QUESTIONS OF INTRODUCTORY DRAWING IN PROGRAMS IN ARCHITECTURE AND DESIGN

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ABSTRACT The focus of the paper is on the introductory teaching of drawing at 1st year university level in a South East Asian context, familiar to the author. The thesis is that a *realist* approach to drawing from observation, which is a combination of line and the shading in of objects, is limited. This is due to the approach's lack of acknowledgement of its more rigorous precedent, and due to what it cannot accommodate of existing knowledge of how visual perception works. A range of factors of visual perception is introduced as being possible objectives for the medium of drawing to address. The author suggests a re-positioning of drawing according to a more inclusive approach. The paper concludes with the suggestion that if drawing is taught in broader parameters, it may be a means through which students are also better able to explore their sense of self.

1.INTRODUCTION

The title of this paper refers to a beginning class in drawing that is sometimes named *Sketch & Rendering*, as part of 1st year curriculum art or design programs at university level. First lessons in drawing tend to involve introducing and improving skills in verisimilitude that result in drawn and shaded likeness from observation of three-dimensional objects and environmental views. It is debatable how much this approach to drawing articulates aspects of visual perception, and how much it is concerned with a traditional convention. The approach inevitably leaves several key aspects of visual perception out of consideration, and it is on this basis that the paper questions its suitability. The author describes the empirically rigorous method that underpins this convention, but is no longer recognizable in it, introduces a convenient derivation of it, and proposes re-positioning such a class in the domain of more pertinent visual questions.

2. METHODOLOGY
2.1. Drawing and Shading-in
The following scenario may be familiar to many teachers of drawing, or observers of the drawing process. An object, or objects are placed on a table and students are encouraged to sketch what is in front of them as diligently as possible in line, observing shapes, proportions, perspective and relevant relationships, and to shade in to achieve identifiable appearance of the motif. This same approach may equally concern observation of environmental locations. Such an approach is often seen in secondary schools, is sometimes a part of the entrance test of art and design faculties of universities, and is often the content of faculties' 1st year drawing classes. As art, this kind of drawing can be stylistically reminiscent of some western art movements, such as Impressionism, Pointillism and Realism. In design programs, the results may be less artistic and more focused on rendering three-dimensional formal relationships. However, the shading-in requirement of the process negates more challenging consideration that might have been given to line itself to indicate tonal contrast.

This is the background around which the paper suggests an alternative approach.
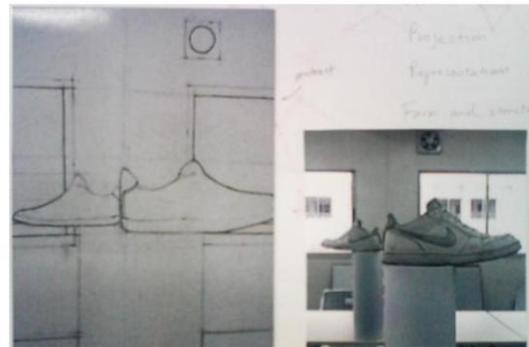
Fig. 1 1st year student's sketchbook page comparing a line drawing with a photo of the motif

2.2. The Space-frame
The Euclidean coordinates system was rationalized by Leon Battista Alberti in the Italian Renaissance through the invention of the space-frame. According to (Blunt, 1975), this was a "net" that was positioned between the painter and the object that enabled him to plot the coordinates of the object from it to an equivalent grid drawn onto the canvas or paper.

The Renaissance theory was that three-dimensional objects in front of the human observer were at the large end of what was illustrated as a wedge or pyramid whose apex reached to the centre of the eye. The space-frame extended across a flat frame that would be placed at an intermediary point in this optical pyramid between the eye and perceivable objects. Durer's famous woodcut (Gombrich 1977) shows the artist at work in this capacity, the needle he uses to align his eye with a certain fixed point on the space-frame suggesting the difficulty of using the device, despite its advantages, and the fact that this method involves the use of one eye only, or *monocular vision*. Drawing and shading-in, as described above, is a derivation of this mechanical method, but lacking the original's rigor.

2.3. Measurement and Structure

A simple method that results in more accurate rendering of three-dimensional objects and their transposition to the two-dimensional plane, because it integrates curvature of the optical plane of the eyes, involves holding one's arm outstretched with a straight-edge at right angles to it and plotting coordinates of the objects to a predetermined ratio. This, in effect, re-instates the space-frame at the point in space that is the distance of one's outstretched arm from one's eye. The advantage of this method is that the arc of one's arm, vertically and laterally, constructs the plane of measurement as curved on both axes, equal to the optical plane. Reflexively, one closes one eye in order to bring the point of measurement into simultaneous focus with the object being measured, hence also its limitation on the basis of monocular vision.

However, in ways that it could be said to set up, the method articulates the rigor of the measuring system in the drawing itself, the sense of methodically searching and calculating becoming an aspect of structure of the drawing. If one were using a space-frame, the square grid on the drawing on which to plot the coordinates would similarly suggest structure. If one were then to ignore shading in, the result would appear to be more an abstraction of characteristics of the motif.

This approach is useful for sharpening students' awareness of perspective and extracting geometrical shapes and pattern from observation. While the resulting configurations are often difficult to identify with the original motifs, they do convey a sense of investigation.
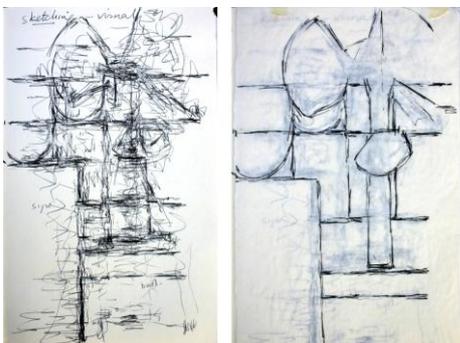
Fig. 2 Students' demonstration drawing by the author, where shapes are extracted onto a tracing paper overlay

In summary, drawn and shaded likeness in its contemporary application is divorced from the original mechanical method, and the emphasis on shading-in to look real precludes acknowledgement of existing theory as to how visual perception works.

The following sections introduce issues of visual perception which could be introduced as part of a more broad-ranging drawing experience.

2.4. Approximation

An alternative approach to drawing may be encouraged and developed that registers variable conditions of visual interest in whatever is the motif, as part of an *approximation* of what is seen.

The results of early eye-tracking devices which recorded eye movements of observers of photos and three-dimensional objects for short periods of time were studied by the psychologist Alfred L. Yarbus. The visual results of such early devices confirm the tendency of eye movements to be *saccadic*; specifically (Yarbus, 1967) to consist of rapid "drift and tremor." Yarbus's results show that movements across the visual field accrue at points of importance in understanding the image. Yarbus (1967) states that "Outlines and contours are important for the appearance of the visual image, but when the image has appeared and is seen continuously, the observer has no need to concern himself especially with borders and contours." Insofar as the *continuity* of visual interest is important when looking at things, the tendency is in contrast to the predisposition to determine contours very statically, as seems to be the case with students, and is often learnt as a convention.

2.5. Searching

The implication of line as used in the more exploratory and mobile sense, as suggested by Yarbus's findings, is theorized by (Gombrich 1977) through comparison between the incised line of Villard De Honnecourt in the 13th century, which he refers to as "schema," and Leonardo's use of line as pertaining to "experience."

Fig. 5 1st year students' drawing that concern *searching*

Drawing which accrues through a process of working and revision has a sense of the *trace* of its, and the agent's, history. Insofar as lines and marks can be a record of eye-movements, Yarbus (1967) states that "Eye movements reflect human thought processes..." In a broader sense, this indicates the creative agent's *presence* in the work, Gombrich's term "experience" here suggesting reflexive involvement.

2.6. Binocularity

Having to close one eye in order to fix the relationships between shapes of an object, or objects to one another according to the drawing convention described in Sections 2.2 and 2.3, may be considered to be unnatural. Since human eye pairs are situated on a slight curve, the disparity between each view of objects within a certain distance from one's sight, when the optic mechanism

brings them together, results in stereoscopic vision (Gregory, 1966). This knowledge is useful to students as a physiological precondition of perception of three-dimensionality.

The present derivation of the Renaissance method, described in Section 2.1, which is to attempt such drawing with both eyes open, nevertheless ignores the different conditions and implications of binocular perception. Such differences were integrated in the pictorial vision of Paul Cezanne in the late 19th century, and were further articulated intellectually by Cubism.

Secondly, the slight curve of the plane of vision results in the phenomenon of *subjective curvature* of the expanded lateral planes that central perspective renders as straight lines. Leonardo developed an alternative perspective system, called "synthetic perspective," in a treatise now known only as note references (White, 1972), which conferred with practical applications in the work of his contemporaries such as Uccello and the French painter, Fouquet. The early introduction of this to students would enable them to recognize the involvement of intuition and subjectivity as factors of visual perception.

2.7. Parallax

Parallax in visual perception concerns the apparent shift of objects as one alters one's vision in relation to them. The relatively fixed and permanent sense of objects, as opposed to their human viewers' mobility, is an understanding of the three-dimensional environment that the child acquires in its development of vision (Bohm, 2009). Reciprocally, objects can be said also to move in relation to oneself.

The main usefulness of acknowledging parallax concerns its more general implication of movement. According to Bohm (2009: 232), in visual perception "…one must do essentially what is done in the theory of relativity, i.e., to give up the concept of something that is absolutely permanent and constant." Bohm's (2009: 236) suggestion that in being visually sensitive to the "boundaries of objects," where contrast is often greatest, "…one obtains an emphasis on the outlines and forms of objects which helps to lead to their being perceived as separate and distinct," is not contrary to Yarbus. In both cases these observations correspond in the three-dimensional world to Bohm (2009: 236) "vibration and other movements of the eyeball." Changizi (2010: 65): "In real life, your visual system is designed to interpret the optic-flow patterns… You know your body is moving not because you see your body moving, but because you see the optic patterns in the world moving."

Where the purpose of exercises is to articulate movement through drawing, the drawing marks are an intermediary dynamic between the creative agents, the students, and their perception of objects moving. Stroboscopic traces of movement might be suggested by the marks, which would be an instance of relative autonomy of the medium.
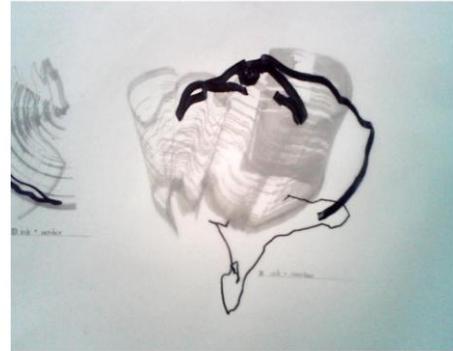

Fig. 6 1st year student's drawing of a screw being dragged across tracing paper by an underlying magnet

3. RE-POSITIONING

A paper by (Dahl, 2003), as part of a published series, details how Descartes' theorization of space in the 17th century, after Euclid, was developed practically by Descartes' contemporary, Gaspard Monge, from Renaissance perspective thinking. In another paper of the series, (Böhme, 2003) discusses more phenomenological questions concerning space as being the site of one's bodily presence. The question is then how students of architecture and other design disciplines encounter a range of consideration of space, as indicated by such papers, if drawing is delivered in the terms described in Sections 2 to 4. In the latter cases, the learning is either considered as being sufficient in itself or the first of what may be scheduled as a range of drawing experiences.

A debatable question of exclusive or chronological delivery of drawing method is that the thinking of students is likely to become set, where it is difficult for them to progress beyond whatever is the starting approach, or becomes eclipsed by the next new approach. The author proposes more integral consideration of a range of issues pertaining not exclusively to drawing, but to visual perception as the generic phenomenon which drawing considers and is developed around.
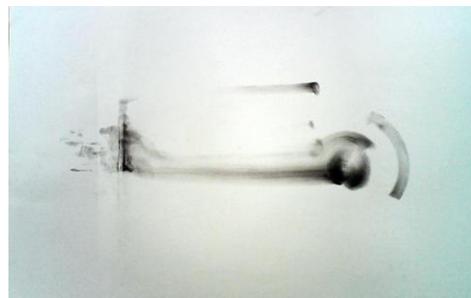
Ist year student drawing that visualizes a set of movements of elbow, arm and hand

The eye-tracking device, discussed in Section 5, suggests that one scans objects and the three-dimensional environment. Interaction between shapes, tonal density, relationship of the lateral plane of vision to the plane of the paper, instead of vision only as vortex, and the greater

relative autonomy of the medium to the purpose would, with this approach to drawing, be more apparent.

Such an approach to drawing may also be an early opportunity to indicate to students that under certain circumstances they can be subjectively related to their work; experiential, in the sense suggested by Gombrich, as well as empirical.

How such consideration is imparted will encourage students' conceptual structuring of thinking between visual perceptual experience and the mediumistic language of their respective design disciplines. Drawing exercises may themselves be speculative, as opposed to prescriptive, according to the sensibility of the teacher

4. EVALUATION METHOD

There are of course many ways of evaluating students' performance with content of the kind discussed in the paper. With more speculative drawing exercises, evaluation may concern the experiential level of students' individual engagement. Insofar as experience can be assessable through the drawings themselves, this will be in qualitative terms. If any drawing question is presented specifically enough at the outset, the focus will be on seeing to what extent the results compare with the question and, in the case of groups of drawings, with one another.

In Fig. 5, above, for example, if a question that resulted in these two drawings had been to avoid the over-stating of the contour, it may be argued that the work was of only average merit. This would not be a definitive criticism of the drawings, but only in terms of the project question, which is an important distinction to make to participating students.

The implication is that a dialogue is initiated through the content of the class, between the teacher through verbal instructions and any practical demonstration or precedent examples, what the students understand and can do, and the presenting results.

5. CONCLUSION

This paper has taken a familiar approach to drawing in an introductory class and has first considered it in the context of the background from which it developed. While the rigor of this background in Renaissance perspective theory is relevant in many design contexts, its exclusive consideration is nevertheless limiting. In any version of this approach, a particular limitation is its use of monocular vision only.

The alternative options presented in Section 2.4 of the paper have their origin in visual questions, either as optical phenomena, such as binocularity, or as characteristics of vision that are experiential, for example as searching for appropriate configurations through relatively automatic qualities of the medium, and parallax effects of movement.

It is suggested in Section 2.6 that a purpose of drawing could or should be the exploration of visual perception, as opposed to being limited to prescriptive conventions. (Dahl, 2003) states that the space-frame, in its capacity of intercepting the visual pyramid as conceived by Alberti, was considered to have "ontological status" indicative of one's human sense of *being*. A possible validation of exploring visual perception through drawing is that the medium can also be a means of self-identification and exploration, as suggested already by the paper's occasional reference to human subjectivity. By this means, apart from others, students will be likely to develop more meaningful personal connection with drawing.

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