nontoxicprint

Waterless Lithography

Nik Semenoff

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Nik Semenoff was born and educated in Saskatchewan,

and is an outstanding researcher, artist, teacher and inventor.

He has taught at the U of S and has been artist-in-residence since 1992.

His cutting-edge research into safer printmaking processes

has placed the University in the forefront of

non-toxic printmaking research and education.

The inventor of the waterless lithographic process,

high-resolution screen-printing and specialized inks,

he has made printmaking both safer and less expensive.

Professor Semenoff has published his research findings

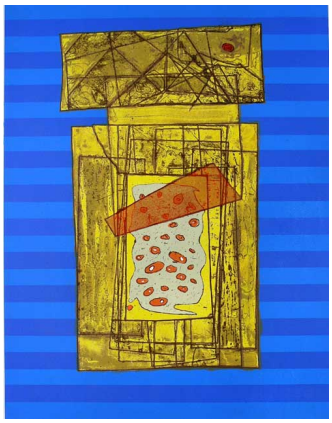
in several refereed journals,

and has been invited to do workshops around the world.

In the early 1950s, I worked at a commercial offset printers as a graphic designer and

illustrator, starting my apprenticeship as a lithographer. Part of the apprenticeship called for me to learn as much about the craft as I could, so when things were slack in the art department, I was sent to help in the department where the process camerawork and platemaking took place. The fact that printing could be done from a rock, intrigued me, even though all our work was done on zinc plates.

This interest lead me to build a small press and obtain a dozen small 10 x 12 inch stones to learn more about the process. At that time, there was little information for me on the stone lithographic method, so like some others, I started to learn the process on my own by the little bits of information I could gather - like from the older camera operator in the plant. He had learned his trade in a British shop, where the artists producing large travel posters first drew on limestone; when satisfied with the color image, they would pull black and white proofs that were photographed for offset production without using a halftone screen. The amount of information from the cameraman was scant, but good enough to get me started.



Nik Semenoff, *Ozymandieas*, waterless lithograph, 2006

A 26 x 20 inch waterless lithograph printed from positive plates. The image was made up of plastics attached to glass and scanned for the line detail. It was printed out on a wide format inkjet printer and exposed to plates. Toner wash was applied to Mylar and transferred to a recycled plate. Flats were produced by painting in areas with dextrin, using iron oxide lines transferred from Mylar.

Over the years I learned how to print from both stone and plate, slowly gathering technical information on this "*diabolical craft*". As I changed jobs and demands on my life, I dropped lithography until I was invited to print at the university's print studio in 1982. The large presses rekindled my interested, so I built a larger motorized press and started printing again in earnest by 1984.

Sometime in the 70s, I became aware of waterless lithography as a local offset printer tried the newly introduced 3M plates. They were not very successful on a normal offset press, so international interest in them faded. Around this time, while doing some house repairs with caulking silicone, I noticed how oil-based paint rolled off the silicone bead I had put along a window frame. Could something more be done in lithography with common silicone, I wondered?

As there was little interest in their waterless process, 3M sold their patents to Toray, in Japan, who were able to solve most of the problems in using this innovative concept. By the late 70s, Toray was showing their improved technology at the major printing trade show in Germany. In 1982 I read in an offset printing magazine that Toray of Japan had introduced waterless printing plates back into the North American market, using silicone as the ink-rejecting layer. As I had again become interested in lithography, I recalled my experience using silicone in a number of other projects, thinking it was time to do some research for litho plates - but other responsibilities demanded my attention.

In 1990 I had been put on the Tamarind symposium program to demonstrate my toner technique to lithographers. On the same day, Jeff Ryan did a morning demonstration of his work with Toray waterless positive plates, but complained that inks suitable for this new process were unavailable, so hand editioning was difficult. He was quite secretive about the process but I recalled my idea of trying common caulking silicone as the ink-rejection layer on the plate.

After arriving home, in a couple days, I was ready to try my own method. I knew that silicone could be diluted with common paint thinner as I had done this to make a mold for casting wax for the lost wax technique of jewelry making. Usually these molds were made using catalytic silicone paste that I didn't have at the time, so I applied diluted silicone for the first layer to retain all the fine detail, and then built up with undiluted material after the first layer cured.

using diluted silicone to make molds of wax for casting

For my first test, I used caulking silicone diluted with paint thinner, and on another part of the plate, tried silicone sealer used as bathroom tile grout. For the image, I used a toner wash, as that seemed like the best material for the masking layer against the silicone coating. The caulking silicone area was much better because of the greater amount of silicone within the coating; that became the first successful test plate I produced. Using my toner technique, I was able to produce a waterless print within the next week.

I quickly learned that leather rollers did not work, but a smaller diameter rubber litho roller did quite well. While Jeff Ryan had problems with ink, I was more fortunate. In the late 50s, when I started to print my own lithographs at home, there was no ink without driers available to me. Hand lithography was not practiced by many as Tamarind was still years away.

Major ink manufacturers focused only on commercial offset that required fast drying. As I had worked at a commercial offset printing plant, I went back to talked to the head pressman about my problem with fast drying ink. He said a new ink had been developed in Holland, which they had started to test to see if it would fit their needs.

Van Son Inks: the containers have changed since the 50s
but the ink has remained one of the best to use on waterless lithographic plates

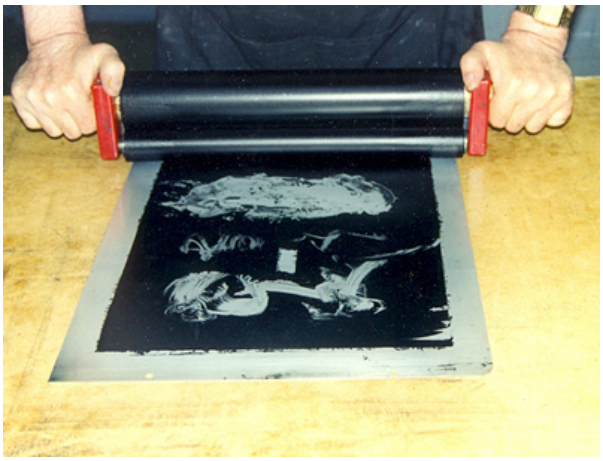
He gave me a small container of Van Son Rubberbase plus black, with the address of the supplier in Canada. This ink was not as greasy as the commonly used inks, also staying open on the slab for a very long time. As I already had a full set of colors in my studio, it turned out to be the perfect ink right from the start of my research into waterless lithography. In my very early papers, I had not recommend Van Son ink because it would be rejected by artists for being used by commercial offset printers, but a New York art printer assured me it was as good or superior to the common ink used by printmakers. I use it to this day.

By the end of summer 1990, I was already printing editions with waterless, using the basic process I had developed, which was safer and more efficient than the techniques used in traditional lithography. I contacted Ken Tyler again to see if he and other printers in the New York area might be interested in leaning more about my process. In November of 1990 I was in New York showing printers how to use silicone for simple waterless printing, instead of purchasing expensive Toray plates. In early 1991, while still traveling on a sabbatical about how toner could be used in screenprinting, I was able to show the waterless process to printers all along the west coast of the continent. I showed my new techniques at the *New Directions in Printmaking*, international conference held in 1992 at the University of Saskatchewan; and an article on the waterless process for drawing on plates and converting commercial positive plates to waterless, was published in LEONARDO in 1993: Vol. 26, #4, pp 303-308.

At the *New Directions* conference, I was given a much-copied paper about Harry Hoehns' attempt at using silicone. There are no date references on when this research was done, but I suspect it was after the 3M plates were made available to offset printers. After reading the text, I understood why Hoehns' process limited editions to 15-20, and was not of a very good quality (as I have been told by printers in New York who saw the results).

a subplate quickly made from Hardboard for a workshop
3-part roller used for rolling up the reverse image

Very early in my research, I realized that a subplate covered with silicone would make it more pleasant during rollup of the plate - especially at cleanup time. While many materials could be used, reclaimed _ inch plate glass is perfect when grained to produce a surface

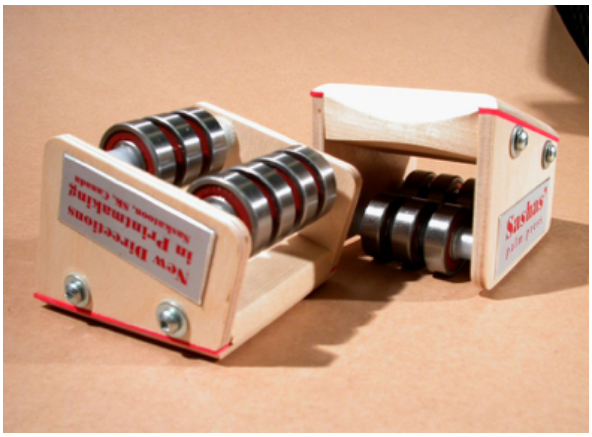


to hold the silicone. In 1992 I started to experiment with a 3-part roller system for inking up plates, perfecting a model in 1993 and publishing on how to construct one in the 4-part set of articles on Waterless Lithography in Printmaking Today, Vol. 4, #1 to #4, 1995.

About this time I decided to use offset printing for my editions because of the better results, but didn't like the large offset proofing press we had installed at the university. Since I did not have an offset press of my own, I built an adaptation that fits on my home built motorized transfer press, calling it *Linear Offset* in contrast to the common cylinder offset proofing presses used by printmakers. Because my press is completely motorized to stop at any set point, I can rollup the plate on the subplate next to the press and slab, while the paper is being printed, so no time is lost. I have now begun to use the offset option for most of my editions.

By 1998, because of the cost of aluminum plates, I developed a method to recycle ball-grained plates by using the smoother backs, which is better for waterless detail. I had experimented with sand blasting thicker sheets of aluminum, casting stones using Medusa cement and also trying resins to produce stone-like slabs. Reclaiming ball-grained plates is cheaper and more convenient for printmakers and students as they can be recycled many times over, until damaged in some way.

The same year I also developed a method by which diluted screenprinting emulsion can be coated on recycled plates to make my own positive waterless plates. While commercial positive plates are easy to convert to waterless printing, their cost is prohibitive for students - also for myself, as I use a large number of plates in an edition.



During 1999 and 2000, I worked on a simple baren-like tool that would allow my daughter's students at high schools to print waterless lithographs in their art classes. The Palm Press has become better known amongst monoprinters than lithographers, but I use one at times when it does the job more simply than a press. The unit might be used for traditional litho as well, if that is what the printer is still doing.

Palm Press: effective substitute for a press when printing small editions

Over the years I have been invited to give workshops at universities and printshops across the USA, in Hong Kong, and Japan. I have demonstrated the process at a number of North American conferences, as have many other printers, who seem to be using basically the same process. It is being promoted as Driography, Silography and Silicone Intaglio, but if Toray choose to call their process Waterless Lithography, that should be good enough for the printmaking community. I have yet to learn what are the revolutionary differences between some of these waterless lithographic processes. I know that many printmakers are using the process from the messages I receive for fine-tuning their techniques. It is being taught at several university art departments, but still seems to be rejected by older faculty who are well versed in traditional methods.

Many times I have stated that I never claimed to have invented the waterless lithographic process, but I will take credit for having come up with a simple process by which an artist can draw directly onto a plate, or photo-mechanically, using commonly available materials. As with opened-source files in Linux, I had hoped that by giving my innovations to the printmaking community, there would be much research by others that would be fed back

into the craft. I have yet to see any such feedback put up on the Internet or published in journals.

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More technical information on Nik Semenoff's waterless process can be found on the University of Saskatchewan Website:
http://homepage.usask.ca/~nis715/.

To contact Nik Semenoff, use: nik.semenoff@usask.ca

For more by Nik Semenoff on this website see:
Litho Toner Wash Copper Sulfate Mordant

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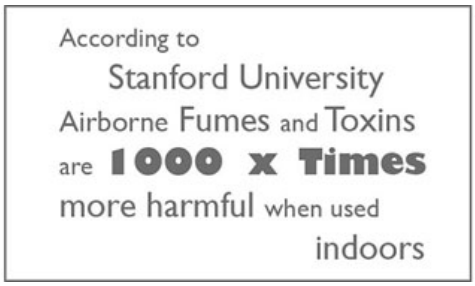

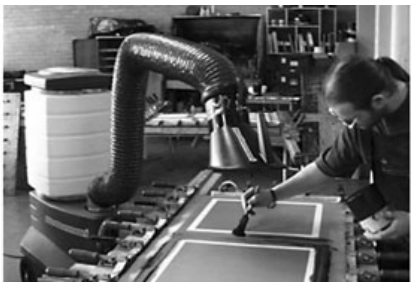

There are ways to remove toxic VOCs and acid fumes at the actual source, i.e. the surface of the stone. Companies such as the Swedish firm NEDERMAN make custom-fixed or portable extraction systems with flexible hoses that they claim provide sufficient protection - especially if used in conjunction with respirators and dilution ventilation. These systems also have filters that capture VOC residues, so that environmental requirements can be met. Some well equipped and more safety-conscious lithographic studios (for instance Tamarind) have similar fixed systems with flexible hoses suspended from the ceiling.
