Class Description
This class will cover the history, process and presentation of Gum-Bichromate and other Alternative Photographic Processes. We will work in a traditional and digital darkroom as well as a laboratory set up for alternative process printing. There will be extra labs and possible field trips. This course is designed for the student with an intermediate knowledge of camera functions and darkroom techniques.

The Gum-Bichromate photographic process came into use in the 1860's, but it was not until the turn of the century that it was popularized by a group of photographers called the Pictorialists. They favored the soft graininess of the process for their “artistic” images, influenced by the Impressionist painters. Gum-Bichromate Photography has enjoyed a revival for the past five decades by experimental photographers rediscovering early photo chemistry. The materials and chemicals used for this process are simple and readily available. The colors are made with watercolor pigments. The papers used are fine art papers. There are many variables in controlling the process providing endless intellectual and creative possibilities.

Student Learning Outcomes
Student will become familiar with Gum-Bichromate and related photographic processes.
Student will learn how to make digital negatives for Gum-Bichromate and related photographic process.
Student will produce examples of different types of negatives and print processes.
Student will produce quality works of art using the Gum-Bichromate process.
Student will become familiar with historical and contemporary works of art produced in the pictorial processes.

Materials List
• 25 sheets Ilford multigrade FB or RC photo paper 8X10 glossy
• 50 sheets 8 1/2 X 11 Epson premium presentation matte inkjet paper
• Transparency media for inkjet (Pictorico transparency material)
• 1.5” Looseleaf notebook with mylar sleeves
• 3 50ml brown glass dropper bottles
• 25ml glass or plastic measuring graduate
• Small jars for mixing colors
• Brushes - (discussed in class)
• Ruler (18”)
• Latex Gloves, box
• Apron
• Pencil
• Clothes pins (plastic)
• Masking Tape
• X-acto knife, #11 blades
• scissors
• single hole punch

Maimeri, Winsor Newton, or other artist's grade Watercolor Paints
• Lamp Black
• Sepia
• Burnt Siena
• Raw or Burnt Umber
• Permanent Alizarin or Primary Red Magenta, Carmine Red
• Winsor Blue, Pthalo Blue
• Cadmium Yellow Lt. or Med.
  Chinese White
  Hooker’s Green

Contact printing frame (13” X 16” or smaller) or materials to make one:
• Very flat finished Plywood
• 1/4 inch plate glass NO single strength glass, it will break.
• 1/8 sheet of foam rubber
• 4 Metal Clamps (spring clamps, handle kind, at home improvement stores)

Course Requirements
1. CRITIQUES - Satisfactory completion of assignments on time for critique. A Critique is the equivalent of an exam. Sometimes the scheduled critique dates have to be modified because of weather, equipment problems or conflicts with other activities. If you know in advance that you will miss a critique, you may receive partial credit if you hand in your work early. IT IS YOUR RESPONSIBILITY TO KEEP UPDATED ON CHANGES TO THE SCHEDULE BY CONTACTING THE PROFESSOR OR OTHER STUDENTS.

2. ALTERNATIVE PROCESSES NOTEBOOK - Notebooks are due Nov 30-Dec 2. Students are required to produce several kinds of negatives for Alternative Processes and resulting prints using these negatives including, but not limited to:

NEGATIVES
Digital Film (transparency) Negative
Digital Paper Negative
Darkroom Paper Negative
Hand-drawn Negative (Cliché Verre)
Color Separation Negatives

**POSITIVES**
Photogram
Cyanotype
Gum Bichromate print (multiple exposures)
Tri-color Gum Bichromate print
Alternative Process, choose from:
  - Liquid Light (photo emulsion)
  - Platinum/ Palladium
  - Van Dyke print
  - Bromoil
  - Other Process from *Coming Into Focus*
  - Photo Oil Color (on silver print)

3. ATTENDANCE & CLASS PARTICIPATION  - Students are expected to punctually attend every class and share knowledge, ideas, and reactions with other students and professor. THREE unexcused absences will result in one grade drop for the semester. THREE late arrivals to class will count as *one unexcused absence*. Students who intend to drop this class are advised to do so as soon as possible to enable others to enroll for the class. I do not have the ability to drop a student from the rolls, only to grade according to my attendance policies.

4. EQUIPMENT  - Safe and Proper use of the equipment and darkroom by students enrolled in the class. No others may use the darkroom, cameras or printers.

5. FINAL EVALUATION  - ALL OF THE ABOVE and
  - FINAL PORTFOLIO (4 of the students’ best prints)
  - ALTERNATIVE PROCESSES NOTEBOOK

*Calculation of Grades*
  - 20% - Critiques, 4 of the students’ best prints
  - 60% - Alternative Processes notebook
  - 20% - Class participation including care of lab.

***** Excessive absence may subtract from grade, see attendance policy.

*Critique Dates*  

*Final Exam Date: Thursday, December 13, 1:45 - 4:15pm (this is tentative)*

*Recommended Text: Coming into Focus, Barnier*
Notice to Students with Disabilities:  Texas A&M University-Corpus Christi complies with the Americans with Disabilities Act in making reasonable accommodations for qualified students with disabilities. If you suspect that you may have a disability (physical impairment, learning disability, psychiatric disability, etc.), please contact the Services for Students with Disabilities Office, located in Driftwood 101, at 825-5816. If you need disability accommodations in this class, please see me as soon as possible.

**ACADEMIC ADVISING:** The College of Liberal Arts requires that students meet with an Academic Advisor as soon as they are ready to declare a major. The Academic Advisor will set up a degree plan, which must be signed by the student, a faculty mentor, and the department chair. The College's Academic Advising Center is located in Driftwood 203E, and can be reached at 825-3466.

***Grade Appeal Process.*** As stated in University Rule 13.02.99.C2, Student Grade Appeals, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Rule 13.02.99.C2, Student Grade Appeals, and University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules Web site at [http://www.tamucc.edu/provost/university_rules/index.html](http://www.tamucc.edu/provost/university_rules/index.html). For assistance and/or guidance in the grade appeal process, students may contact the Office of Student Affairs.
GUM BICHROMATE PHOTOGRAPHY

PAPER

The recommended watercolor paper is “Arches Cover”. One sheet can be cut into four 11x14’s. The paper must be sized for use with this process.

GELATIN/FORMALIN SIZING

**GELATIN SOLUTION**

| 3 packages Knox Gelatin (plain, unflavored) | Heat solution slowly to 110 degrees, and place in tray. |
| 1 liter distilled water | Hint: Size 10 to 15 pieces of 11x14” paper at a time. |

Place a pencil“T” in the top margin on the front side of each piece of paper (the paper’s watermark can be read correctly.) Place each piece face up into tray of solution. When stacked, turn over the stack so that it’s face-side down. Gently slide out the top sheet of paper, sliding the down-turned face of the paper against the rounded edge of the tray to take off any bubbles. Hang the sheet from the “T” margin edge of the paper. When dry, harden in Formalin Solution.

**FORMALIN SOLUTION**

| 25 ml Formaldehyde 37% Solution (available at pharmacies) | This is VERY TOXIC chemistry. Always work outside and wear protective gloves, apron, and glasses. Vapors shouldn’t be breathed, so keep at arm’s length while working. |
| 1 liter distilled water |

Dip each piece of dried, gelatined paper face up into tray of solution. There is no need to rub off bubbles like was done with the gelatin solution. Again, hang the sheet from the “T” margin of the paper in an outdoor, well-ventilated area. When dry, the gelatin/formalin coating process must be repeated two more times to build a total of three coats.

When the one-coat gelatin/formalin dipped paper is dry, put the paper into the gelatin again, avoid bubbles when removing, and this time hang with “T” margin hanging down. The idea is to evenly coat the paper so that is has no gelatin streaking. Dry, dip into formalin, hang with “T” margin on bottom again, and dry.
On the third pass, follow the same steps, but hang with "T" margin on top, dry, dip in formalin, hang with "T" margin on top, and dry. These three coatings and hardenings should produce a very sturdy paper on which to apply the emulsion.

(NOTE: Some people use Gesso rather than gelatin sizing to prepare the paper. Use a ratio of 1 part Gesso, to 1 part water. Coat the front of the paper, and after it is completely dry, coat it a second time. Use when dry.)

NEGATIVES

Whether a film negative or a paper negative, the negative should be soft and flat in contrast.

To make a paper negative, start with a very flat, positive print, and use lowest contrast filter or paper grade (old paper that fogs easily works well here). In a darkroom, wet both the positive print and the unexposed test strip/paper for 3 minutes in plain water. Place the paper together, emulsion to emulsion, and press with a rubber roller or squeegee. Expose without glass on enlarger baseboard, normal process, rinse, and dry.

Mask the negative, whether film or paper, with black paper and masking tape, on the side which will not be touching the emulsion when positioned on the coated paper. You can make your mask with either a torn or sharp edge. Use a hole punch on at least two sides of the masked margin for registration during the different color exposures. Now you can coat your printing paper.

GUM BICHROMATE EMULSION

The emulsion is made of two basic solutions, which may be individually mixed before hand. One is a light-sensitive Ammonium Dichromate solution and the other is a Gum Arabic/Watercolor solution of each color to be used. The two-solution emulsion is not mixed together until right before coating the paper, which is then dried and immediately contact exposed to UV light.

**AMMONIUM DICHROMATE SOLUTION**

100 gms Ammonium Dichromate (available through formularies)
250 ml distilled water, HOT

This is a TOXIC CHEMICAL; wear gloves and protective gear, and don’t breathe the fumes; mix in a well-ventilated area.

Since this light-sensitive solution may be stored in the dark for a few months, it is a good idea to use a brown bottle. An eye-dropper cap helps when it is time to mix the emulsion. Carefully dissolve the salts in the hot water until the solution is so saturated that the salts will no longer dissolve.

The above formula is an estimate of the amount of Ammonium Dichromate needed to get to the saturation point. If it crystallizes, it should still be usable when shaken. Heating in a pan of hot water might also help redissolve the salts if desired.
A solution must be made for each color to be used. Use a scale to get the correct amount of watercolor pigment into your container. Less pigment will give a thinner, less dense color, more pigment may stain the paper. Either a stoppered bottle or a small, airtight plastic canister works well, since the Gum Arabic should not be allowed to dry out.

Colored emulsions can be layered from lightest to darkest during the printing process. Note: Some chromium colors may be hazardous when mixed with the Ammonium Dichromate solution, so avoid them.

<table>
<thead>
<tr>
<th>GUM ARABIC/WATERCOLOR SOLUTION(S)</th>
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<tbody>
<tr>
<td>2 gms Tube Watercolor (Winsor Newton)</td>
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<tr>
<td>25 ml Prepared Gum Arabic Solution (quart size or larger)</td>
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<tr>
<th>TRADITIONAL EARTH COLORS ARE:</th>
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<tbody>
<tr>
<td>Raw Umber (light yellowish brown)</td>
</tr>
<tr>
<td>Burnt Sienna (reddish brown)</td>
</tr>
<tr>
<td>Sepia (brown)</td>
</tr>
<tr>
<td>Lamp Black (carbon)</td>
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<tr>
<th>TRADITIONAL SEPARATION COLORS:</th>
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<tr>
<td>Alizerin Crimson (bright bluish red)</td>
</tr>
<tr>
<td>Cadmium Yellow (bright yellow)</td>
</tr>
<tr>
<td>Windsor Blue (bright cyan)</td>
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Place equal parts into a small, narrow 25 ml graduate, cover with a paper towel, and shake until mixed. Throw away the paper towel.

This emulsion, using the two solutions just mentioned, should be mixed immediately before coating the paper. The work area should have low incandescent lighting with only 25 to 40 watt bulbs. Fluorescent lighting will affect the emulsion. Place protective paper over the work surface to avoid staining. Remember, the Ammonium dichromate solution is a TOXIC CHEMICAL. Wear gloves and an apron; don’t breath the solution, and don’t get it on skin or in eyes.

You may start with the lightest color first and add on darker colors in successive sensitizing-exposure-drying sequences.

Dribble the solution onto the dry gelatin-sized paper. Begin brushing emulsion with a 1 inch wa-
tercolor brush, such as a Hake. Distribute the Gum Bichromate Emulsion into an even, thin coat, taking off excess solution from the brush with a paper towel, if necessary. Use a hairdryer (a high heat setting is permissible), and make sure the emulsion is completely dry before contacting with your negative.

ASSEMBLING A CONTACT PRINTER

A commercially available contact print holder may be used, or one can be made from plywood, 1/8" foam, 1/4" uncoated plate glass, and small spring clamps.

CONTACT PRINTING

- Place the negative, emulsion side down, on top of the very dry coated paper.
- Tape the masked edge to the paper.
- Mark the registration holes with a ballpoint or waterproof pen on the first coating.

Because paper expands when wet and shrinks when dry, registration may be difficult on subsequent color runs; some printers don’t mind the effect. Place in the contact print holder and clamp tight with spring clamps. Check the alignment of the registration holes through glass before exposing.

EXPOSURE

Since the light-sensitive Ammonium Dichromate in the Gum Bichromate emulsion reacts to UV light, exposures may be made either outdoors or using a light box with UV bulbs. The light source will determine your exposure time. The first exposure can easily be used to determine whether to
add or subtract exposure time in subsequent runs. A color may always be added again, even at a much later time, but once dried, a color may not be taken away.

**WATER DEVELOPMENT**

Slide (face down) into water bath and let soak for at least 15 minutes. After the first minute, lift carefully and slide into clean water. Continue to change water as needed. UV light acts on the Gum Bichromate emulsion in such a way that it hardens the areas with the most exposure. Until it has dried, though, the emulsion is still very delicate, and care should be taken not to damage it. The unexposed Gum Bichromate will dissolve away from the print during development.

Manipulation may be done during this development process. Using a paint brush, scrape away any unwanted emulsion of this particular color run. Once the print is dried, though, it will not come off. Remember, you are essentially adding to the dark areas with each layer that is built on. Keep in mind that once all the color emulsions have been added, the very final clearing step will eliminate some yellow stain and brighten colors. Continue development until no color drips off the paper.

**CLEARING THE PRINT**

This may be done weeks or months later.

**CLEARING BATH**

<table>
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<tr>
<th>7 gms Potassium Metabisulfite</th>
<th>1 liter Distilled Water</th>
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Completely dissolve the Potassium Metabisulfite in the water.

Once all of the colors have been added and the paper has completely dried, the print must be cleared. Soak the print in the clearing bath for 2-5 minutes. Rinse for 10 minutes, and hang to dry.

**IMAGE MANIPULATION AND SPOTTING**

Watercolor may be used to spot errors or enhance the print. An X-ACTO knife may be used to surgically remove small, unwanted spots.
Required Notebook Items

NEGATIVES
Digital Film (transparency) Negative
- Create grayscale image in photoshop
  - High-contrast - cyanotype
  - Low contrast – gum bichromate

Digital Paper Negative
- Create grayscale image in photoshop, adjust tonal range, invert
  - High-contrast - cyanotype
  - Low contrast – gum bichromate

Darkroom Paper Negative
- Darkroom demonstration - control tonal range with contrast filters

Hand-drawn Negative (Cliché Verre)
- On vellum paper using wax pencil, ink, paint marker

Color Separation Negatives
- Separate colors in photoshop
  - Cyan, magenta, yellow, black

POSITIVES
Photogram
- darkroom

Cyanotype –
- see pages 37-47 in Barnier

Gum Bichromate print (multiple exposures)
- See Gum Instructions - Riley

Tri-color Gum Bichromate print
- See page 239-251 Barnier

Alternative Process, choose from:
- Liquid Light (photo emulsion)
- Platinum/ Palladium
- Van Dyke print
- Bromoil
- Other Process from Coming Into Focus

Photo Oil Color (on silver print)

Materials List
- 25 sheets Ilford multigrade FB photo paper 8X10 glossy
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- Brushes - (discussed in class)
- Ruler (18”)
- Latex Gloves, box
- Apron
- Pencil
- Clothes pins (plastic)
- Masking Tape
- X-acto knife, #11 blades
- scissors
- single hole punch

Maimeri, Winsor Newton, or other artist's grade Watercolor Paints
- Lamp Black, Chinese White
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- Very flat finished Plywood
- 1/4 inch plate glass (NO single strength glass, it Will Break)
- 1/8 sheet of foam rubber
- 4 Metal Clamps (spring clamp, handle type available at home improvement stores)

Potassium Ferricyanide
Ferric Ammonium Citrate (green powder)
Sodium Borate or lead acetate
Distilled Water

Foam Brushes
100ml graduates
margarine tubs
shot glasses
unbuffered rag board, paper
no alkaline environments, not <7.5 ph