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Intaglio printmaking in the secondary school

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There is a wealth of printed material on intaglio printmaking techniques and history, but there is relatively little printed material or work directed towards the inclusion of intaglio printmaking in the secondary school art curriculum. It is my basic assertion in this thesis that intaglio printmaking can be taught with success at the secondary level.

The thesis consists of three chapters. The first chapter is concerned with the purpose, value, and application of intaglio printmaking in a secondary school art program. The second chapter identifies the materials, the cost of materials, and the sources of supply. Chapter three deals with the organization of materials in the classroom.

Photographs of intaglio prints comprise the visual aspect of the thesis and supplement the text in some instances. I have supplemented the photographs of my own work with original prints by high school students, which should give some idea of the student's competence.

Photographs of some of the paintings and drawings that I completed during the Master of Science in Teaching program are in the appendix. This will provide a record of my work for the art department and is intended as a supplement to the thesis.

Intaglio Printmaking in the Secondary School

by

James Lester Wylder

A THESIS

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CONTENTS

I. The Purpose, Value, and Application of Intaglio Printmaking in a Secondary School Art Program.

1. Purpose: The art classroom of the secondary school has been acquainted with the relief processes of wood block and linoleum and with silk screen printing for a long time. With the exception of a few scattered instances, intaglio printing has been reserved for the college art department. It is my feeling that the intaglio process has learning possibilities for the secondary student beyond the relief and screen processes.

This thesis is concerned with adjusting classic intaglio procedures and materials to the art classroom of the secondary school. It is to be assumed that the reader is an art teacher with some experience with intaglio printmaking, perhaps one college class devoted to this subject. The major adjustment is the substitution in materials used for the plate. Tiles, linoleum, x-ray films, and other synthetic products are used in lieu of metals like copper and zinc.

My research has shown me that intaglio is offered only in the Denver, some North Dakota, and Albany, New York public schools. Intaglio printing deserves much more attention at the secondary level. This process will involve the student in an esthetic appreciation of the graphic art that he may encounter in books, advertising, art museum, and art galleries which are beginning to show

prints more often.

2. Value: The ability to draw is the foundation for almost all art activities. The sketch can be a few lines or it can be an elaborately developed study of light, shade, and form. In any case, the sketch is preliminary to work on the plate. A great deal of the teacher's time is spent teaching students to see and to draw what they see.

Sensitivity to line is augmented and extended by work in the intaglio media. One may think of a print as if it were a drawing that could be repeated. Once this idea of an exactly repeatable image is fully understood by the student, he will be more selective in how and what he wants to draw. A soft, misty, or moody subject would be rendered most effectively by 'drypoint' lines which have a soft, fuzzy quality. The action of working machinery or the intricacies of a complicated form can be rendered with clear, concise, engraved lines. The intaglio process produces an embossed line that takes on the authority of the printed page. Subtle nuances of various intaglio media must be considered. The student should ask himself, "What will be the best medium to use for interpreting my theme?" This question is a good starting point for a class discussion of materials and techniques of working. I like to give the students complete freedom to choose their theme. This will assure some personal investment by the student in the project.

The intaglio process works in slow motion. Each phase may be examined in detail. The preparation for the design furthers the student's knowledge of composition. The search for an appropriate 'syntax' of line and texture to render the design broadens the student's awareness of the variety of these elements. Engraving, gouging, and scratching the plate is a manual and intellectual exercise that will enlarge the student's knowledge of materials and techniques. Inking and printing the plate is an aspect of the intaglio procedure that will further the student's awareness of how printed material like newspapers, books, and magazines are actually produced. The resulting edition of prints is a visual record of the student's efforts and may be compared and contrasted with professional prints to further the student's appreciation of intaglio as a medium for expression in the fine arts.

The modern intaglio printmaker has a long and interesting heritage on which to base his art. William Ivins' book Prints and Visual Communication is an excellent reference to this heritage. He traces the history of printmaking in an effort to "find a pattern of significance in the story of prints."[1] He approaches the subject from a sociological point of view indicating cultural effects on

[1] William M. Ivins, Prints and Visual Communication (Boston, 1953), p. 8.

prints, their shifting significance during various periods of history, and the mechanical evolution of technique. This book is fundamental for the understanding of the history behind modern printmaking in all media.

3. Application: The secret of teaching intaglio seems to consist of a minimum of explanation on the part of the teacher and a maximum of experimentation and discovery on the part of the student. Students often discover ways of working that the teacher has completely overlooked.

Four students from Cleveland High School, Portland, Oregon were selected to participate in a workshop on intaglio. The aims of the workshop were:

A. to prepare these students for filming a video tape on intaglio scheduled for the following week

B. to clarify teaching methods in presenting intaglio on the secondary level

C. to note the time that the students required to complete an intaglio print

One hour each afternoon for five days was devoted to this project.

Three girls and one boy were selected. The girls were chosen because they might have more difficulty with the technical aspects of intaglio and therefore help clarify information that would be needed to present the process to a class. One girl worked with an x-ray plate, one with a linoleum block, and one with a collagraph plate. The boy

produced a wood engraving and a drypoint from an x-ray plate.

Twenty minutes of the first day was devoted to explaining the intaglio process to the students. In the last forty minutes the students were encouraged to experiment with the tools and materials and to ask questions. The rest of the week was devoted to working with the students individually. Each student drew several designs and selected the design that was most suited for the medium that he had chosen.

It is essential in intaglio that the plate is textured in some manner so that the plate will hold the ink. The students were not adept at building up passages of dark tones with lines; they wanted to gouge out the entire area of the plate that would be dark. However, there was never a question about which area of the plate printed nor that the print would be the reverse of the plate. Each student developed his own working methods with the tools and competed to create unique textures and unusual effects. The materials were pushed considerably beyond their expected limits.

The x-ray film and linoleum plate that the students had experimented with on the first day were printed the second day with a Craftool press. The resulting prints were very useful examples of the possibilities of the media. Each student was able to see how his scribble had printed. These prints were passed around for examination

and mounted on a bulletin board for reference. The wiping of the plate and the printing procedure were also demonstrated during this second session.

By the end of the week each student had produced a plate and one print. The format of the video tape was discussed and the students reviewed their parts.

During the forty-minute taping session each student demonstrated the use of the tools and showed examples of his prints. I introduced the film with a brief discussion of the process and led a seminar at the end. An attempt was made to draw out reactions to the process and to the images they had produced. Typical student comments in this regard follow:

> "I wasn't concerned with design. I wanted to use the tools and find out what they would do. The x-ray film responds to tools immediately and I would like to try something that takes longer. I think that you control the image by the material you use."
>
> "The quietness I wanted to express is not there. The print is too dark and heavy. Plywood absorbs a lot of ink and I think that next time I would stay with linoleum."
>
> "I used netting, string, tape, cardboard, and glue on the collagraph. This gives a dark, rich texture to the print that I like. I also liked the embossed print that we did without inking the plate."
>
> "Next time I will make more drawings before I start on the plate. The wood engraving did not turn out because the lines were too close together. There is no significance for me in other people's art. I understand my own art; I like it but I don't know why. I notice texture and I like the embossed print but it doesn't mean anything to me

unless I do it myself."

> "I enjoy working with other media like clay but I don't have any facilities and there is not enough time at school. I think that design carries through from one medium to another and it almost dictates what you present--mood, form."

The most frequently mentioned criticism was that more drawings should have been done before working on the plate. The students agreed, however, that it was difficult to do a good job with intaglio the first time and expressed a willingness to investigate intaglio further. They liked the idea of printing from lines below the surface of the plate. This was their first experience with intaglio media of any kind.

In summary, it is proposed that intaglio can be adjusted to meet the needs of the art classroom of the secondary school and that intaglio is a significant aspect of a total art curriculum.

II. The Materials Used in the Intaglio Process, Their Cost and the Sources of Supply.

There are three categories of materials that the high school teacher should be concerned about: 1. the materials that never need replacing and require only periodic maintenance, 2. the materials that need to be checked or replaced every few months, 3. the materials that are used up during the school year and must be restocked. I have provided a list of these materials with the quantity that should be ordered to supply a class of thirty students, drawings of important tools and equipment, and a list of supply houses.

A. Materials that become permanent investments of the art department

1. The Intaglio Press

One of the major considerations of the secondary school is that of price. The Sturges model Graphic Chemical presses, the Brand etching presses, the Rembrandt etching presses, and the Craftool etching presses meet the requirements of the professional printmaker. Craftool, Inc. has produced a press (art press no. 4112) for $149.50 that is popular in the secondary schools. It has been on the market for a number of years and has proven to be an adequate and versatile piece of equipment. The high price of a professional press is prohibitive

for most school budgets. Therefore, the Craftool model (no. 4112) is recommended. For more detailed information on intaglio presses, refer to Hayter's comments in his book, New Ways of Gravure and About Prints.

The printing press will be the largest single investment and ranges in price from the $149.50 Craftool model to several thousand dollars for a huge electric powered precision press. It is often possible to cut the price of the press considerably if an old washing machine wringer or a steel mangel can be found in a local thrift shop.[2]

2. Sharpening Stone

The best stone is the 'Behr-Manning' hard Arkansas grooved stone, sold by Frank Mittermeier, Inc. for $9.35. The stone has four grooves that are machined to 1mm, 2mm, 4mm, and 8mm on one side, and it is flat on the other side. This stone is ideal for honing gouges and gravers. The cost is not prohibitive (about $2.00 more than the cost of a stone flat on both sides) because this stone saves the student and the teacher time and gives the best possible cutting edge to the tools. Montana Assay does not advertise the grooved stone but their prices on other stones are $.20 to $.30 less than Mittermeier.

[2]See Ernest S. Lumsden, The Art of Etching (London, 1925) p. 19.

Pike oil is used on the stone while the tools are being sharpened. It is $1.00 per pint and will last for the school year since only a small amount is used each time.

3. Gravers

Gravers are used for engraving. There are five basic styles of gravers shown on page 27. Two of each kind should be purchased by the art department. This means that ten students can engrave while the others are using the drypoint or etching tools. By rotating the three processes, thirty students will have a chance to become familiar with each. The Montana Assay Office, Frank Mittermeier, Inc., and the Graphic Chemical and Ink Co. are major suppliers of these tools. The tools are offered individually and in sets. It is less expensive when the gravers are bought individually and mounted into 'half-head, short' handles. The handles are $1.75 per dozen and the metal shafts are $.60 each (Montana Assay price). Graphic Chemical and Ink Co. sells gravers with a bent shaft as shown on page 27. A tool with a bent shaft is preferred for ease of handling.

4. Scraper

The scraper is used to scrape the burr from the engraved plate and to resurface areas of the plate when corrections are needed. It has three faces that come to a point. The edges should be kept very sharp. Each table

of students should have access to a scraper. Montana Assay's price is $1.20 each. Graphic Chemical and Ink Co.'s price is $1.85 each. There is no apparent difference in quality or style between Montana Assay's and Graphic Chemical and Ink's scraper.

5. Burnisher

Montana Assay lists a burnisher (no. 15-011½) with a curved blade for $1.15. The burnisher was originally a jeweler's and goldsmith's tool as were the burin, scraper, and drypoint stylus. For intaglio printing, burnishers are used to finish polishing the edges of plates and for pressing down and polishing areas in the plate's surface.

6. Drypoint Stylus

Ten drypoint tools should be purchased by the art department. Montana Assay's 'Wallerscriber' (no. 21-457) with a solid carbide tip is $1.25 and will hold up well under constant use. The steel styluses listed are $.10 to $.15 cheaper but will not wear as well.

7. Wood and Linoleum Block Cutting Tools

Frank Mittermeier, Inc. advertises a large variety of these tools, ranging in price from $1.20 to several dollars per tool. These tools are delicate and the cutting surface is easily injured. Several Japanese companies have marketed a set of six to ten tools that range in price from $.59 to $1.00 per set. The Japanese sets are

preferred at the secondary level because they are sturdily constructed and because they are inexpensive. Most art departments will already have a set of the Japanese tools, the familiar Speedball tools, or the more expensive Miller Falls tools.

X-acto knives or pen knives are commonly stocked also and are needed for wood and linoleum blocks. They cost $.60 each.

8. Files

Three flat metal files are needed for beveling the metal plates. The fine, medium, and coarse grades should be purchased in 6" or 8" lengths. The cost per file ranges from $1.15 to $2.25. Montana Assay supplies these files and their median price is $1.40 per file.

9. Dauber

The dauber is used to spread the ink on the printing plate. Graphic Chemical and Ink Co. advertises a rolled felt or leather dauber for $2.90. This price seems unreasonable since a dauber can be made in less than five minutes by rolling an old leather belt, cutting a 2" by 3" piece of cardboard, or rolling a piece of felt from a worn blanket. If felt or leather is used, the dauber should be 4" long and 1" to 1 1/2" wide. The dauber is used for inking engraved and etched plates because it will force the ink into the engraved lines.

10. Brayer

A rubber brayer, four inches long, is sometimes preferred for 'rolling up' the plate. A brayer is used to ink the drypoint plates because a dauber will injure the 'drypoint burr'.

11. Glass Plate

A thick piece of glass at least 12" square should be purchased and gently ground with 220 carborundum. The sand-like carborundum textures the glass plate. The ink will not slide or run on this textured surface.

12. Hotplate

Expensive hotplates are offered in the supply catalogues for professional printmakers. Students, however, get along very well with the cheapest hotplate available. If there is a gas burner in the art room, a metal plate (with steel legs) can be positioned half an inch above the burner like a griddle. The hotplate is used to warm metal printing plates while inking and before printing. The hotplate will probably never be used above the 'low' setting.

13. Damp Box

A wooden box 12" deep, 20" wide, and 25" long should be made to hold the blotters. The box must either be lined with plastic or heavily varnished to protect it from the damp paper and blotters.

14. Sawdust Box

A box, 8" deep and 18" square or larger, should be made to hold sawdust. The sawdust is soaked with kerosene and is used for cleaning hands.

B. The materials that need to be replaced periodically

1. Felt Blankets

The felt blankets take a lot of abuse and are used by every student each time he prints. The press flattens the blankets and they begin to lose the spongy quality that is necessary to force the paper into the printing plate. The Continental Felt Co. is the major supplier of felt and they list five grades by width, weight, and thickness. Three felts are needed for classroom use. The width and length of the felts is determined by the size of the plate and also by the size of the press bed. Student work is generally smaller than 21" x 27".

The bottom blanket is called the sizing catcher and is 1/16" thick (style no. 6028). The middle blanket is called the cushion and is 1/8" thick (style no. 6054). The third blanket, called the pusher, can be 1/4" (style no. 1547) or 1/8" thick.

Continental Felt's basic price is $5.00 per pound and the blankets can be cut to the desired size for a slight extra charge or it can be easily done by the purchaser. The 1/8" blanket (no. 6054) cut to 21" x 27" would cost

less than $6.00. The cost of all three blankets this size will be around $20.00. Shipment can be made from Continental Felt in approximately one week.

Graphic Chemical and Ink Co. lists blankets at slightly higher prices and they are less specific about the weights and textures.

The blankets should be 100% wool and they must be treated with the utmost care. "Blankets should be washed in soap and warm water at the slightest tendency to harden. Blanket rigidity, caused by absorption of the size in printing paper, is often the cause for poor printing."[3]

2. Blotters

Twenty-four blotters (one quire) should be purchased from Graphic Chemical for $2.50. They are 19" x 24" and will be stacked and weighted with a flat, heavy plate in the 'damp box'. They should be neat, clean, and always ready to receive the wet etching paper between their pages. The blotters will last for a long time if they are carefully handled with a clean cardboard clamp.

3. Tarlatans

Tarlatans are starched cheesecloth and are used to wipe the plate. They are available from Graphic Chemical at $.35 per yard with a 36" width. Mr. Joseph Sernberg,

[3] Jules Heller, Printmaking Today (New York, 1958), p. 136.

Newark Dressmaker Supply Co., sells tarlatan at $.35 per yard in a 54" width but only in 240 or 120 yard lots. It would be more expensive to buy from Sernberg. However, 120 yards will last for a long time and the 54" width is preferable. Fifteen yards of the 36" width should supply a classroom for one year or longer.

C. The materials that are consumed in the intaglio process

1. Ink

Intaglio printing ink is a mixture of burnt plate oil and pigment. The mixtures of pigment and oil vary according to the size of the pigment particle.

Etching ink is the most suitable ink for intaglio and can be obtained from nationally known art supply firms. It is a stiff, oil base, black ink that dries slowly (about three days after printed) to allow the artist plenty of time to work with it on the plate. Etching vine black ink (no. 1014) is sold by Graphic Chemical and Ink Co. in a pound can for $3.00. This ink can be used with success on all plates that cannot be heated. It can be mixed with a small amount of plate oil to make wiping the plate easier.

There are a number of other black inks available at a lesser price, but the vine black seems to be the most popular and has the most consistent quality. Colored and black inks can be purchased as dry pigments and mixed. This will reduce the cost considerably. Refer to Jules Heller's

Printmaking Today, David Strang's The Printing of Etchings and Engravings, and E. S. Lumsden's The Art of Etching for ingredients and methods of mixing intaglio ink.

2. Printing Paper

Newsprint or inexpensive drawing paper can be used to 'proof' the plate at various stages of development. A quality etching paper should be used for the final edition of prints.

The paper must be strong enough to mold to the plate without tearing when it is damp. The paper is usually graded by the manufacturer by weight, tensile strength, sizing, opacity, printability, and other factors.[4] There are many kinds of papers that are suitable for intaglio printing from very thin rice paper to heavy watercolor paper. Some art stores carry paper especially designed for intaglio printing. The main criteria is 'wet strength'; that is, the paper must be strong enough to mold to the plate without tearing when it is damp.

Andrews, Nelson, and Whitehead have several papers that are suitable for intaglio printing. The Copperplate paper, 30" x 42 1/2" size, is $60.00 per hundred for any quantity between 100 and 249 sheets. The Domestic etching paper, 26" x 40" size, is $28.00 per hundred for any quantity between 100 and 249 sheets. The Rives paper,

[4] See Zellerbach Paper Company's booklet, The Testing of Printing Paper.

white and buff light 19" x 26" size, is $20.00 per hundred for any quantity between 100 and 249 sheets.

In order to estimate correctly the amount of paper that a class of thirty students will need, the following points should be kept in mind:

a. The paper is cut 2 inches larger than the plate

b. There will probably be less than three print editions completed during the semester by each student

c. There will be mistakes and corrections that will require additional paper

Inexpensive rice paper, which is six to eight dollars for 500 sheets, can be backed with a piece of construction paper to help hold that paper together. The rice paper provides the quality surface and the construction paper provides the strength.

3. Printing Plates

a. Copper

Red copper for engraving and etching is available from Graphic Chemical and Ink Co. for $.06 per square inch. National Steel and Copper Co. has a 16 gauge, 24" x 36", copper sheet that sells for $30.00 per sheet. Other suppliers are the Harold Pitman Co. and Rembrandt Graphic Arts Co. Copper should be bought in as large a sheet as possible and cut to size with a hacksaw or saber saw for classroom use. The cost of copper is almost prohibitive and should be reserved for advanced students, unless the

students buy it themselves. It must be kept in mind that the price of copper is fluctuating very rapidly at this time.

b. Zinc

Zinc is available from Graphic Chemical and Ink Co. for $.03 per square inch and from Copper and Brass Sales, Inc. Zinc is easily worked and is more suitable for secondary school use than copper.

c. Aluminum

Rembrandt Graphic Arts sells uncoated aluminum plates in 6x8, 8x10, and 9x12 inch sizes for $.55, $.65, and $1.90 respectively. They also sell an etching powder for aluminum (no. 3015) that is dissolved in water and harmless to the skin. These plates are light, easy to work, and suitable for engraving, drypoint, and etching.

d. Plastic

Rembrandt Graphic Arts sells a set of twelve 20 gauge plastic plates in several sizes. The 9x12 inch plates are $4.00. These plates could be cut in halves or quarters to serve an entire class.

e. Linoleum

Squares and scrap pieces of linoleum can be obtained from local floor covering firms. These firms will often give the scraps away if they know that it is intended for school use. There are so many kinds of linoleum that it is impossible to describe all the printing characteristics.

Because it is such a familiar item, it is easily introduced into the classroom and the students feel at ease working with it.

f. Plywood

Finished plywood is available in 4' x 8' sheets for about $3.85 from a local lumber company. The 1/4" thick plywood is best. It can be carved with the wood cutting tools or the pen knife and will show its grain on the print. One board will supply an entire class.

g. Masonite

Tempered masonite is also available in 4' x 8' sheets from lumber companies for about the same price as plywood. Burins, penknives, and woodcutters can also be used. Masonite is one of the most versatile of all printing surfaces.

h. X-ray Films

These films are free from any x-ray department or hospital. They are suitable for drypoint; they print well; and they are easily stored.

i. Experimental Plates

I am sure that there are many other materials that would make a suitable printing plate. The 'collagraph' method, developed by Glen Alps at the University of Washington, Seattle, Washington, of gluing bits of textural materials, papers, sandpaper, and sand onto a masonite plate is worth trying. White glue should be used. The plate can

be wiped and printed like any other plate. Care should be taken that the materials are not in high relief. If the plate were too thick, it might injure the blankets or the press.

4. Cleaning Solvents

a. Kerosene

Kerosene, commonly known as stove oil, is the most widely used solvent and can be purchased from a gas station for about $.35 per gallon. The students can use kerosene on their hands without harm. It is also less flammable than gasoline.

b. Alcohol

Denatured alcohol is used to clean the plates before grounding them for etching and before inking because it will not leave a residue or greasy film on the plate. Denatured alcohol is $.75 per pint.

c. Turpentine

Turpentine is used like kerosene but it is more flammable and more expensive. Turpentine is $2.00 per gallon.

d. Hand Cream

Hand cream is used before handling ink to make cleanup easier, especially for the girls.

e. Hand Cleaner

There are many commercial hand cleaners available for printers and auto mechanics. They can be found in auto supply stores in one pound cans for about $1.20. Graphic

Chemical and Ink Co. has 'Perfection Hand Cleaner' for $.60 per pint.

f. Asphaltum Thinner

Turpentine may be used to thin asphaltum ground if it begins to thicken in its container.

5. Sandpaper

Most art departments have several grades of sandpaper on hand. It is useful for beveling the softer plates like linoleum and plywood. I have also used sandpaper to roughen the surface of plates to create a tonal effect.

6. Emery Paper

Buy the finest grade emery paper (no. 0000) available to polish and remove scratches from plates and tools. About ten sheets of emery paper at $.20 per sheet from Graphic Chemical and Ink Co. should be cut into small squares for student use. The paper does not wear out as easily as sandpaper.

7. Buffing Compound

Red, standard jeweler's rouge (no. 52=450) comes in 1/8 pound sticks at $.25 per stick from Montana Assay. Three sticks should be purchased. This can be used as a final polish for the plate before printing. The rouge should be applied in a circular motion with a pad of felt, a rolled felt dauber, or a cotton towel. There are many powders and rouges available. E. S. Lumsden's The Art of Etching has a brief passage devoted to this subject.

8. Whiting

Whiting is a powder that is used to remove oil from the hands. It enables the printer to hand-wipe a plate with the palm or finger without 'drag' or smudging. The printer should wipe his hands on a rag to remove completely excess whiting before handling the plate. Graphic Chemical and Ink Co. sells whiting for $.40 per pound. Some paint and hardware stores sell whiting for as low as $.15 per pound, or $.05 per pound in a bulk rate.

9. Burnt Plate Oil

This oil is used as an additive to the intaglio ink. One should mix a small amount of plate oil with heavy ink, especially when the plate must be wiped cold. The heavy grade plate oil (no. 3) is the most suitable and is available from Graphic Chemical and Ink Co. for $2.00 per quart.

Many materials have been excluded from this chapter. However, I believe that the present list will be adequate in most instances. My research has shown that each book on intaglio reflects the author's bias for materials and techniques. Lumsden mentions almost all materials and techniques and gives his opinion of each. His book The Art of Etching is the recommended supplement for this chapter. Brunner's A Handbook of Graphic Reproduction, Heller's Printmaking Today, and Strang's The Printing of Etchings and Engravings are also good reference books.

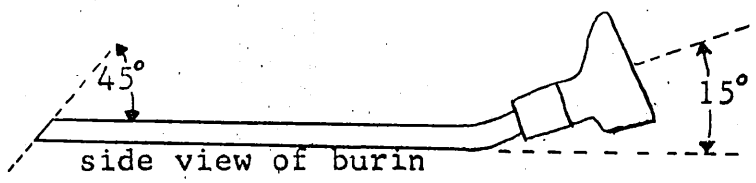
The various supply companies respond to requests for catalogues within three weeks. For a prompt response, write a form letter on school letterhead paper. The amount of time required for delivery of an order varies for each company. A request for this delivery information should be included in the letter for a catalogue.

Current price changes must be compared, especially when ordering metal plates. A price change list is included with catalogues that have been published more than one year back. The price changes should be written into the catalogue for easy reference.

The Cost of Materials

PERMANENT MATERIALS	COST	No.	TOTAL COST
1. Press - Craftool	149.50	1	149.50
2. Sharpening Stone	9.35	1	9.35
3. Burins	.60	10	6.00
4. Burin handles - per doz.	1.75	1	1.75
5. Scraper	1.20	4	4.80
6. Burnisher	1.15	2	3.30
7. Drypoint Stylus	1.25	10	12.50
8. Wood and Lino cutters	1.00	5 sets	5.00
9. Pen knife	.60	5	3.00
10. Files	1.40	3	4.20
11. Dauber - home made			
12. Brayer - home made			
13. Glass plate	2.00	1	2.00
14. Hot plate	10.00	1	10.00
15. Damp box - home made			
16. Sawdust box - home made			
MATERIALS REPLACED			
1. Felt blankets - per pound	5.00		20.00
2. Blotters	2.50	quire	2.50
3. Tarlatans	.35	15	5.25
MATERIALS CONSUMED			
1. Ink			
A. Vine black	3.00	2	6.00
B. Dry pigment - vine	.65	5 lb.	3.25
2. Printing paper			
A. Domestic etching	28.00	100	28.00
B. Rives	20.00	100	20.00
C. Copperplate	60.00	100	60.00
D. Rice paper	6.00	500	6.00
3. Printing plates			
A. Copper - 24 x 36 in.	22.32	1	22.32
B. Zinc - per sq. in.	.03		
C. Aluminum 6 x 8 in.	.55	10	5.50
D. Plastic 9 x 12 in. - set of 20 plates	4.00	1	4.00
E. Linoleum - free			
F. Plywood - 4 x 8 ft.	3.85	1	3.85
G. Masonite - 4 x 8 ft.	4.00	1	4.00
H. X-ray film - free			
I. Experimental			
4. Cleaning Solvents			
A. Kerosene - gal.	.35	3	1.05
B. Alcohol - qt.	.75	1	.75
C. Turpentine - qt.	.75	1	.75

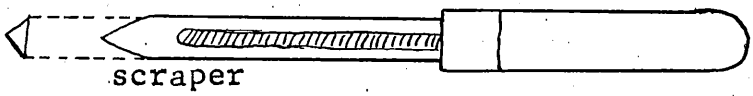
materials continued	COST	No.	TOTAL COST
D. Hand Cream - price varies			
E. Hand cleaner - pt.	.60	2	1.20
5. Sandpaper - sheet	.20	10	2.00
6. Emery paper - sheet	.20	10	2.00
7. Buffing Compound - stick	1.25	3	.75
8. Whiting powder - pound	.40	1	.40
9. Burnt plate oil -qt.	2.00	2	4.00



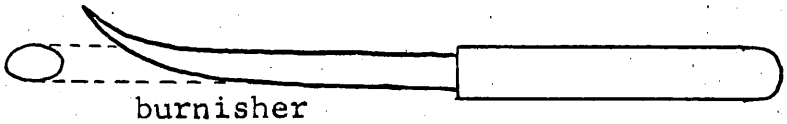
side view of burin

square scoop diamond knife oval

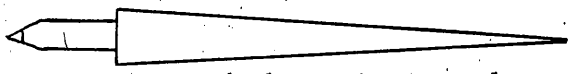
end section of burins



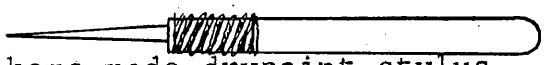
scraper



burnisher



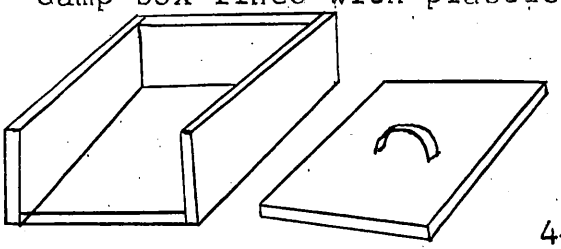
tipped drypoint stylus



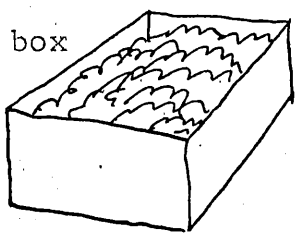
home made drypoint stylus

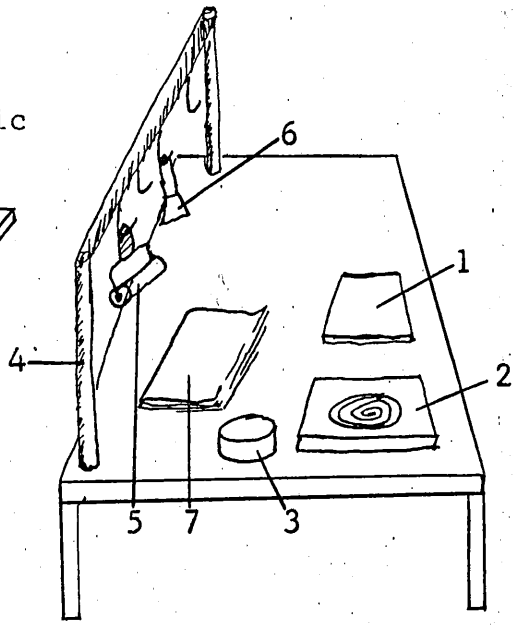
WIPING TABLE
1. plate of glass
2. hotplate
3. ink can
4. utinsel rack
5. brayer
6. spatula
7. newspapers

damp box lined with plastic



sawdust box





Supply company	Product
Andrews, Nelson and Whitehead 7 Laight Street New York, N. Y. 10013	paper
California Ink Co. 501 15th Street San Francisco, California	ink
Charles Brand Machinery Inc. 84 East 10th Street New York, N. Y. 10003	presses
Continental Felt Company 22-26 West 15th Street New York, N.Y. 10011	felt blankets
Copper and Brass Sales, Inc. 6555 E. Division Detroit 12, Michigan	plates
Craftools, Inc. 396 Broadway New York, N.Y. 10003	press, tools
Diamond Pointed Tool Co. Atlantic Highlands New Jersey	drypoint styluses $5.00 each
Edward Dickerson 2034 N. Mohawk Street Chicago, Illinois	press
Edward C. Muller 61-3 Frankfort Street New York 38, N.Y.	engraving tools general
Frank Mittermeier, Inc. 3577 East Tremont Ave. Bronx 65, N.Y.	tools
Graphic Chemical and Ink Co. P.O. Box No. 27 728 North Yale Avenue Villa Park, Illinois	general
M. Grumbacher 460 East 34th Street New York, N.Y.	general

Langeneckert, Inc. 705 Pine Street St. Louis, Missouri 63101	press pg. 190 general
Leber Ink Co. Box 606 Tukwila, Washington 98067	ink, esp. collagraph
Montana Assay Office 610 S.W. 2nd Avenue Portland, Oregon 97204	tools, sheet metal, general
National Steel and Copper Co. 700 South Clinton Avenue Chicago, Illinois	copper sheet
Mr. Joseph Sternberg Newark Dressmaker Supply Co. 140 Halsey Street Newark 2, New Jersey	tarlatans
Harold M. Pitman Company 230 West 41st Street New York, N.Y.	plates, ink
Rembrandt Graphic Arts Co., Inc. Stockton, New Jersey 08559	general
F. Weber Company 1220 Buttonwood Street Philadelphia, Pennsylvania	tools, grounds
Zellerbach Paper Co. 245 South Spruce Street South San Francisco, Calif.	paper

III. The Organization of Materials in the Classroom

Storage is always a problem in the secondary school art class. Fortunately, the materials for intaglio printing, with the exception of the press, are small and light weight. They can be easily stored on shelves or in drawers like other art supplies. The tarlatans and ink cans are the only dirty items after cleanup and should be kept in plastic sacks in a separate drawer. The tarlatans can be folded over wire clothes lines above the printing area.

The materials used for working on the plate and those used in printing are kept in different areas. I prefer to do all of my work on the plate in a room separate from the printing room, but this is neither economical nor convenient for an entire class. Each table of four to six students should have a box with the various tools for working on the plate in the center of their table. In this way the tools are accessible to all students at the table and are easily checked at the end of each period. Sharp pointed tools, such as burins and drypoint needles, can be stuck into a piece of cork or into a one-inch thick board with holes drilled 3/4" through.

It is important that each group of students be held accountable for its tools and that the tools are kept clean and orderly for use in the next class. The students will respect this method of organization and find that it is conducive to their work and work habits.

The printing area is by nature a dirty area and requires greater organization. In most cases a table model press is used. It is mounted on a heavy wooden bench with drawers or shelves below. When the press is not in use it should be covered with a plastic cloth, such as an old tablecloth. Ink, cleaning solvents, dauber, spatulas, and the plate of glass should be kept in the same area as the press. The best place would be in drawers beneath the press if they are provided.

The wiping table serves several purposes and is located in the printing area. It should have a supply of old newspapers at one end that can be put under the plate while wiping. The table must be large enough to accommodate the plate of glass, newspapers, hotplate, kitchen rack, and an area to wipe the plate. Inking brayers and spatulas are hung on the rack during wiping.[5]

Items like the sandpaper, sharpening stone, and printing paper are distributed by the teacher as the need arises for their use. At the beginning of each new project the students will also receive their printing plates in a similar manner. The idea of order and consistent placement of materials cannot be stressed too much. Efficient cleanup and work habits should be built into the organization of the classroom.

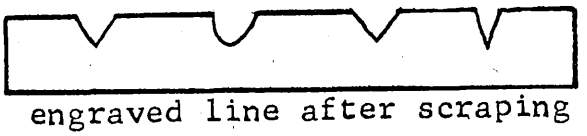
[5] See page 27 for details of the inking table and refer to Lumsden for total room layout.

Four people should be assigned to take care of the materials that are used by the entire class. The press is dusted and covered with a plastic tablecloth. The felt blankets are taken off the press and placed singly on a rack or hung on a clothesline to air dry. The press bed is centered and the pressure lever for the top roller is released. The cans of ink and the spatulas are wiped clean and put away. The inking brayers are cleaned by scraping the excess ink off with a piece of stiff rubber or cardboard and then rolling the brayers on a newspaper that is soaked with kerosene. The brayers are hung on the rack over the wiping table. The blotters in the dampening box should be neat and flat. The inking slab, which is in this case a plate of glass, is wiped clean with kerosene and a rag. The hand cleaners and creams are put in a drawer. Finally, the sinks must be cleaned.

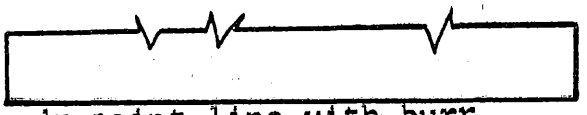
This should take four high school students less than ten minutes to complete. A mimeographed cleanup sheet with the duties for four people can be posted each Monday morning for quick reference during the week.

The steps of the printing procedure in chronological order are as follows:

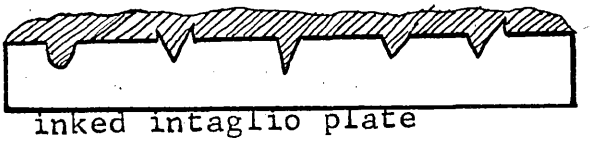
1. Wet several papers and place between blotters
2. Extend the bed of the press to one end
3. Arrange the blankets in order as shown on page 34
4. Place a clean sheet of newsprint on the bed of the press just in front of the roller
5. Ink and wipe the plate (warm metal plates before inking)
6. Place the plate on the bed (newsprint under the plate)
7. Center the blotted paper on the plate
8. Smooth blankets over the plate
9. Turn handle of press until the bed completely travels through the press
10. Lift the print by one corner and pull from plate
11. Stretch the print with paper tape



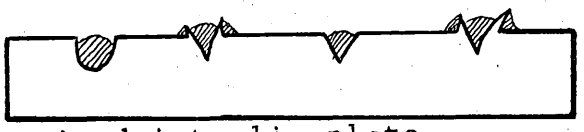
engraved line after scraping



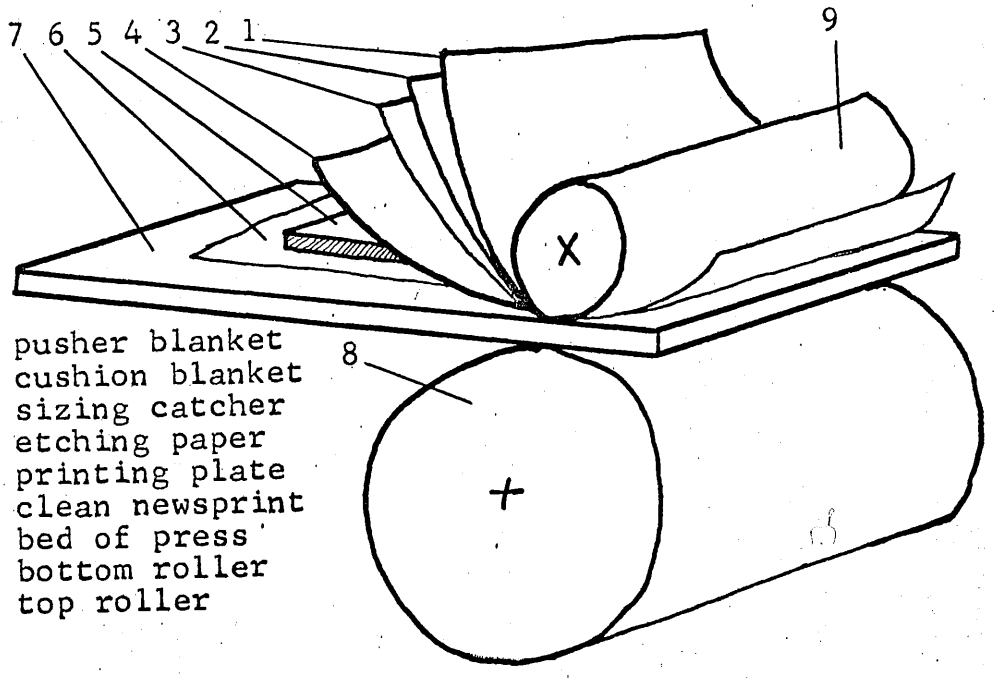
drypoint line with burr



inked intaglio plate



wiped intaglio plate



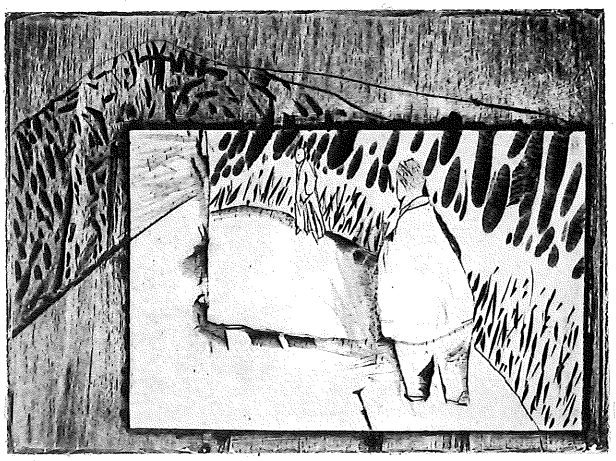
1. pusher blanket
2. cushion blanket
3. sizing catcher
4. etching paper
5. printing plate
6. clean newsprint
7. bed of press
8. bottom roller
9. top roller

PHOTOGRAPHS OF THESIS PRINTS

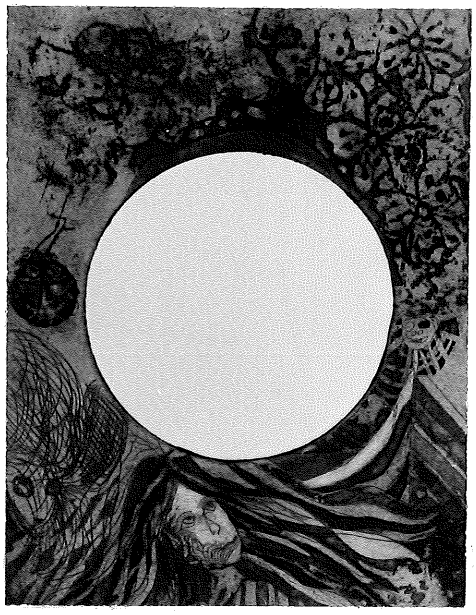
1. Title: "Worldly Mother"
   Plate: copper
   Tools: drypoint
   Size : 6 x 8 in.

2.

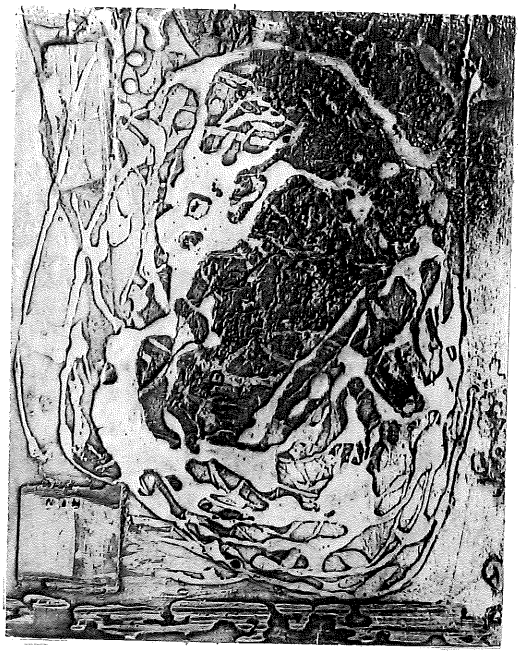
Title: untitled
Plate: x-ray film
Tools: sandpaper, drypoint
Size : 8 x 10 in.



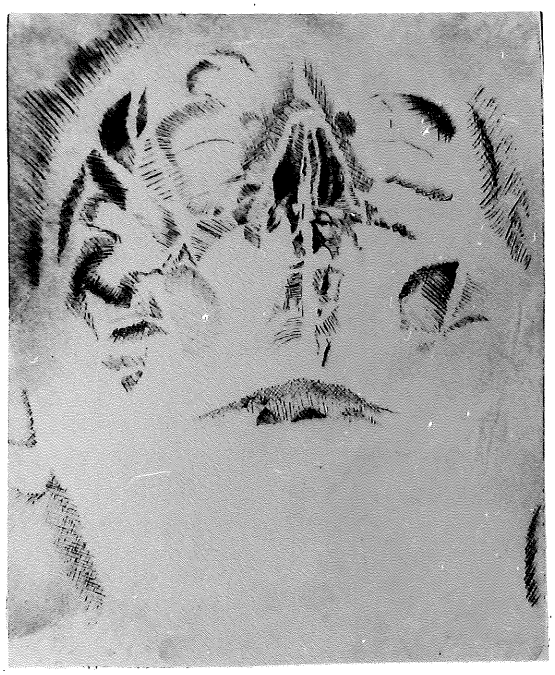
3. Title: "Gloomy Sunday"
Plate: plywood with linoleum
Tools: woodcut gouges
Size : 5 3/4 x 7 3/4 in.



4.
Title: "The Oblong Blur"
Plate: copper
Tools: etching, drypoint
Size : 5 1/2 x 7 in.

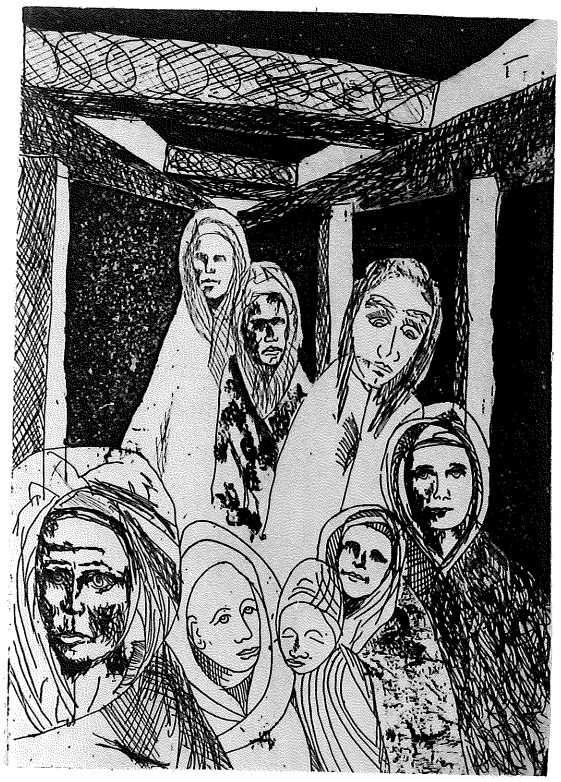


5.
Title: "Travail"
Plate: masonite
Tools: glue, pencil shavings
Size : 7 1/2 x 9 1/2 in.



6.

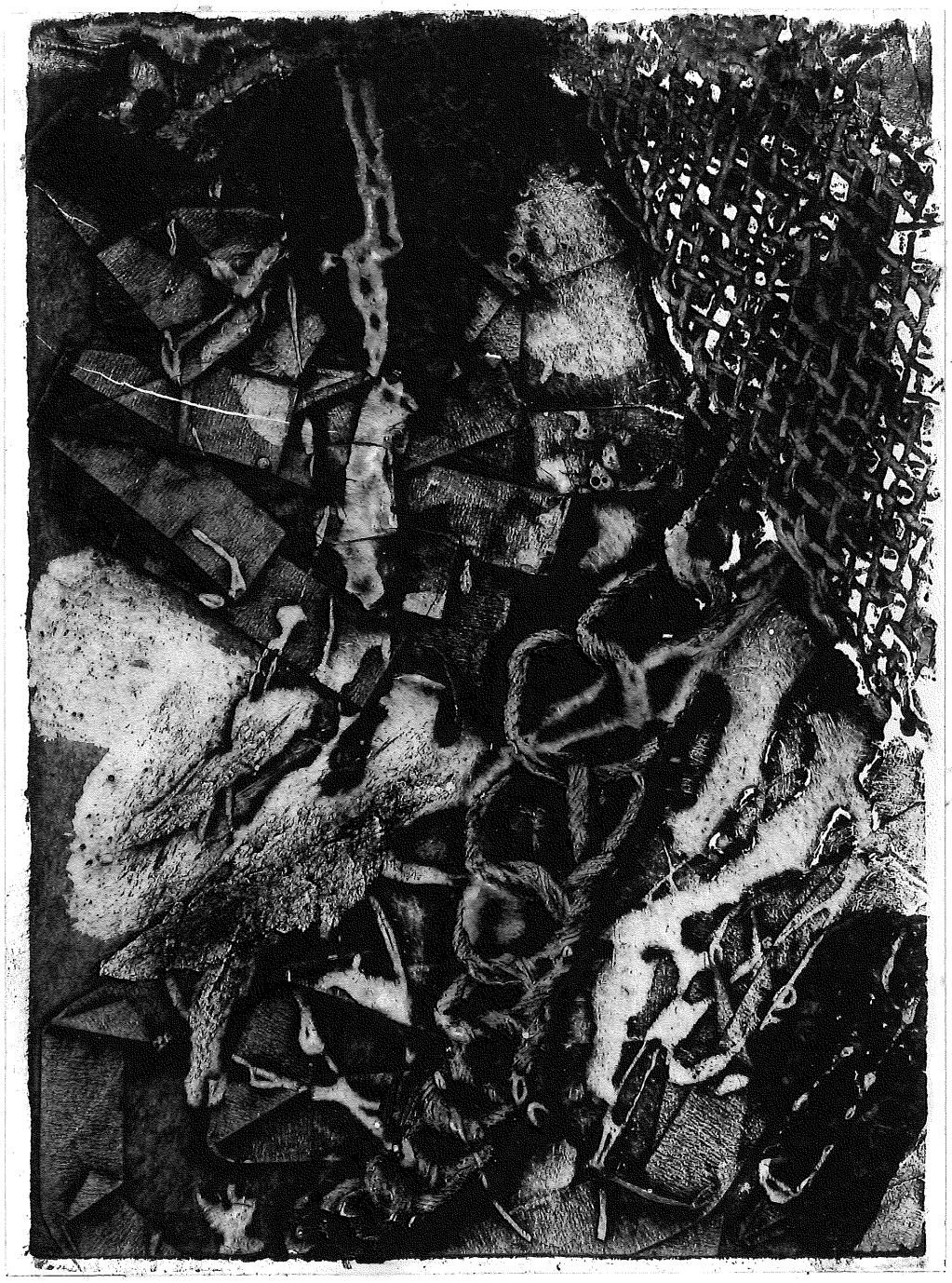
Title: "Head"
Plate: x-ray film
Tools: drypoint with pin
Size : 8 x 10 in.



7.

Title: "The Aliens"
Plate: zinc
Tools: etching
Size : 4 3/4 x 7 in.

PRINTS BY STUDENTS FROM CLEVELAND HIGH SCHOOL



1. Collagraph print

2. Linoleum print

3. X-ray film print

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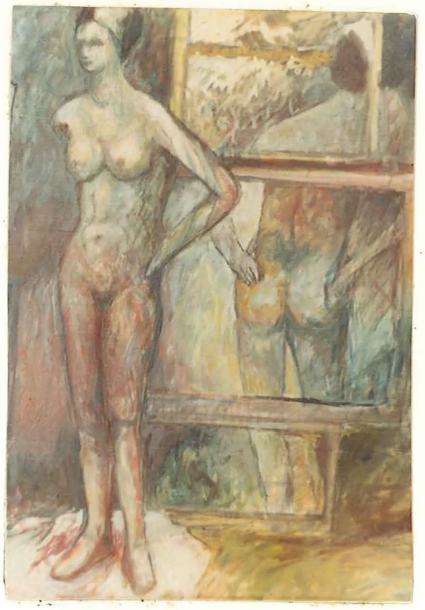
APPENDIX

Painting 1.
40 x 50 in.

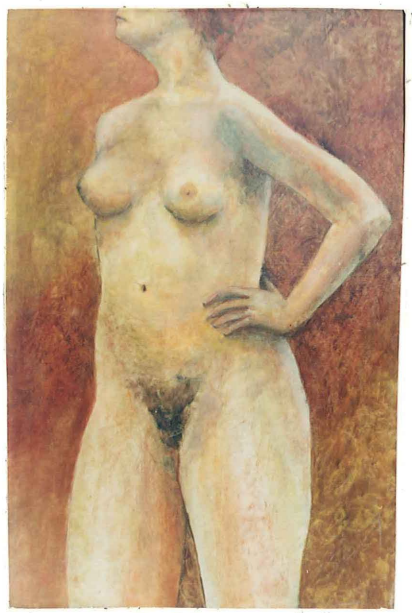
Painting 2.
36 x 53 in.



Painting 3.
32 x 36 in.

Painting 4.
37 x 44 in.

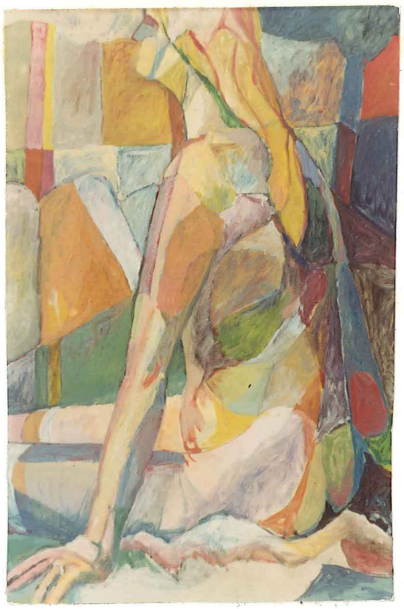
Painting 5.
41 x 57 in.



Painting 6.
30 x 40 in.

Painting 7.
31 x 24 in.

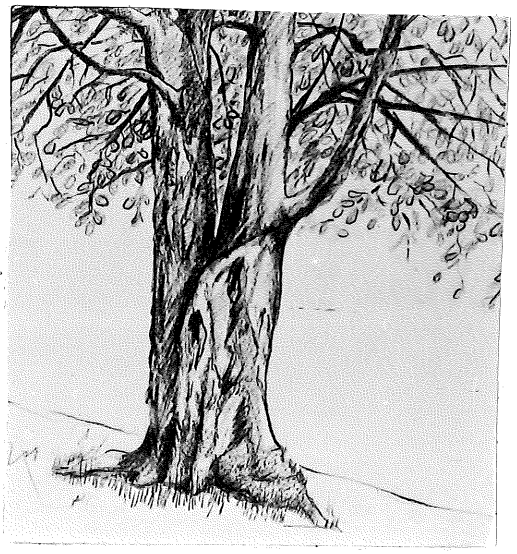
Painting 8.
37 x 34 in.



Painting 9.
50 x 34 in.

Painting 10.
watercolor
20 x 30 in.

Drawing 1.
7 1/2 x 10 in.



Drawing 2.
6 1/2 x 7 in.

Drawing 3.
9 x 6 1/2 in.