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Review:

S. Edgerton Jr., *The Renaissance Rediscovery of Linear Perspective*, (New York, 1975), *The Art Bulletin*, New York, Vol. 59, No. 2, (July 1977), pp. 281-282.

SAMUEL Y. EDGERTON, IR., *The Renaissance Rediscovery of Linear Perspective*, New York, Basic Books, 1975. Pp. 206; some ill. \$15

Edgerton is concerned with more than the rediscovery of linear perspective. He wishes to account for a dramatic shift in topographical realism that occurred around the turn of the 15th century and assumes that this shift was "based on the assumption that visual space is ordered a priori by an abstract uniform system of linear coordinates" (p. 7). Hence he is faced with answering (p. 32): "How did people in early fifteenth century Florence 'see'. . . . What was the peculiar 'mental set' at that time which made certain citizens of Florence as amenable to pictures constructed according to the cold logic of optical geometry?"

To resolve these questions Edgerton turns to the theological context in Florence prior to considering briefly the significance of the "abacco" tradition and Leon Battista Alberti's interests. He then goes back to provide a brief survey of "the fathers of optics"-Alhazen, Grosseteste, and Witelo-by way of introduction to Alberti's *Optics*. All this serves as the background for the hero of the book, Paolo dal Pozzo Toscanelli whose interests in Ptolemaic cartography Edgerton sees both as the inspiration behind Brunelleschi's first method of linear perspective and as indirectly responsible-via Paolo's correspondence with Columbus-for the discovery of America. The book ends with a discussion of perspective as a cultural paradigm-its validity as a "symbolic form." The lucid style of the book makes it extremely readable but at the expense of glossing over a number of problems. Among these we shall consider seven.

I. Definition of Terms

Edgerton avoids defining even basic terms and does not take a stand on such fundamental questions as whether perspective is or is not a convention (p. 6):

The issue is moot, and the question as to whether perspective is revealed or imposed continues to stir debate among cultural historians and perceptual psychologists (at present, the "discover" side seems to be carrying the day).

Nor is he consistent in his relativism. Somewhat later, with reference to Alhazen, he claims (p. 74):

In such insights by this, the greatest of the Arab optical theorists, can be seen the foreshadowings of the ultimate and true perspective which was to come forth in Italy centuries later.

This is a positive stand from which he again retreats at the end of the book (p. 165):

Surely in some future century, when artists are among those journeying throughout the universe, they will be encountering and endeavouring to depict experiences

impossible to understand let alone render by the application of a suddenly obsolete linear perspective. It too, will become "naive", as they discover new dimensions of visual perception in the eternal, never ultimate, quest to show truth through the art of making pictures.

The reason for Edgerton's ongoing confusion is quite obvious. He does not distinguish clearly between the objective relationship that linear perspective establishes with the measured world and the subjective interpretations of visual perception-let alone make more subtle distinctions, as has Gombrich, between perspective relating to the "what" but not the "how" of vision.

Edgerton's discussion of the two main methods of linear perspective-which convention remembers by the names "distance point" and "costruzione legittima" suffers from a similar lack of definition. Whereas writers such as B. A. R. Carter¹ (1970) have demonstrated how the differences can be explained succinctly, Edgerton defines the "costruzione legittima" in fuzzy terms as (p. 195) "that form of linear perspective dependent, as Alberti's, on a vanishing point. To be distinguished from `distance point construction . . . '

Edgerton then proceeds to give an equally vague definition (p. 196) of the distance-point method and claims that this was used by Alberti, albeit scholars have traditionally described Alberti's method as a "costruzione legittima." No explanation for this discrepancy with accepted views is given. The diligent reader will find only a footnote (ix, 9) referring him to an article on the question in *Arte lombarda*.

II. Brunelleschi's First Perspective Method

Edgerton's presentation of this is as delightful as it is misleading. He begins by recalling Krautheimer's interpretation, which claims that Brunelleschi must have used a ground-plan/elevation method, prior to presenting his own interpretation concerning Brunelleschi's possible use of a mirror in preparing his picture of the Baptistery. But precisely how these two interpretations relate is not stated.

His replication of Brunelleschi's supposed experiments using a mirror and camera looks convincing until we realize that he has resorted to "tilting the mirror very slightly" (p. 149) and that "the camera itself was also tilted slightly to help form the composition of this picture" (p. 150). Surely such a tilt would have been ill-suited for any neat geometrical demonstrations that Brunelleschi might have wished to make. But this question is sidestepped as is the question of alternative theories. Edgerton does cite Brunelleschi's biographer Manetti but takes no notice of how Manetti carefully qualifies his claims about the quantitative approach of Brunelleschi with the phrase "or thereabouts" (*vel circa*). Had Brunelleschi used a strict ground plan/elevation method, in all likelihood Manetti would have praised more directly the objectivity of the method.

¹ B. A. R. Carter, "Perspective," *The Oxford Companion to Art*, ed. H. Osborne, Oxford, 1970, 840-861.

III. Ptolemy's Third Cartographic Method

Of the methods discussed in Ptolemy's *Geography* Edgerton is particularly interested in the third (discussed in Book vu) (p. 104):

What Ptolemy now proceeded to explain is almost a clear-cut linear perspective projection based on geometric principles. This, indeed, is the first recorded instance of anybody-scientist or artist-giving instructions on how to make a picture based on a projection from a single point representing the eye of an individual human beholder.

Admittedly Edgerton says "almost" but he forgets that "almost is not quite." Nor does he explain why Ptolemy's discussions of planisphere projections deserve no mention, especially since there is reason to believe that such projections existed prior to Ptolemy's time. Moreover, we know from the influential Biagio Pelacani da Parma, whose work may well have been studied by Brunelleschi, that persons in optics were actively studying Ptolemy's *Planisphere* as early as the 1390's and, indeed, were projecting shadows of planispheres onto walls in darkened rooms. But of this activity Edgerton mentions nothing. Instead he is forced to admit there is no clear evidence that his third method of Ptolemy had any influence on the invention of perspective (pp. 104-05):

In most later Greek and Renaissance Latin copies there is either no explanatory diagram at all, or if there is one, it misconstrues the text. It was apparently even so difficult that cartographers could not understand it-for never, to my knowledge, was this third method employed in the making of Ptolemaic maps.

Edgerton does not resolve the paradox of how a method that was not understood could have inspired the origins of linear perspective. A further feature of Ptolemaic geography that impresses Edgerton is "the grid system which reduced the traditional heterogeneity of the world's surface to complete geometrical uniformity" (p. 113), a fascinating claim that blithely overlooks the whole medieval surveying tradition of the "agrimensores" who used such grids extensively.

IV Ptolemy, Toscanelli, and the Discovery of America

Nor does Edgerton's enthusiasm about 2nd-century cartography stop here (p. 120):

Ptolemy's atlas seems also to link this rediscovery of linear perspective to the most spectacular Renaissance achievement of the fifteenth century-the discovery of America by Christopher Columbus.

Here Edgerton again introduces Toscanelli as a go-between. This possibility is presented as if Edgerton were the first to consider it (albeit *vide* nn. viti, 18-22). We are not told that the idea was put forth at a geographical congress in Antwerp (17 August 1871), nor that Garin² has referred to the matter as "the thorny problem" of Toscanelli and has noted

² E. Garin, "Ritratto di Paolo dal Pozzo Toscanelli," *La cultura filosofica del rinascimento italiano*, Florence, 1961, 313ff.

articles against (as well as for) the idea. Uzielli's book on the subject is cited without any analysis of its contribution (n. vnt, 22).

V Space, Vision, and the Unity of Renaissance Thought

Throughout his work Edgerton is concerned with the problem of space. He supports the a priori neo-Kantian approach of Erwin Panofsky and argues that (p. 161) "in the fifteenth century, there emerged mathematically ordered 'systematic space', infinite, homogeneous and isotropic making possible the advent of linear perspective."

Moreover, Edgerton is convinced that with Bradwardine and increasingly with the Italian painters the notion developed "that the theoretical infinite space of the mathematician and the physical space one sees before the eyes are one and the same thing" (p. 20). Unfortunately Edgerton does not account for the considerable evidence that the story is not so simple and uniform as he would have us believe. For example he does not explain why the eighth proposition of Euclid's *Optics*, which expressly denies an inverse size/distance law, should have continued unadjusted throughout the 16th, 17th, and 18th centuries even though linear perspective clearly demonstrated that such an inverse size/distance law existed. So theories of vision were not immediately adjusted to fit newly discovered principles of linear perspective.

Nor, for that matter, did all painters immediately adopt the new principles. Indeed, then as now, many practitioners perceived the objective rules of linear perspective as too stultifying and theoretical. All of which leads us to ask whether 20th-century scholars, following the example of Panofsky, have been seeking to impose on the 15th-century phenomena a unity that never existed at the time. Indeed we would suggest that the real significance of linear perspective was not that it established a single integrating viewpoint that rendered rational and homogeneous both visual and representational space but rather that linear perspective stimulated a variety of competing interpretations concerning works of art.

Linear perspective provided a new means of giving demonstrations of method in works of art. Authors of treaties on linear perspective could make theoretical claims concerning the significance of such demonstrations. Outsiders writing on the subject could, in turn, interpret the significance of both the demonstrations and the claims concerning them, and meanwhile those concerned with theories of vision were still free to pursue alternative explanations. Hence there were now at least five obvious levels of interpreting the same work of art.

It might prove instructive if one viewed other crucial events in intellectual history in this light. One might well find that the contribution of Columbus's discovery of America or Copernicus's work on astronomy lay not in imposing a new order but rather in moving one step further towards a multivalent level of explanation.

An example of just how complex remained the tensions between vision, linear perspective, painting, and theoretical concepts of space can be found in Alberti's notion of what Edgerton calls "horizon line isocephaly" (p. 26), by which he means the principle that the vanishing point is at the horizon level. There are numerous paintings in the later 15th century, notably ones by Ghirlandaio and Botticelli, where no such simple rule can

be found. The vanishing point of buildings often does not coincide with the horizon line. Indeed three or four eye levels are often implicit.

VI. The Problem of Unsupported Claims

Edgerton's book contains a number of fascinating turns of phrase that, when carefully considered, are unsupported and/or insufficiently explained. One wonders why he describes portolan maps as "tactile" (p. 97). He cites no evidence to support the assertion that "binocular vision might also, the Quattrocento Florentines thought, give the sensation of curved lines" (p. 137). Nor does or can Edgerton prove the remarkable claim that (p. 165) "Space capsules built for zero gravity, astronomical equipment for demarcating so-called black holes, atom smashers which prove the existence of anti-matter these are the end products of the discovered vanishing point." Sometimes, as in his allusion to a scriptorium for Ptolemaic texts in Florence (p. 98), Edgerton raises important points, but then, alas, he does not follow them through.

VII. Misleading Points and Errors

Edgerton cites a passage from Alberti that he claims is "remarkable" especially because of the wit of Alberti's personification in speaking of "the 'tired' visual rays" (p. 84). This is simply misleading because the image of the tired eye goes back at least to Vitruvius (IILV9). Edgerton goes on to contrast Alberti's work with "the unrelievedly sterile optics of Alhazen, Witelo, Bacon or Pecham." This statement not only downplays his earlier claim concerning the "insights" of "the greatest of the Arab optical theorists" (p. 74) but also ignores the evidence that Alhazen and Witelo carried out a number of interesting optical experiments.

When Edgerton turns to discuss "the human eye as understood in the Middle Ages and Renaissance following Alhazen's theory of vision" (p. 70), he makes no mention of the great variety of diagrams of the eye. Nor does he give any clues concerning the provenance of his own curious diagram, which bears little resemblance to the best known medieval illustrations. Finally there are small but not insignificant details that are wrong: hence the date 1484 instead of 1494 is given for Pacioli's *Summa di Aritmetica*. . . . (p. 39).

All these points detract sadly from a book that asks such fascinating questions and touches on so stimulating a range of ideas. The positive feature of these drawbacks is that the book makes entertaining reading out of a subject that is often deadly dull. In this respect the book is highly to be recommended. Students and others who wish to come to grips with the puzzling realities of the situation are advised, however, that Edgerton's various articles make a far greater contribution to the field than does this book.

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