Primitive Drawings

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The cone, the sphere, and the cylinder are geometric solids derived from a circle. Within our contemporary digital framework a cone is a singular object that is a built-in component in most software platforms, a primitive. The same could be said for the sphere or the cylinder. However, these massive and apparently singular forms are composed of sets of simpler geometric elements: the circle and the point. In the history of architectural drawing, the ability to break down the cone, the sphere, and the cylinder into specific geometric properties has made these figures not only significant formal elements but also drawing instruments in their own right. Stereotomy, the drawing practice used to develop the shape of stones within vaults is a central example of this. Within this drawing practice cones were used to draw toroidal vaults, hemispherical domes, and simply to break down spheres into developable surfaces . These three simple solids, the cone, the sphere, and the cylinder can therefore be understood as geometric elements capable of describing forms of a higher degree of complexity then themselves. By extending this logic into the digital realm, it is possible to imagine geometric primitives not as something to be aggregated, intersected with, or subtracted from but as drawing instruments. Drawings instruments that are capable not only of creating simulated three-dimensional form, but also describing form through flat two-dimensional variants of orthographic drawing.

This project begins with the study and development of the techniques of drawing with solids exemplified in Guarino Guarini's Architettura civile (1735). Cones, spheres, and cylinders are each reduced to sets of two-dimensional relationships and then redeployed as instruments of distortion. Guarini's techniques were then used to create an orthographic drawing based on Robin Evan's analysis of Philibert de l'Orme's chapel at Anet . These techniques were then written into a computational process that allowed for the production of multiple variations of distorted curvature. All of the drawings, are flat, orthographic two-dimensional constructions that utilize a single line-weight for all information. Orthographic projectors, originating circles, and deformed nameless curves all appear with the same value, allow the drawing as an object to function independent of a specific representational outcome. Thereby reframing orthography as a drawing process in which the entirety of its components are read as potential form.

As orthographic projection and by extension descriptive geometry face a near extinction in most architecture curriculums, this project proposes a reimagining of their basic tenants within a digital framework. While simulated three-dimensional space continues to offer new potentials for formal invention and communication, the limits of flat two-dimensional orthographic drawings have yet to be tested.

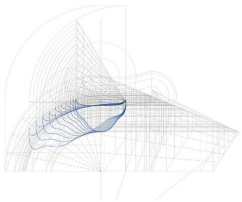

FIGURE 1: The projection of a semi circle onto the face of an oblique cone.

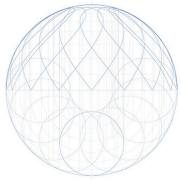

FIGURE 2: The orthographic projection of an annular array of circles onto a hemisphere.

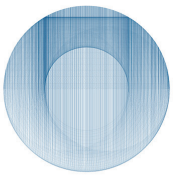

FIGURE 3: The same as above written into a computational process.

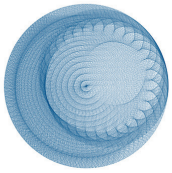

FIGURE 4: The same as above with variations around 360 degrees of rotation.

PRIMITIVE DRAWINGS

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This project begins with a study and development of the techniques of drawing with solids exemplified in Guarino Guarini's Architettura civile (1735). Cones, spheres, and cylinders are each reduced to sets of two-dimensional relationships and then redeployed as instruments of distortion (Fig 1). Guarini's techniques were then used to create an orthographic drawing based on Robin Evan's analysis of Philibert de l'Orme's chapel at Anet[2] (Fig 2). These techniques were then written into a computational process that allowed for the production of multiple variations of distorted curvature. All of the drawings, are flat, orthographic two-dimensional constructions that utilize a single line-weight for all information (Figs 3-4). Orthographic projectors, originating circles, and deformed nameless curves all appear with the same value, allow the drawing as an object to function independent of a specific representational outcome. Thereby reframing orthography as a drawing process in which the entirety of its components are read as potential form (Fig 5).

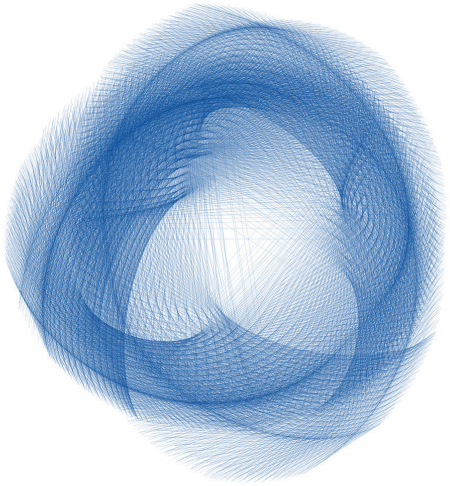
As orthographic projection and by extension descriptive geometry face a near extinction in most architecture curriculums, this project proposes a reimagining of their basic tenants within a digital framework.[3] While simulated three-dimensional space continues to offer new potentials for formal invention and communication, the limits of flat two-dimensional orthographic drawings have yet to be tested.

(Endnotes)

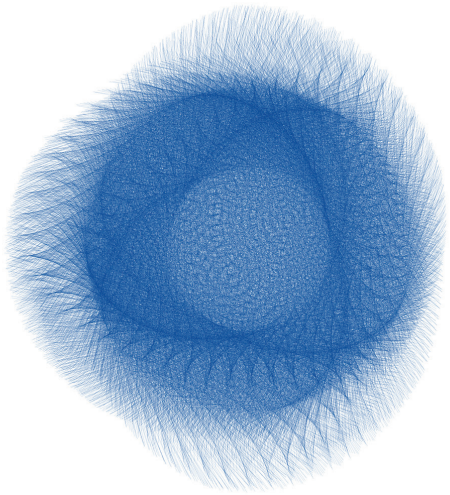
1. Guarini, Guarino. 1737. Architettura Civile. Turin: G. Mairesse.

2. Robin Evans. 1997. "Translations from Drawing to Buildings." In Translations from Drawing to Building, 153–89. Cambridge: MIT Press.

3. Mark Burry. 2011. "Geometry Working beyond Effect." Architectural Design 81 (1): 80–89.



a



b

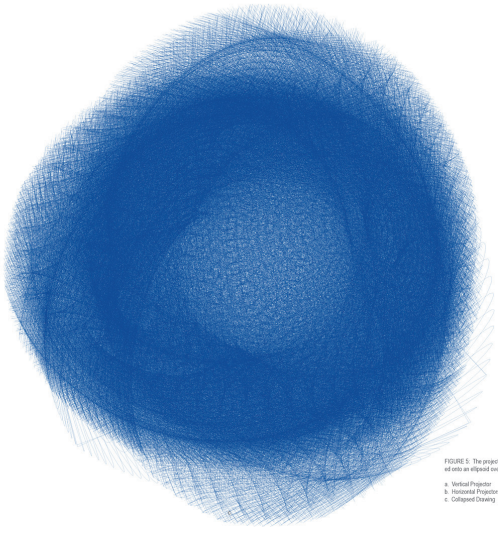


FIGURE 5: The projection of an annular array of circles projected onto an ellipsoid over 360 degrees of rotation.

a. Vertical Projector
b. Horizontal Projectors
c. Collapsed Drawing