2000

The Phoenix process

Andrew Davidhazy

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Andrew Davidhazy
Imaging and Photographic Technology Department
School of Photographic Arts and Sciences
Rochester Institute of Technology
Rochester, NY 14623


Original Polaroid


Phoenix Derivative Print


Eyes


Patty

I am a frequent user of Polaroid materials, especially as the material of choice when doing high speed photography and peripheral peripheral demonstrations. I am a particularly heavy user of Type 667 film because it's very high speed allows me to conduct these demonstrations using little additional light or to use small apertures when working with high speed, short exposure, but low total energy, electronic flashes.

One of the byproducts of this film is a paper negative that I have traditionally simply called "scrap" and thrown away. I had noticed in the past that on occasion the negative images left on these paper negatives had a very interesting visual quality to them and had often wondered if these negative "remains" could be used further to possibly generate additional copies of the scene depicted in the photograph.

I should first point out that I knew that Polaroid does indeed make a Positive/Negative film, Type 665, which accomplishes exactly what I was originally hoping to produce from these paper negatives. In this film a positive print is produced along with a very good quality negative that can be treated in a 2% solution of Sodium Sulfate and then used to generate high quality enlargements on conventional photographic papers.

In spite of the fact that Polaroid Type 665 is readily available and is an excellent product for what it is intended, I was intrigued with the idea of working with the paper negatives produced by the Type 667 film instead of simply tossing them away. After many years of procrastinating about doing something about this, I decided to examine and evaluate the 667 negatives in greater detail and defining a project whereby I could test some of my theories regarding further use of these seemingly useless negatives.

The first step was to determine in more detail what the image qualities of one of these negatives actually were so that appropriate materials could be chosen with which additional work might be undertaken. On closer and more exact examination it becomes apparent that the negatives exhibit very low contrast and, in addition, they sometimes show a reversal of tones in shadow areas.

I decided to first try dealing with the low contrast of the negative. To do this I decided to simply copy the negative onto high contrast film. I chose Tech Pan and processed it in a variety of developers including D-72 and in a Kreonite processor operated at various speeds. I eventually settled on this type of processing and ran the Tech Pan at the same speed as one would use for Tri-X.

Since the originals were negatives and were copied onto negative working film, the result was a set of transparencies that while not technically perfect showed promise of interesting visual qualities. This work was undertaken with very little documentation of procedure but it nevertheless served as the basis on which further work, described below, was based. Figure 1 is a reproduction of one of these transparencies.

My original intent, as I stated above, was to produce standard Black and White prints rather than transparencies. In order to do this I could have made a copy negative of the transparencies generated on Tech Pan film but this would require making a copy of the slide which itself was a copy of the original paper negative. I thought that there ought to be a better way of doing this and while driving to work one day it occurred to me that Polaroid actually already made a product that seemed specifically made to order for solving my problem. The product is their Polagraph 35mm instant film intended primarily for audiovisual applications. It is designed for making high contrast Black and White positive copies of original artwork.

Since Polagraph film is a positive working material, if it was used to copy the negatives generated in the 667 process, the result would basically be a copy negative. The fact that Polagraph is also a high contrast material would obviously come in handy because it might correct for the low contrast inherent to the 667 paper negatives.

To make the Polagraph copy negatives I used a standard copy set-up equipped with flash illumination. The camera I used was a Canon F1 equipped with a 50mm f:1.8 lens. I had to add +3 diopters worth of close-up lenses to the prime lens to enable me to reproduce the 667 negatives in such a manner that they filled the 35mm frame. A macro- lens might have provided better resolution but I did not have one readily available. The aperture was f:22 and one Ultrablitz power pack was set to discharge 50 watt-seconds total energy into two flash heads each located about 12" from the print and each equipped with a polarizing filter. In addition to the polarizer at the lights it is also advisable, as I found out, to place an additional polarizing filter at the lens to reduce specular reflections that might crop up as a result of uneven or warped paper negative surfaces. These filters need to be carefully aligned to eliminate reflections from the surface of the paper negatives.

It is interesting to note that since this is a positive working material one has to get used to the fact that glare on a surface will appear as black or dark areas on the film rather than white areas. For this reason I prefer to use a black background for my negatives since this will make the prints eventually appear to be surrounded by a white field.

When I first tried this process out I only had some outdated Polagraph material at hand and being unsure about exposure I bracketed through an 8 stop aperture series on that

first single 12 exposure roll. Since the Polagraph film has such a steep response curve, or such high contrast, it is almost impossible to give exact exposure guidelines and you will have to determine your own optimum copy exposure settings. There are, however, exposure guidelines included with the film and you could use these as starting points.

In my case, since the film was almost 6 years old the processing was not perfect and only one of the images was close to being correctly exposed. But this one copy negative was full of promise and provided me with the impetus to continue the project.

With four rolls of fresh Polagraph material I proceeded to conduct some basic qualitative and quantitative tests. I first made a set of exposures of a reflection step-wedge, or grey-scale, onto Type 667 material. I took density measurements of the individual steps of the grey scale and then made density measurements of the same steps as they were reproduced by the type 667 positive and negative materials.

I then proceeded to plot the Polaroid output against the step-wedge input and compared the Polaroid output to what the step-wedge would have plotted as when compared against itself. A perfect reproduction would have plotted as a straight line with a slope of 45 degrees. From this abbreviated, comparison based, tone reproduction graph seen as Figure 2, it became evident that the 667 positive did not deal linearly with the input densities in terms of reproducing an exact reproduction of the original step wedge. The reproduction was good but it had minor failings in the highlights and more major ones in the shadow regions of the step wedge. The total density range of the original wedge was close to 2.0 while the density range of the copy positive was only about 1.5. This could have been caused by slight underexposure of the 667 print.

The contrast of the 667 paper positive as seen on the graph was much lower than that of the positive. The total density range from the highlight to the shadow region was only .35 . However, an interesting effect is apparent in the curve associated with an extension of the paper negative response into deeper and deeper regions of the shadow area of the wedge. After reaching a minimum density the response again starts to rise. This is an indication that some sort of reversal has taken place.

This is, in fact, a reversal that I later found out actually does take place and is the cause of a sabattier or solarization effect that becomes apparent in the shadows. This is also where it occurs in conventional photographic processes when the sabattier effect is induced by exposing the film or paper to light after development has already started.

This reversal can actually be seen taking place in the Type 667 material if one quickly separates the positive from the negative in room light and instead of looking at the positive print one immediately concentrates one's attention on the paper negative.

In the Polaroid process wherever there is little exposure, such as in the shadows, very little silver metal is produced in the paper negative material. These areas, however, donate large numbers of silver ions to the positive print material, or receiver sheet, where

they combine with trace amounts of silver present in the receiver sheet to produce metallic silver thus reproducing shadows.

This means that in the shadow areas of the paper negative there are significant amounts of unexposed silver halides present in a surplus of developing solution. When these areas are exposed to light, as when the positive and negative are peeled apart, these halides are exposed to light and immediately are darkened by the presence of developer within the emulsion layer. This causes a reversal of tones in these areas as seen by the reversal of tones in the shadows perceived visually and illustrated by the graph of Figure 2.

The degree of reversal appears to be affected by a number of factors including the original exposure, processing time and temperature. Its visual effectiveness depends a great deal on the original subject matter.

If a 667 unit were separated in the dark rather than in the presence of light this reversal would not occur and a very interesting by- product of this approach to an alternative imaging process would not manifest itself in the final images produced by this process. In addition to the sabattier effect the presence of edge effects that make their appearance as lines of density is also often apparent and adds visual impact to the final images. These lines typically show up along the boundaries between areas of reversed and normally reproduced tonality.

Finally, the 667 paper negatives of the grey-scales were copied onto Polagraph film along with several negatives of figure studies, and architectural and peripheral portraits that I had saved from the trash can. The strip of film looked very much like a conventional negative. There appeared to be sufficient contrast to print easily with my Leitz Focomat 1C diffusion/condenser enlarger onto normal contrast paper or with a medium grade filter. This was very encouraging.

In fact, I was able to produce subjectively highly successful prints on Kodak Polycontrast III "N" surface paper using a #3 filter. After prints were made I then plotted the densities of the reproduction of the grey-scale on the same graph as the previous two curves of the Polaroid 667 positive and paper negative responses. The graphical outcome confirmed some of the visual predictions shown in Figures 3 and 4. It is evident from the curves that the prints made from the Polagraph negatives exhibit a definite sabattier effect. Also, the densities of the grey scale, as shown in Figure 2, follow the response of the 667 positive film quite closely for a while but after a point the density starts to fall, instead of leveling off or continuing to rise as one would expect.

Along the way I did make some additional observations. I would suggest that it would be advisable to copy the Type 667 negatives as soon after exposure as possible. In fact, the character of the copies will vary as the reversal process continues under room illumination until eventually the quality of the image stabilizes upon drying. If Type 667 negatives are not copied immediately but left to dry they can still be copied quite successfully even if they look unsalvageable due to having developed a crystalline crust on their surface. Simply immerse the paper negatives in cold water and agitate gently. If

you place a freshly exposed negative in water, or if you leave the negative in the water too long, the image may wash off the support completesly. Immersing the dried negative in water will swell up the emulsion again and it will acquire a high gloss surface that will aid in enhancing the little density range that the negative has. The negative can be copied wet or it can again be left to dry. The wet negative emulsion is very susceptible to abrasion. During the drying process the print may acquire an irregular shape or curl making subsequent copying somewhat more difficult but not impossible. However, sometimes it is this very characteristic that gives a final image that special extra quality that makes it stand out from the rest.

Along with a potential for reversal of tone in the shadow areas, this process also introduces a significant amount of grain lending a pronounced textural quality to the images. The grain pattern is very tight and sharp. As far as handling the material, the newly created negatives are easy to work with but are somewhat more prone to damage from abrasion than conventional films.

My current involvement with this process is centered along two lines of interest. On the one hand I am conducting further technical tests primarily concerned on an investigation of the controls available over the reversal or sabattier effect, and the application of other Polaroid materials besides that of the 667 type film. On the visual front, I am caught up in defining novel applications and exploring the visual and creative possibilities offered by this new approach to Bimaging, this new aesthetic that I call the Phoenix Process.

The Phoenix Process - Article II

Andrew Davidhazy
Rochester Institute of Technology
Imaging and Photographic Technology Department
Rochester, NY 14623

For something a bit out of the ordinary you might try a new process which I call the "Davidhazy Phoenix Process". The name is associated with a process that rescues enhanced images from materials that invariably currently end up in the trash bin. The process enables photographers to make take-offs of the original image that often have much more visual appeal and impact than the original photograph!

The process is not too complex and in addition to introducing a new technique to your creative repertoire it will expose you to a more complete understanding of tonal relationships, image contrast, Polaroid instant films and the concepts behind negative and positive working emulsions.

You will need to have available a Polaroid Pack type or a 4x5 sheet film type camera equipped with a Polaroid 545 holder, some Polaroid 667 or type 57 sheet film, a manual or electric Polaroid instant 35mm film processor, at least two rolls of Polaroid Polagraph 35mm film, a method for making close up photographs with a 35mm camera and some standard B&W enlarging paper.

To start with you need to generate the images that you will be making the Phoenix derivations from. These will be made on the 667, 557 or 57 film. The images should by themselves possess pictorial qualities that would make them good photographs to begin with.

You may want to try making several exposures of the same scene by exposing at other than normal settings such as intentionally over and underexposing by one, two or even three stops. As you make these exposures, after development and peeling the positive print from the paper negative, do not throw the paper negatives away. Instead, after peeling them apart expose the paper negatives to a strong light and then save them in a dust free spot until they have thoroughly dried. Sometimes this might be overnight.

You may notice that some of these negative images acquire very interesting qualities in terms of tonal distribution and general character. From a technical point of view you will notice that the images invariably lack contrast. In the next step the "Phoenix Process" will enhance these negatives and allow you to make conventional enlargements onto standard photographic papers.

Once the paper negatives are thoroughly dried set-up a 35 mm camera equipped with a macro lens on a copy stand and proceed to copy these negatives with the Polaroid Polagraph film. This is a high contrast, positive working film of about ISO 400 speed.

Just prior to copying the Polaroid paper negatives quickly dip them in a tray of cold water. Be very careful not to leave them in the water too long or the negative emulsion may dissolve away into the water. At this point the image may also be quite soft and any abrasion will leave a gouge in the final image. The water will reduce the curl that the paper negatives might have acquired during drying and also smooth out the image that may by this time exhibit a crystalline pattern due to the chemicals that have dried up on the emulsion.

You may wish to use a polarizer over the lights that illuminate your paper negatives. It might also be advisable to use a second polarizer over the camera lens and properly oriented to completely eliminate stray reflections that might otherwise crop up in the Polagraph copies.

I have noticed that sometimes the rewetted Polaroid paper negatives are damaged by immersion into a water bath. The exact reason for this has not yet been determined but I have found that when hypo is present in the water in even minute quantities the negative tends to totally disintegrate in the water bath.

Use a grey card to set the exposure but make sure to bracket at least one stop over and under the predicted exposure. Assuming that you exposed the film properly, after development you will notice that you now have a set of images that look like standard B&W negatives. The Polagraph material, being a high contrast positive working emulsion, boosted the low contrast of the original negative and also kept the tonal

relationships as they were in the original namely making a negative of a negative by working as a positive!

Choose the Polagraph negatives that have the best visual appearance and carefully place one of these negatives into an enlarger. Print it onto conventional paper adjusting the paper or filter grade to match the contrast characteristics of the Polagraph negative.

You will be surprised at the unusual pictorial qualities that may appear in these photographs. The Sabattier effect is often very evident in the final images, especially if you have included large areas of complete darkness in the original scene. The negatives will also be somewhat grainy and possibly exhibit pronounced Mackie lines at boundaries between subject areas of contrasting tone.

The Sabattier effect is caused by the fact that in the shadow regions of the Polaroid paper negative the light sensitive emulsion is not affected by the developer since these areas are by and large unexposed. However, when you peel the negative from the positive in room light these shadow areas are immediately exposed to light and they get developed by the developer that is still active in these areas. Sometimes the shadow densities reach higher densities than the original subject's highlight densities and then you have a complete reversal of tones. At intermediate exposure levels you will find partial tonal reversals. When first experimenting with this technique you may find that subjects with a large contrast ratio will produce a more pronounced reversal effect.

Note that if you peel the positive and negative materials apart from each other in total darkness you should be able to make a fairly decent positive print with tonal relationships very similar to the positive print generated by the conventional Polaroid process.

It is hard to predict exactly what your Phoenix photographs will look like but I am confident that experimenting with this process will create a renewed sense of discovery and enthusiasm related to the unusual visual statements made possible by this novel process. Visual effects produced by the Phoenix Process.

If you have questions or would like to discuss any aspect of this creative enhancement process write to me at the Rochester Institute of Technology, PO Box 9887, Rochester, NY 14623.

or send me e-mail at: andpph@rit.edu