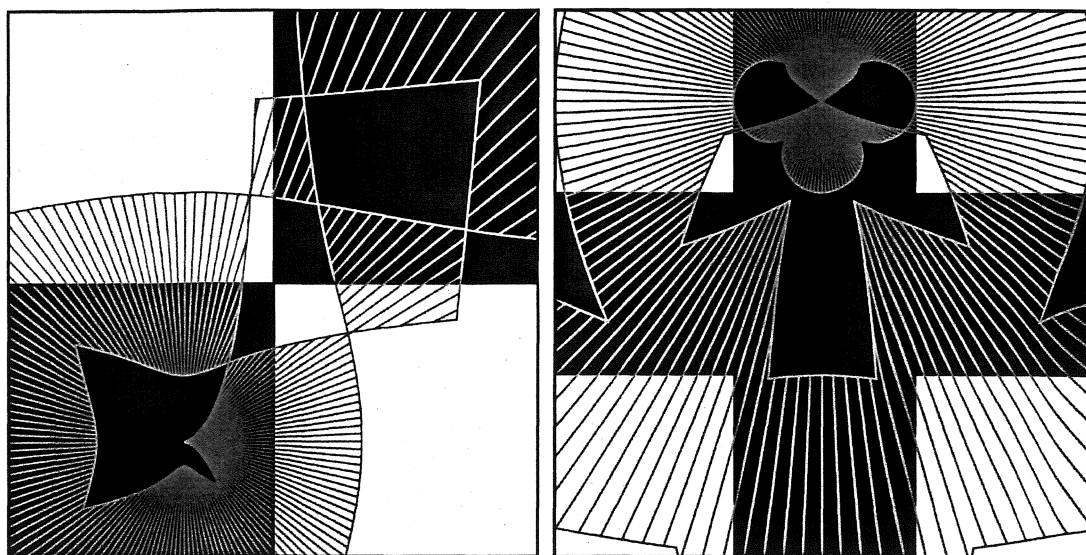# Digital Monoprints: Mining Conchoid Nets

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Around 1915 during the Russian revolution Kasimir Malevich became the first painter to embrace pure abstraction. The first of these works were minimal, often consisting only of a single circle, square or triangle. As the paintings developed more shapes were added, always of a primary geometry. Malevich believed that by purging his work of all traditional imagery he could create a wholly new art suitable to a radical new society and probe to the purer regions of human feeling and thought. He professed that this work had a spiritual underpinning and many historians agree, pointing to the similarities between Suprematism, the style he fostered, and icon painting.

Generating Conchoids

Utilized by the ancient Greeks and studied by Albrecht Durer, the conchoid boasts a much longer history in art. This project used the borders of Malevich's geometric figures as directrices for generating conchoids. Selecting a point as the source of a set of radial lines starts the generation of a conchoid. On each radial two points are offset equidistant from the intersection with the directrix. The set of all of these equidistant points is a conchoid. With twelve points corresponding to the numbers on a clock face serving as radial sources and three different offset distances the number of conchoids reached 36 per painting.

Figure 1 (left): Conchoid constructed on Malevich's "Four Square".
Figure 2 (right): Conchoid constructed on Malevich's "Black Cross".

Conchoids in the above figures translate the geometry into organic forms, some of which are extremely suggestive – like the strange "angel" that emerges from the cross on the right. That the conchoids allude to natural and religious imagery is intriguing, since the genesis of Malevich's geometry lies partly in a Russian tradition of religious painting. Ironically, a mathematical construction generated on a geometric emblem uncovers the spiritual and emotional implications of the emblem.

Conchoid Nets

Each set of 36 conchoids and their radials layer into complex nets of 4000 lines. The net below is the set of all conchoids and radials from "Four Square".
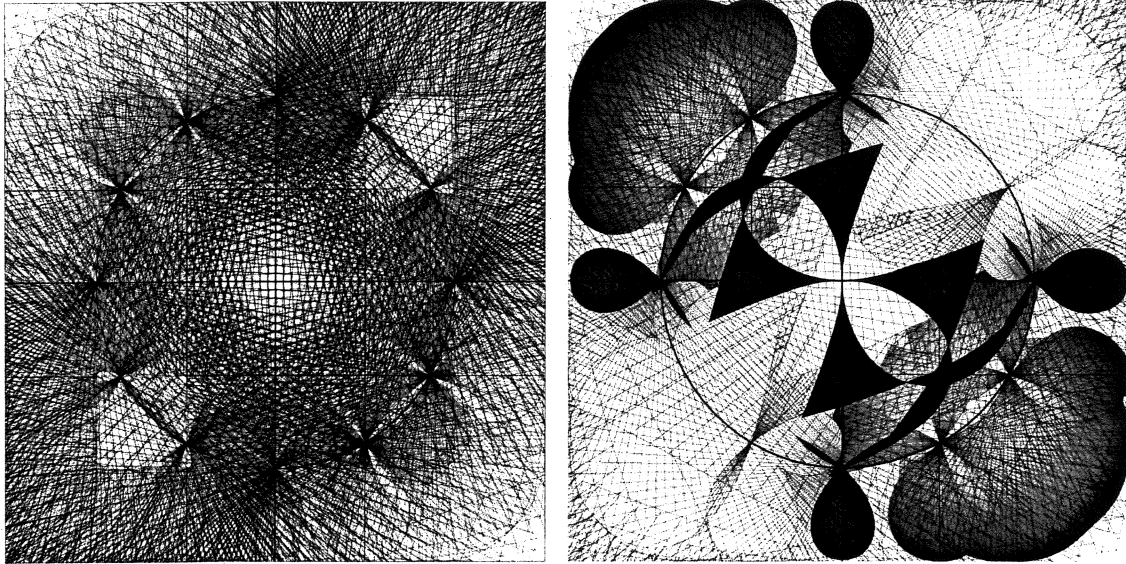

Figure 3 (left): Conchoid net constructed on Malevich's "Four Square".
Figure 4 (right): **Vane for Apian - Sturm,** digital monoprint, black ink on paper, 16.5 cm x 16.5 cm, 2003.

Smaller nets were created from 12 conchoid subsets (figure 4) of the larger net. These nets serve the bases for several sets of images featuring highly patterned, linear prints interlaced with shapes defined by the conchoids. Generated first in Rhino 3D, a spline-based CAD program, the actual shape filling and line attributes occurred in Adobe Illustrator.

Though created digitally the paper prints of images take on the look of classic prints. Once arriving at an evocative composition, the file was printed with archival ink on a warm white, slightly textured paper. A toned ground replicates the look of a fine etching. The lines are extremely fine – about .25 point – in order to create a very slight break up between the printer's dots and the line edges. This is not noticeable with casual viewing. On close inspection, though, it imitates the slightly eroded edges of an acid bite, thereby enhancing the allusion to etching.

After printing the file is further worked and then printed as a new image. Each modification obliterates the previous image, which is not saved. This maintains the status of the printed image as unique. The process is analogous to the monoprinting process in which a printing plate is re-inked or modified in a different fashion for each successive imprint. Certain structural themes may remain, but the image continues to change and renew.