with Bernard Doherty

Collecting Options

Stamp collecting imposes no discipline on its followers - other than that imposed by themselves. They may collect what pleases them, and they may arrange their collections as fancy takes them, with either a relentless determination, or as a leisurely, non-demanding form of relaxation, interest and general education.

Thus part of the fun of being a stamp collector can be found in closely examining stamps to determine how they were produced - how they were printed, the type of paper used and how many perforations a particular stamp may have. Whilst other collectors may be more interested in the design depicted on a stamp and why it was issued, or in the postal system and the various services provided, collecting envelopes with postal markings and particular etiquettes (labels used by the post office to indicate to postal employees how a letter is to be transmitted, we all know the blue air mail etiquette with the *Southern Cross* and *Par Avion*).

The first type of collector will examine stamps, often under a magnifying glass comparing one stamp with another of the same issue, for varieties or flaws which may have occurred during their production.

This collector will measure the number of **perforations** on each side of a given stamp, the number in a 2cm space being the so-called ***gauge*** of that stamp. From one printing of a stamp to another, this gauge may differ and could mean a great deal of difference in the value of that stamp over its more common variety. Special perforation gauges made of strong, durable plastic are available from most stamp dealers quite cheaply, enabling the easy measurement of perforations.

Also of interest is the type of paper used (a separate study in its own right) and the watermark (if any) impressed into the paper as a security device. Usually the watermark can be detected when the stamp is laid face down on a black surface. Once again, the difference between one watermark and another in a particular stamp issue may mean a considerable difference in value. All sorts of devices, some using illumination, are available to make the watermark-seeker's job easier, but beginners need use only a sheet of black paper or card when starting out. (More on this subject later).

The second type of collector is interested in the reason for the issue of the stamp and usually the background behind it. Remember that every stamp tells a story. This collector researches that story.

Australian $10 Painting Definitive

Let's examine the 1977 Australian $10 definitive stamp depicting Tom Robert's painting *Coming South*, on the basis of the first type of collector mentioned above.

The Australian Commonwealth Specialist Catalogue describes this stamp as: "**Photo-litho** printed by Asher and Company, Melbourne on two colour Roland Rekord press on KP6T paper including Helecon. Reprint on four colour Roland Rekord press on Clarke 104gsm litho-chrome paper including luminescence.

Five cylinders were used. Yellow cylinder replaced original after 15 per cent of the printing. Perf 14½ x 14¾, Reprint 14¾ x 14¾. No watermark".

"The first printing of this stamp had autotron colour bars in the top left hand corner of each sheet. In the reprint, no colour bars appearing in the top left corner. The stamp paper is whiter in appearance when compared with the KP6T paper used in the initial printing."

Thus the collector can seek the different perforation gauge and paper types, for this issue.

This collector may also examine the different printing methods used, **photo-litho** in this case. Using four (colour) cylinders CYAN (blue), MAGENTA (red), BLACK, YELLOW. The fifth colour cylinder was that used to replace the original YELLOW after about 12.5 per cent of printing. Quantity printed: 6.2 million. Reprint 30.6.82: 4.154 million."

The following is a summary of an article on photo-offset lithography by SJ Cope FAIA (Dip) in the *Australian Philatelic Bulletin* No 134, page 25-31, which provides an interesting insight into the development and mechanics of this process:

"In the past most Australian stamps have been printed by either the photogravure or engraved plate reproduction methods.

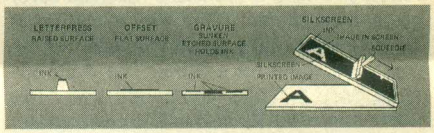
These two methods belong in reality, to one specific printing process - the *intaglio* or *below-the-surface* method of reproduction - the essential difference between the two methods being the manner in which the image is placed on the image-carrier (or printing plate). Photogravure uses photographic transfer and chemical etching, whilst engraved plates are hand engraved.

The intaglio process is only one of four major printing processes widely used today - each with a distinctly different preparation principle, but all four having a common end-purpose. The basic principle of all printing is to reproduce multiple copies of an *original* onto paper or other materials, using two broad stages:

1. *Preparation* - the original image transferred onto an image carrier;
2. *Reproduction* - the transfer of the image from the image-carrier to the printed surface, as many times as required, using ink and pressure.

The essential difference between the four major printing processes lies in the type of image-carriers used, and the means by which the image transfer is made.

Each process is defined by *the nature of the image-carrier*, or the type of printing plate produced from the *original copy*. These image-carriers have the following characteristics:



1. *Intaglio,* or *Gravure - below-the-surface* plates. Both photogravure and engraved plates have the image incised *into* the plate surface;
2. *Relief*, or *letterpress - above-the-surface* plates. The image areas are high, with the non-image areas at a lower level (a rubber stamp is a relief process). This is the only process which prints directly from the type and, has been the conventional method of printing used for over 500 years;

3. *Stencil,* or *Screen Process - through the surface* screens. Image areas are holes in either hand-applied lacquer or film emulsion affixed to a fine-gauge fabric or metal screen. Ink forced through these openings reproduces the shapes onto the printed surface;
4. *Planographic*, or *lithography-on-the-surface* plates. Both the image and the non-image areas are on the same plane. The transfer of an image from flat plates to printed

surface is achieved by a basic principle of chemistry - *grease and water do not readily mix* (this will be further explained later).

Because of the wide diversity of printing requirements - such as sizes, quantities, colours, surfaces and materials - and the economies which can be affected using a particular process for specific types of work, each process holds an advantage over the others in certain categories of printing. This does not mean that there is a clearly defined category of printing for each process. On the contrary, many print jobs can be handled economically, and with similar end results, by more than one process. Letterpress and lithography compete for much of the commercial printed matter; and gravure and lithography can both reproduce, with a high degree of fidelity, long-run, high-speed colour printing.

Lithography was chosen to print Tom Robert's *Coming South* as in that instance it was able to more precisely reproduce the very fine detail in the painting.

The Birth of *Lithography*

A Bohemian, Alois Senefelder (1771-1834), invented what was to become lithography, in 1798. As a youth in Munich, Senefelder had ambitions to become an actor, but found that he was more successful at play-writing than acting.

Lacking funds to pay for the printing of his plays by the conventional method, he experimented to find a printing method that he could personally employ.

Senefelder's first attempts were with copper plates. Firstly coating a plate with an acid-resisting compound, he wrote his characters in reverse into the coated surface, down to the bare metal. When treated with acid, the exposed plate was etched below the surface - the result being an engraved, reverse reading, below-the-surface image.

Reverse writing meant many mistakes and so Senefelder searched for a quick-drying varnish which he could use to paint over the errors; he eventually developed a home-made mixture of wax, soap, lampblack and water which proved satisfactory.

The expense of copper plates, however, made this printing method impractical to the impoverished Senefelder. Further experimentation with inexpensive Bavarian limestone as a substitute for copper plates, eventually had success - but, like many momentous inventions - it was discovered completely by accident.

Needing to write a laundry list, and having no pen or paper available at the time, Senefelder wrote the list with the *correction fluid* onto a freshly ground stone. A little later, being curious, he poured a dilute solution of nitric acid over the stone. Within a few minutes the acid etched the un-inked surface of the stone, leaving the inked letters in slight relief. Carefully inking the raised letters he obtained an excellent transfer of the image onto paper - but in reverse (or mirror image).

For a time he successfully used this method to reproduce his plays - drawing the letters on a flat ground stone in reverse. After he was finished with the stone, it could be ground flat and used over again - a decided saving in money! Further experiments in trying to find a better method of placing the image on the stone than laboriously writing in reverse, led to the principle of lithography as we know it today (Senefelder preferred to call it *chemical printing*).

The breakthrough came because of an order to reprint a book, the original of which had a number of illustrations reproduced on insert sheets from copper engravings - and these copper engravings were available to him.

In an effort to overcome the long, tedious job of copying these illustrations by hand in reverse, Senefelder inked one of the copper engravings with his *correction fluid* and pulled a proof of engraving onto paper. Carefully placing the proof on a clean lithographic stone, he transferred the inked image, using considerable pressure. The design on the stone was clean, sharp and a mirror image of the original. He allowed this to dry to a hard finish.

Now placing the stone on the bed of his press, Senefelder wet the entire surface with a solution of water and gum. Being naturally porous, the stone retained a thin film of water on those surfaces not covered with the inked design - the design image, being composed of a fatty compound (wax and water), repelled the water. Then over the whole surface he passed a leather roller covered with his *correction fluid* which was now being used as a greasy ink.

The design accepted the ink, but the moisture covered, non-image areas remained clean - rejecting the ink. Placing a sheet of paper over the stone, Senefelder found that the normal impression through the press resulted in a reproduction as good as the original copper plate could have achieved - and the image on the paper was not in reverse.

Senefelder had discovered how to write or draw illustrations directly onto a transfer paper, and to transfer this *artwork* onto a limestone surface. He also discovered that by using a water roller over the surface of the stone, and then an ink roller, he would only place ink on the image area - which could then be transferred to paper by pressure. This speeded up his work, reduced the incidence of error caused by reverse writing and eliminated the etching process.

Lithography had been discovered - the word originating from two Greek derivations ...*lithos* meaning stone; and *graphein* meaning to write - literally meaning *stone writing* or *writing from stone.*

The principle of lithography remains the same today as it was on the day of discovery - *the ability to transfer a selected image from a completely flat surface is achieved by the chemical fact that grease and water do not readily mix.*

Admittedly, the techniques have changed. Thin metal plates have replaced the Bavarian limestones. Aluminium is most commonly used, but other materials such as paper, plastic coatings, acetate, zinc, copper, chromium and stainless steel are also used in the making of the plates.

The commercial method of transferring an original image onto the plate is now fully photographic instead of by the use of a transfer paper. Modern ink, plate, printing press and photographic technology has pushed lithography to the forefront of the graphic reproduction processes.

Commercial Development

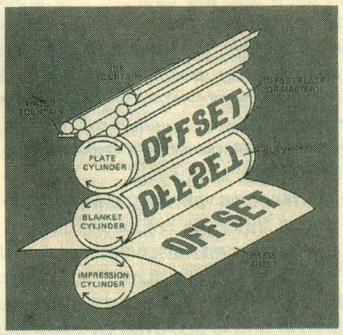
Four factors were instrumental in the development of lithography into a major commercial printing process. These were:

1. The invention of **photography**; The flexibility of photography for transferring the *original* image onto a plate, meant quicker, sharper, more accurate and better controlled plate images. Also, photography led to the development of the half-tone screen which meant that the printer could reproduce illustrations with a tonal range - such as a photograph;

2. The use of thin, **flexible metal plates** instead of the heavy rigid limestones; these flexible plates attached to the cylinders of rotary presses;

3. The advent of the **rotary press** increased the speed and output enormously; and

4. The introduction of the third or ***offset* cylinder**, something which is unique to lithography, was the most important single factor. The third cylinder overcame the problem of wear, friction and the reduced life of the image carried, and introduced the term *offset* to the process.



The conventional lithographic press now has three cylinders as part of its basic printing unit:

1. The plate cylinder - the one to which the thin metal image carrier is affixed. The plate is *right reading*, not in reverse;

2. The blanket cylinder - a soft rubber-covered fabric is wrapped around a cylinder which comes into contact with the plate. The

inked image from the plate is transferred onto the blanket by this contact. One of the purposes of the blanket is to absorb much of the water which is also transferred from the non-image surfaces of the plate. The soft surface of the blanket applies the minimum friction to the plate surface, thus reducing the wear factor and increasing the plate life;

3. The impression cylinder - the paper moves between the blanket impression cylinders, transferring the inked image from the blanket to the paper through the pressure exerted by the impression cylinder.

Graphic Reproduction of the $10 Stamp by Photo-Offset Lithography

The production procedure would be as follows:

1. The selected painting was separately photographed as positive colour transparencies. The ideal transparency size is half-plate (127mm x 101mm);

2. An overlay containing the additional graphics, such as the word *Australia*, the denomination and the caption, was prepared as a common element for the whole painting series. Together, the transparencies and the common overlay, become the total pictorial and graphic representation - and is known at that stage as the *finished art*. The original from which multiple copies were reproduced by the process of printing.

3. As all colour printing uses the subtractive colour theory to reproduce natural colour, the finished art must first be broken down into the three colour primaries - magenta, cyan and yellow. This is known as *colour separation* and is achieved by exposing the colour transparency to three separate negatives, using a different colour filter for each exposure. A red filter will produce a negative image that, when converted to a positive, becomes the cyan printing plate; a green filter will produce the magenta plate; and a blue violet filter will produce the yellow plate.

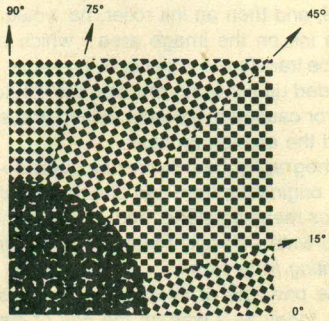
In various combinations and strengths, when printed onto paper, these three primary printing colours will, theoretically, produce all colours, hues, shades and tones. Again, theoretically, the three primaries printed in equal strengths over each other will produce black - and the white of the paper becomes the white in the illustration.

Therefore, in theory, the three primaries - magenta, cyan and yellow - should be able to reproduce the total colour spectrum. In practice this does not occur, particularly in the darker colour range. To overcome this unavoidable problem, the plate-maker produces a *black* plate from a single negative exposed to the transparency for a short time through each of the filters. This negative represents only the darker ends of the three subtractive primary colours that make up the total content of the original subject - the negative is not exposed long enough to gain the middle tones or highlights;

4. The graphics on the overlay will be combined with the black negative (or *stripped-in*) at this stage. If the graphics are to be white, the overlay is used to *drop-out* all other colours on all four negatives, leaving only the white of the paper when printed. This overlay can be used with any of the negatives to obtain any particular colour required;

5. Two other important techniques are being applied almost simultaneously with the colour separation. The first is *colour correction*, which is another way in which an allowance is made for colour inadequacies in the materials being used. As the impurities in the materials being used, particularly the inks, are precisely known, the separation films are corrected with these factors in mind. Thus the separation negatives are made slightly lighter or darker, relative to each other, so that when made into the printing plate, and one of the primary ink colours used, the impurity of the colour in each of the inks will be allowed for;

6. The second technique is the use of the *half-tone screen*. An offset printing press cannot vary its ink density on paper - it can only put one colour ink onto the paper in an even layer, at any one pass through the machine, But many illustrations have tonal variations to represent the visual image (photographs always have a tonal range). To copy a continuous tone original onto a negative - the first step in making a printing plate - a half-tone screen is always placed between the finished art being copied and the negative.



When the negative is exposed, this screen will have broken the original image down into a series of variable-size dots relative to the strength or weakness of each tone within that original - very small and widely separated at the light end of the tonal range, large and overlapping at the dark end - with a number of dot sizes between the two extremes. In reality, an optical illusion has been created - the variation in dot sizes conveys a sense of tonal variation to the eyes, even though a uniform layer of ink has been placed on the paper.

The half-tone screen is used in the exposure of all four separation negatives, giving a tonal range at each of the colours to be placed on the paper. This allows for the variations of primary colour densities intrinsic in the original being reproduced, and, when the four plates are printed on paper in register, these colour densities are reconstructed. This results in a reproduction of the subject's total colour range;

7. The four colour corrected, half-tone separation negatives can now be *printed-down* onto four separate metal plates.

A photo-sensitive film emulsion coating is first placed on the surface of a thin, flexible metal plate. Usually a separation negative is placed in contact, emulsion to emulsion, and exposed under intense lighting. When developed and washed in a similar manner to any photographic process, a positive image the reverse of the negative will be bonded to the plate surface - the unexposed emulsion coating, which was protected by the opaque areas of the negative, will have been washed away leaving bare metal. This modern offset plate is now comparable, in theory, to Senefelder's Bavarian limestone blocks on which he transferred an image from paper to stone using his *correction fluid*.

What has been produced is a *surface* plate. Surface plates are still subject to some friction wear, and do have a limited life, even though this is considerably longer than before offsetting was introduced. The litho plates used for printing the Australian painting *Coming South* used a Collies Kalle P. 7 pre-sensitized plate unbaked positive working. The plate was pre-lacquered with photopolymer. Both deep etched and multi-metal plates have the image area chemically etched to a depth slightly below the surface, giving these types of plates greater ink-carrying capacity, resulting in a stronger and more brilliant ink coverage; although the terms *etched* and *deep-etch* are used, the actual depth is barely measurable. They have a much longer life because the image area, being below the surface, is not subject to wear. These plates use a positive, not a negative, at the print-down stage.

ABOUT STAMP COLLECTING

A plate is made from each of the four separation negatives (or positives converted from these negatives), each plate containing the total colour content of its particular subtractive primary;

8. Wrapped around the plate cylinders of an offset press, and subjected firstly to a water coating and then a coverage of a specific ink colour, each plate will reproduce its emulsion-surface image onto the blanket and then onto the paper passing through the machine;

9. A four unit press will have the plates printing in sequence - firstly magenta, then cyan then black with the yellow last. The sheet or web (paper), passing through the machine will pick up each of the colour images in sequence and, if in perfect register, will reconstruct the primary colour content of the original subject - or printed reproduction;

10. Once the sheet is completely printed, sorting, checking, perforating and guillotining are carried out.

The Major Characteristics of Offset

Offset shows the individual dots created by the half-tone screen, and each of the four colours can easily be distinguished. Also, the wording has solid areas of colour (or *line*), because the half-tone screen is not used in the image transfer of non-tonal areas - which are, amongst other things, type.

This characteristic makes it extremely easy for collectors to pick the process used to print a particular stamp.

Photogravure, on the other hand, under a magnifying glass, shows a microscopic, but uniform, square pattern over the whole of the printed surface, including the wording.