants from the National Endowment for the Arts and the Lilly Endowment will be used by the Clarks (in conjunction with the restoration laboratories of the Library of Congress) for research and development of long-lasting sizings for fine papers. The Clarks also regularly participate in lectures, seminars and demonstrations of the papermaking process at schools and universities.

For information write to Howard and Kathryn Clark, Twinrocker, Inc., Brookston, Indiana 47923.

*For a discussion of the differing characteristics of handmade and machine-made papers, see TBL, Chapter 12, particularly sections 12.3, 12.4, 12.5 and 12.10.

FOOTNOTES:
a column of comments from readers

Mel Hunter, whose 1972 article in the Book Production Industry Magazine provided the stimulus to Jim Butler's experimentation with the drawing of color separations on surfaced Mylar, has written to comment on Susan Ellis' description of Butler's working method, which appeared in TTP, Number 1.

Hunter notes that in the Butler/Ellis article there is "no discussion of contacting Mylar drawings directly to positive photoplates, thus eliminating the useless negative. In commercial printing, stepping up the same or multiple images on one large plate is usual, and the negative is mandatory for these problems. But in this one-at-a-time printing, why not simplify and go directly to a positive plate? If the Mylar is contacted face down, you also have no reversal problems. On repeating or symmetrical designs, the Mylar can be flipped to provide a mirror image or multiple image from only the one drawing."

Hunter also emphasizes the importance of graduated percentage tone charts, as discussed in his 1972 article, but not mentioned by Butler/Ellis. "The use of such a guide during every stage of the making of a color print by this method is of unestimable value," he says. "It gives one a feeling of prior knowledge of what to expect when the whole thing is completed. It enables the artist to choose inks which will combine into the tone-hues he wants without such breathtaking guesswork. And lastly, it is priceless in enabling an artist, no matter how experienced a painter, who is just getting into printmaking to visualize how the broken-up color tint areas, drawn in black, will combine to form a color in his composition. This is the stage at which many, if not most, new printmakers fail to achieve their hoped-for results.

"Considering the heavy costs, in both time and money, of attempting a color lithograph, any tool which can enable the artist better to visualize how to achieve what he wants ought to be provided and clearly explained before the first work is started.

"In better than four years of steady activity at Bank Street Atlier, with Burr Miller, and now at Circle Gallery, I have been unable to avoid hearing literally dozens of incoming artists, starting their first lithographs, go through the same conversations with the printers, master printers, and gallery directors. They cannot easily make the mental adjustment to preseparation of color, using just black tones on gray plates. The question of values comes up over and over. The explanations that are given, while accurate and clear to anyone with technical printing experience, are Greek to an easel painter. So the print is not what was visualized. Very often there is real disappointment, and a few hot arguments—all of which are unnecessary.

"With a graduated percentage tone chart, it is easy to point to a cool brown, which is labelled as X% of a certain red, X% of a certain blue, X% of a certain yellow, and X% of black. And there, alongside, is a tone block of X% of black as you would draw it. Suddenly, light dawns, because the artist can see what the unfamiliar terms in a new field really mean to his own work. The transparency and stability of the Mylar [as described in the TTP article] are important, but the chart is the perfect 'other half' of the process, and is every bit as valuable through at least the first half-dozen prints for any artist. Even after that, one can often visualize how to achieve specific effects much more successfully when using it."

Mel Hunter is Director of Atlier North Star, scheduled to open in Grafton, Vermont, in the summer of 1975.