

Prompted by the promise of CNC* smart tools emerging in the Maker Movement, from 2012 to 2014 I designed and made laser-cut corrugated cardboard lamps, decor containers and sculptures, as well as these laser engraved signs and wall art, which incorporate innovative techniques and materials, including paint filled laser engraved Panolam and acrylic sheet. Panolam is a 1/4" thick Medium Density Fiberboard (MDF), which has Melamine, a hard, durable plastic thermofused to the surface. The high contrast of the engraving filled with light-absorbing flat black spray paint in contrast to the natural sheen of the Melamine surface produces an image that crisply stands out in any lighting condition. I also created paint filled reverse laser engraved images on the back of clear acrylic sheet, as seen in this Instructables tutorial: <https://www.instructables.com/Enhance-Your-Image-when-Reverse-Laser-Engraving-on/>

Numerical control (also **computer numerical control**, and commonly called **CNC**) is the automated control of machining tools (such as drills, lathes, mills and 3D printers) by means of a computer. A CNC machine processes a piece of material (metal, plastic, wood, ceramic, or composite) to meet specifications by following a coded programmed instruction and without a manual operator directly controlling the machining operation.

A CNC machine is a motorized maneuverable tool and often a motorized maneuverable platform, which are both controlled by a computer, according to specific input instructions. Instructions are delivered to a CNC machine in the form of a sequential program of machine control instructions such as G-code and M-code, then executed. The program can be written by a person or, far more often, generated by graphical computer-aided design (CAD) software and/or computer aided manufacturing (CAM) software. In the case of 3D printers, the part to be printed is "sliced", before the instructions (or the program) is generated. 3D printers also use G-Code.

CNC is a vast improvement over non-computerized machining that must be manually controlled (e.g. using devices such as hand wheels or levers) or mechanically controlled by pre-fabricated pattern guides (cams). In modern CNC systems, the design of a mechanical part and its manufacturing program is highly automated. The part's mechanical dimensions are defined using CAD software and then translated into manufacturing directives by computer-aided manufacturing (CAM) software. The resulting directives are transformed (by "post processor" software) into the specific commands necessary for a particular machine to produce the component and then are loaded into the CNC machine.

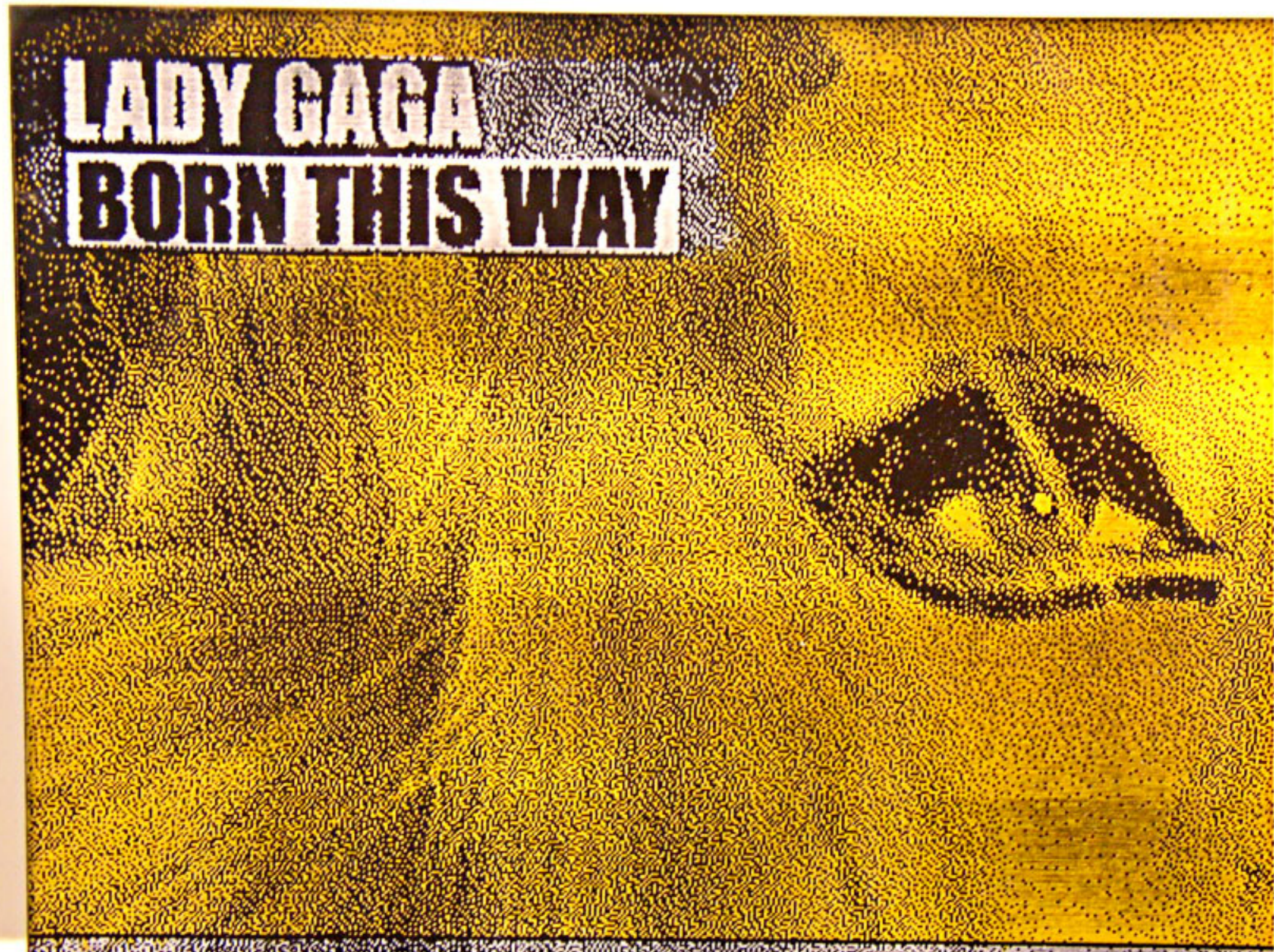
Since any particular component might require the use of a number of different tools – drills, saws, etc. – modern machines often combine multiple tools into a single "cell". In other installations, a number of different machines are used with an external controller and human or robotic operators that move the component from machine to machine. In either case, the series of steps needed to produce any part is highly automated and produces a part that closely matches the original CAD drawing.



A CNC machine that operates on wood



Muse in Music 13-007 10.5”h x 13.5”w



Muse in Music 13-007 (detail)



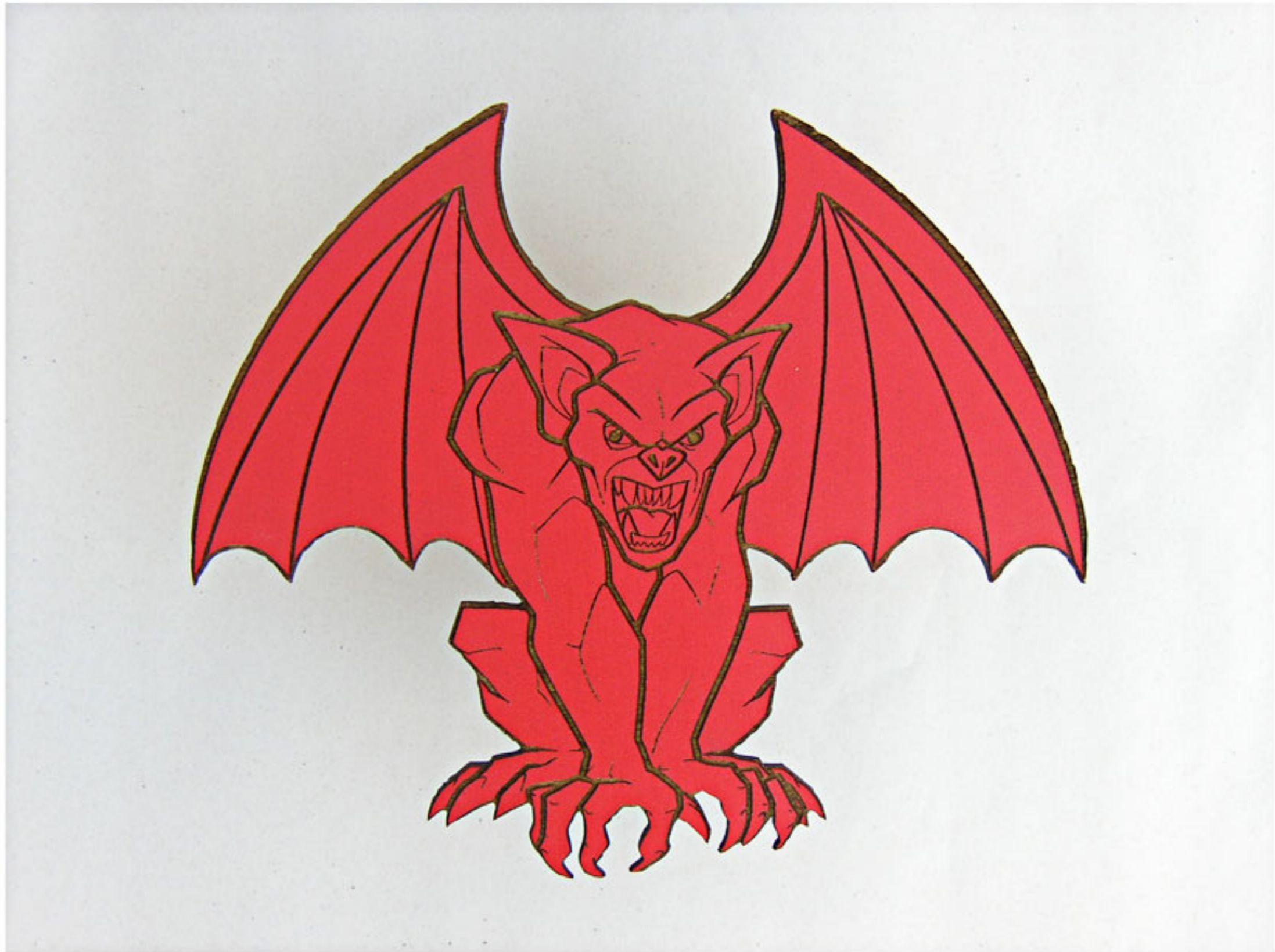
Halloween cut-out: "skull" 7.5"w x 11"h



Halloween cut-out: “*skull*” (detail) on Panolam



Halloween cut-out: "skull" 7.5"w x 11"h on Panolam



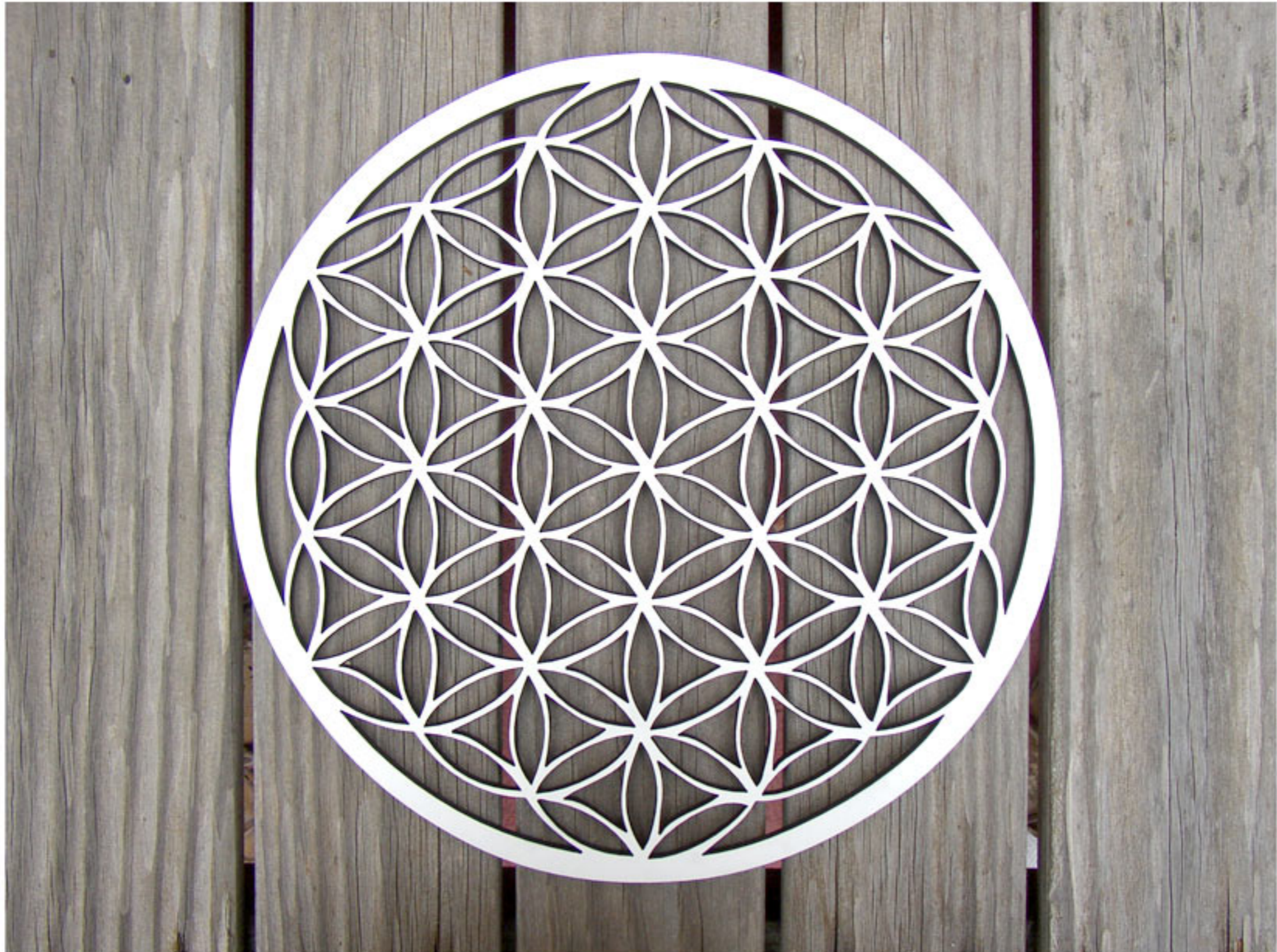
Halloween cut-out: “*gargoyle*” 9.5”h x 11”w



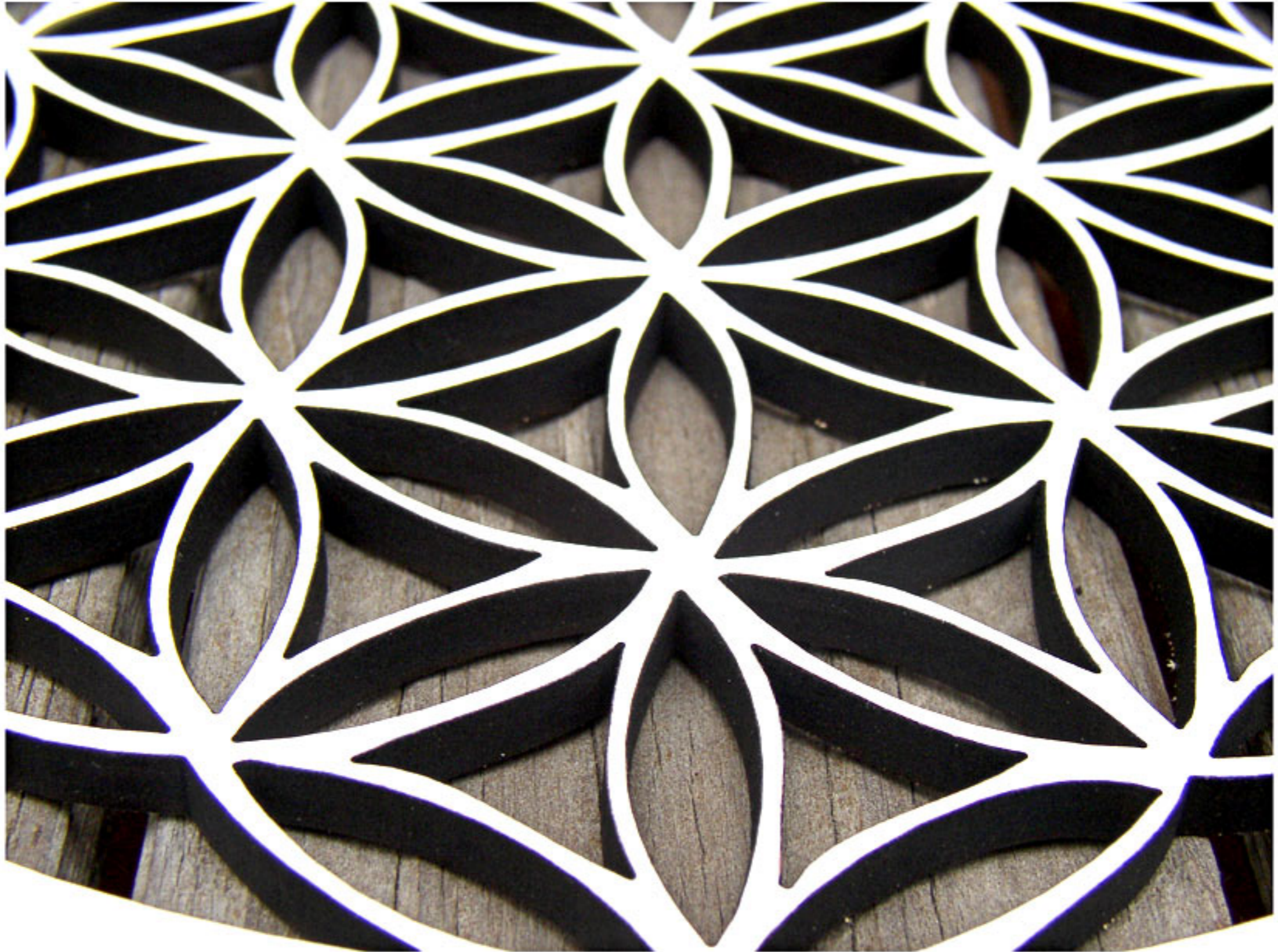
Icon 2202: winged heart (Sufi) 11"w x 11h"



Icon 2200: yinyang 11" diameter



Icon 2211: flower of life 11" diameter



Icon 2211: flower of life (detail)



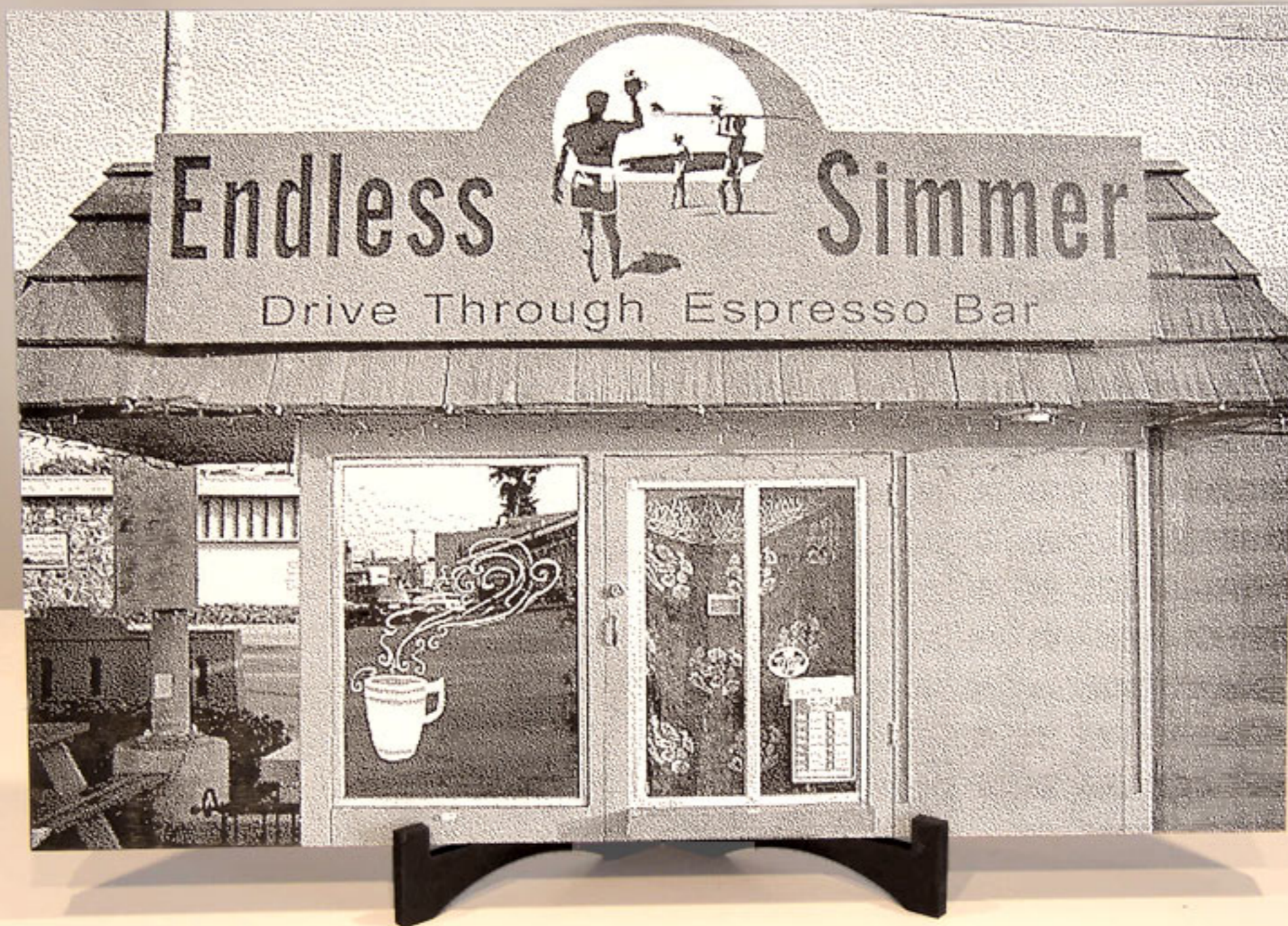
Icon 2208: ankh-02 (detail)



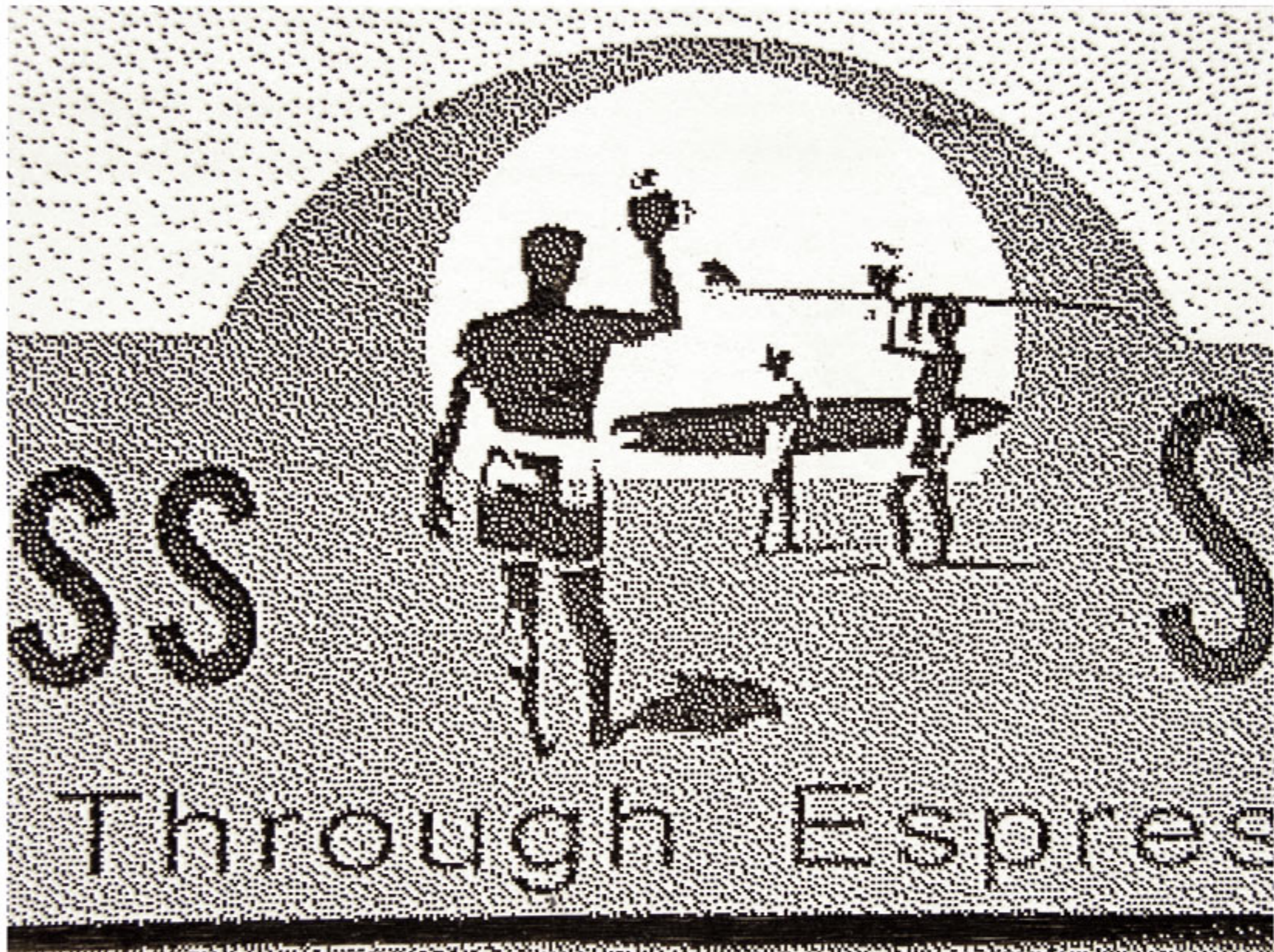
Icon 2208: ankh-02 5"w x 11h"



Icon 2205: Faravahar (Zoroastrian) 5”h x 11w”



Street Scenes 10-003 11.5"h x 17.5"w



Street Scenes 10-003 (detail)



Muse in Music 13-006 11.5”h x 17.5”w



Muse in Music 13-006 (detail)



Furry Critters 12-002 13"h x 19"w



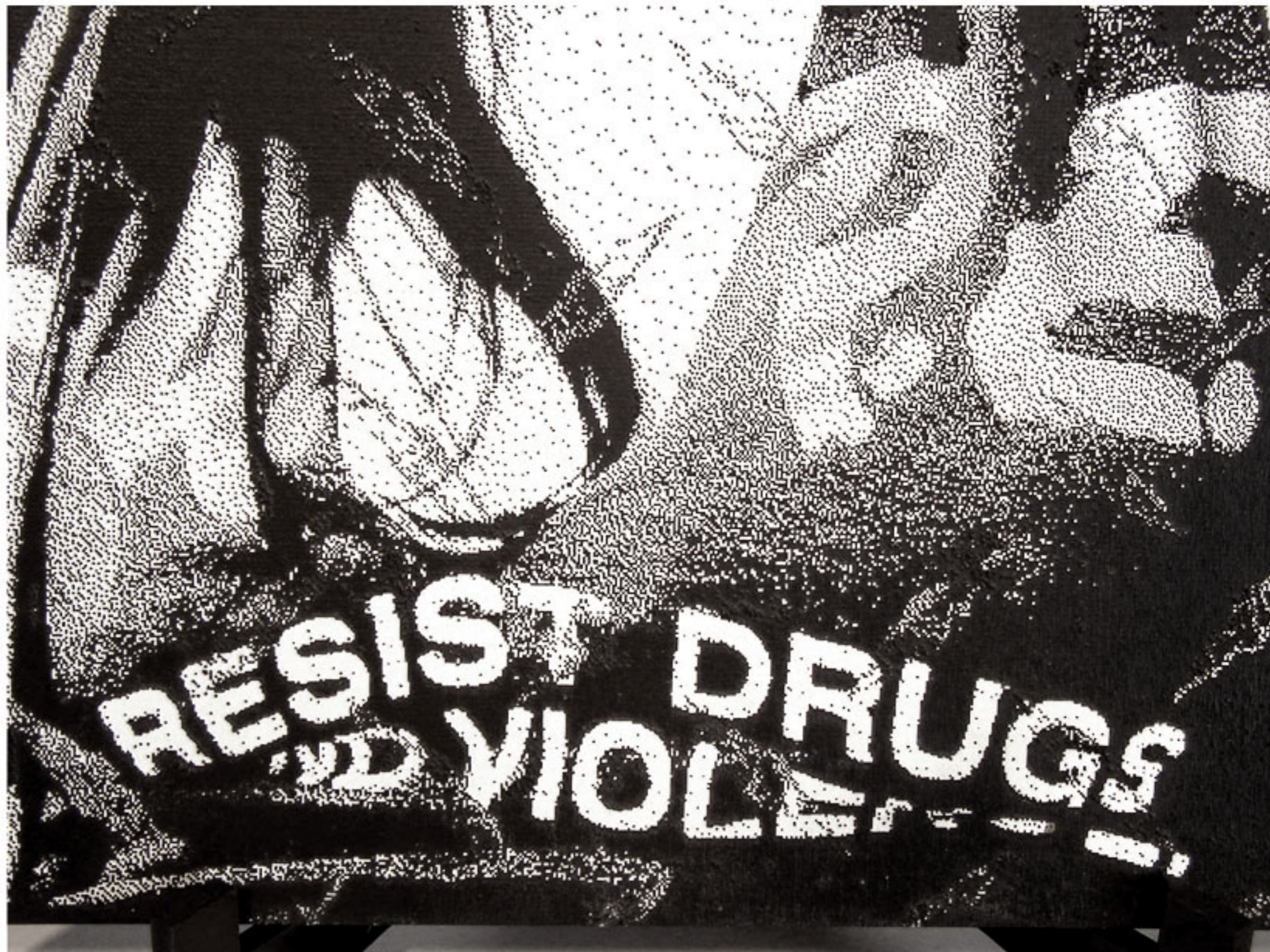
Furry Critters 12-006 8.5"h x 11"w



Comedians 15-024 13"w x 19"h



Comedians 15-024 (detail)



Comedians 15-004 (detail)



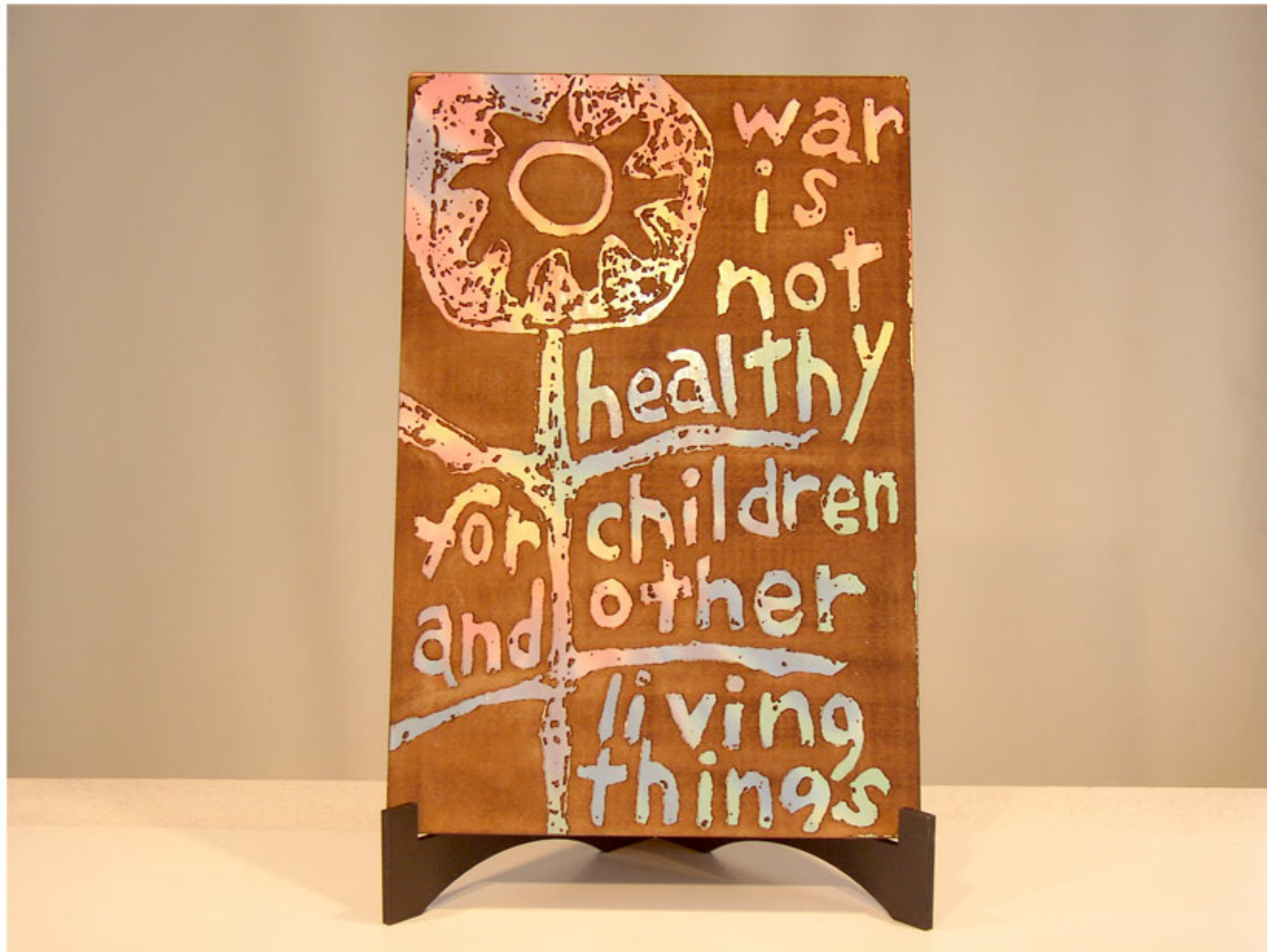
Comedians 15-004 13"w x 19"h



Drawing 16-002 11.5"h x 17.5"w



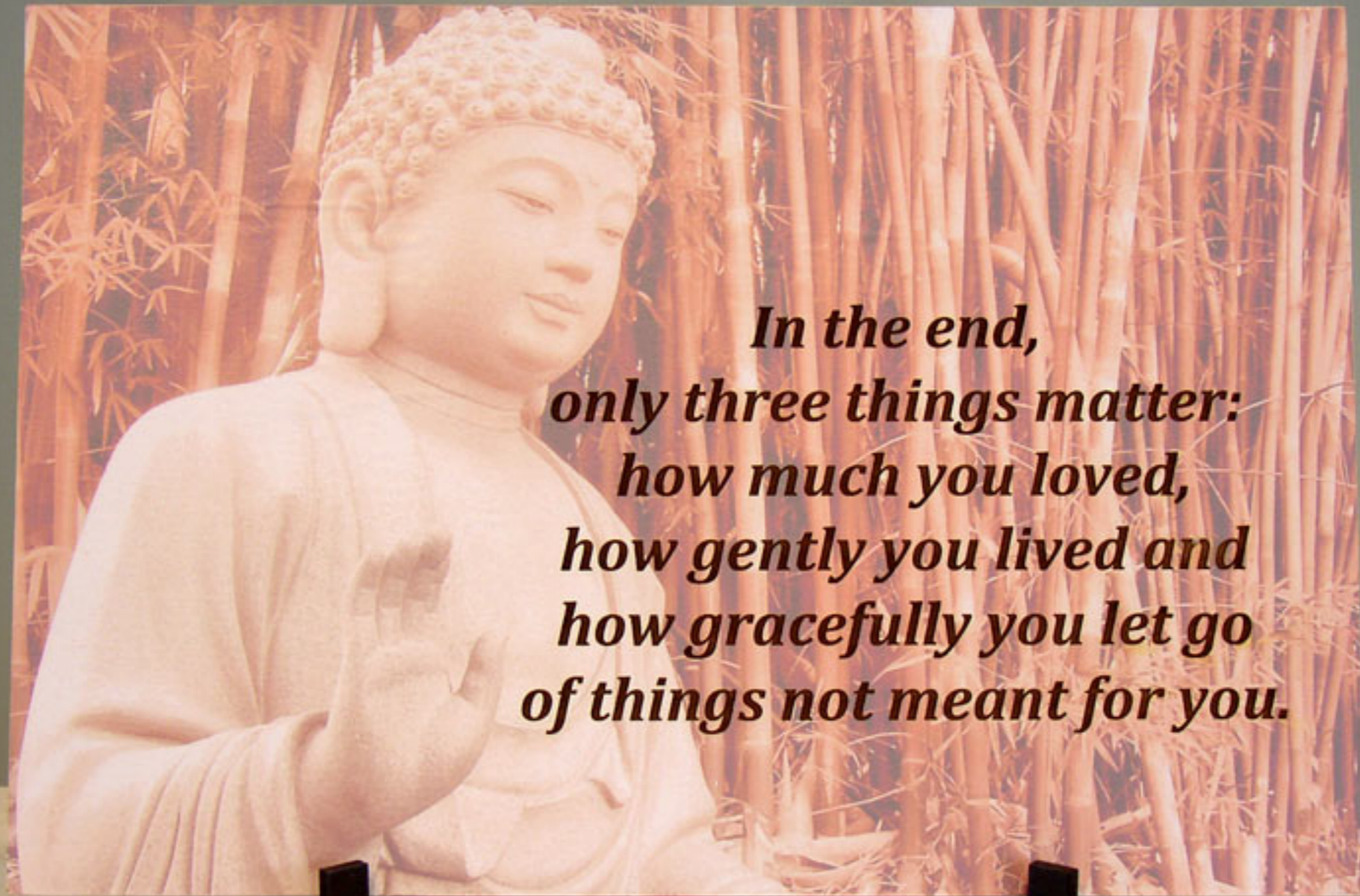
Drawing 16-001 11.5"w x 17.5"h



Sign 1001: "War is not" 12"w x 18"h

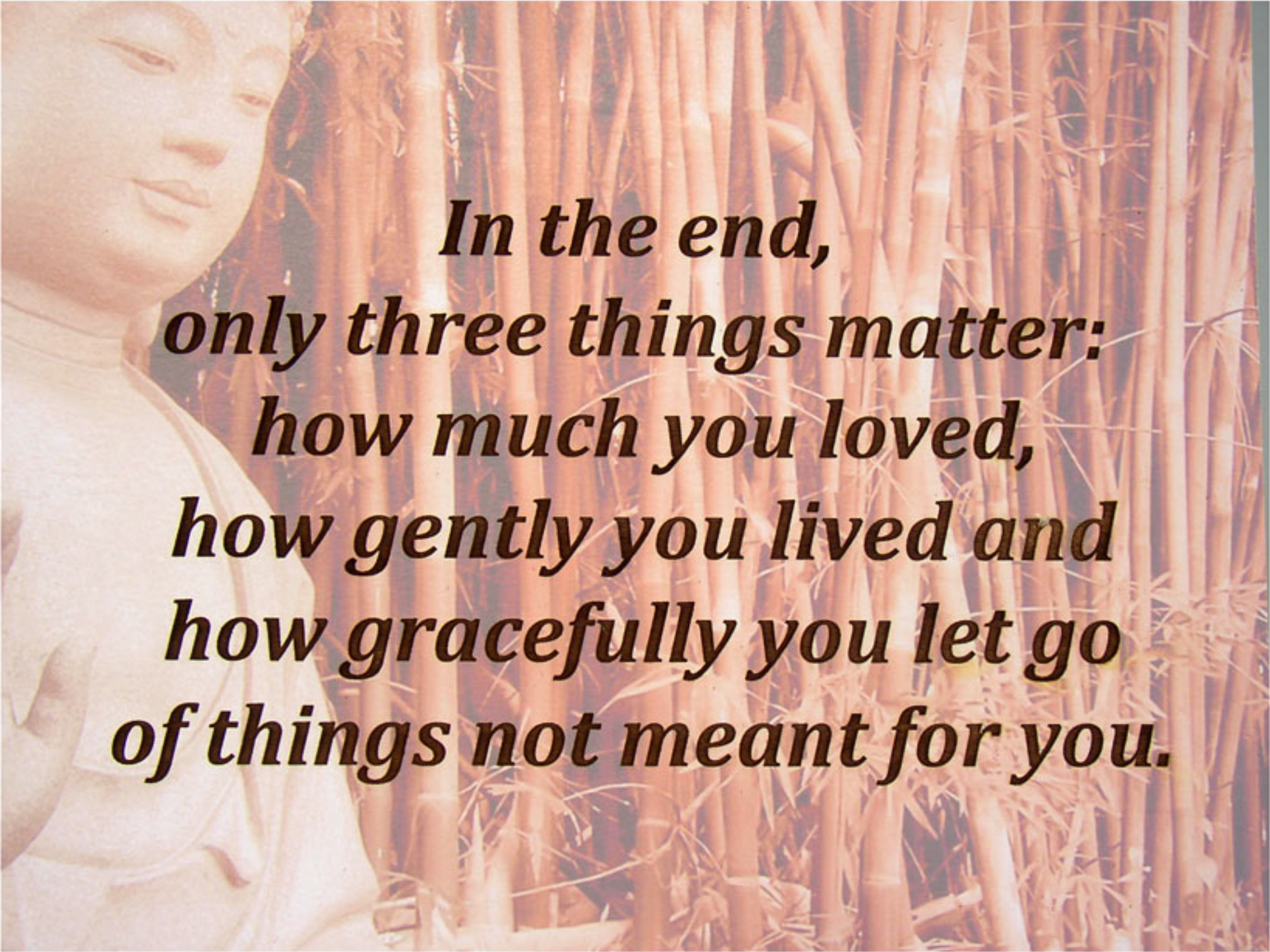


Sign 1001: "*War is not*" (detail)



***In the end,
only three things matter:
how much you loved,
how gently you lived and
how gracefully you let go
of things not meant for you.***

Sign 1003-s: *"In the end"* 12"h x 18"w



***In the end,
only three things matter:
how much you loved,
how gently you lived and
how gracefully you let go
of things not meant for you.***

Sign 1003-s: *"In the end"* (detail)



Namaste

I honor the place in you in which
the entire universe dwells.

I honor the place in you which is of love,
of truth, of light and of peace.

When you are in that place in you and
I am in that place in me, we are one.

नमस्ते

Sign 3010: "Namaste" 8"h x 10"w



Sign 3022: "Let the beauty" 8"h x 10"w



Sign 3032: “*anonymous cut out mask*” (detail)



Sign 4001: "dang" 8"w x 5"h



Sign cut-out 7033: "Gratitude" 11"w x 4"h