

*Philosophical Forum*, vol. XXVII, No. 4, Summer, 1996.

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THE SEMANTIC OF LINEAR PERSPECTIVE

"Though it may seem strange and paradoxical at first sight, the center of gravity is shifted from the philosophy of nature to the philosophy of culture." --Ernst Cassirer<sup>1</sup>

To open with the question with which I will mainly be concerned, what does linear perspective mean?

A response best begins with what it meant at one time, and this can only be approached by recalling how it works. A pyramid with its base the things seen, its apex the viewers eye, is cut by a plane, upon which the things are projected to convey a picture. This plane, or section of the visual pyramid, may be placed between the viewing point and the things seen, as in linear perspective; or it may be placed behind a “viewing point” which is actually the locus of converging light waves, as with a camera, as with the eye. The details significantly vary; the principle is in all three cases the same (Fig. 1).

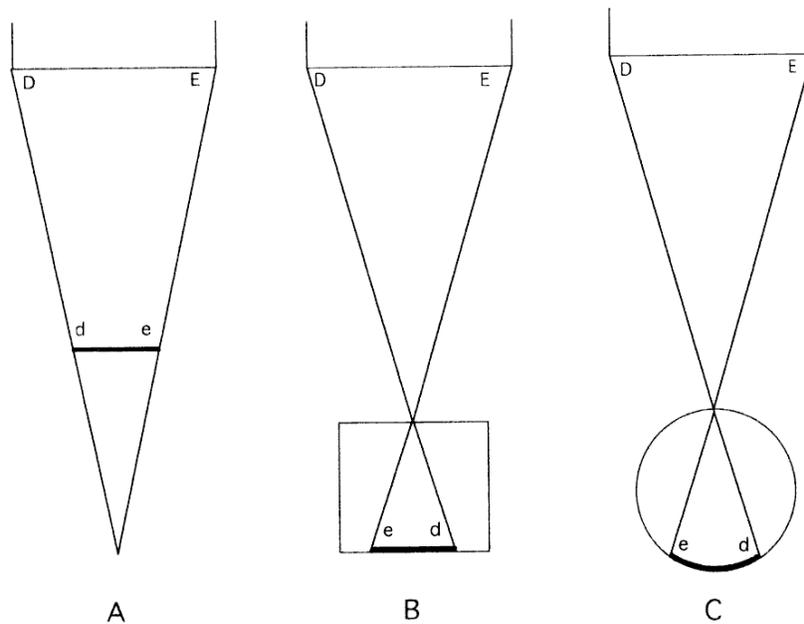


Figure 1. A plan. The relation of a building facade, D, E, to the picture and the apex of the visual pyramid. (A) Linear perspective. The visual pyramid is cut by a section, equal to the picture. D becomes d and E becomes e. The picture is in front of the apex. (B and C) Camera and Eye. The picture is behind the apex. e and d are inverted. In a modern camera the section is the film, while in the eye it is the retina.

Because of this shared geometry, perspective was long thought equal to sight. In one notebook entry Leonardo compared the image in a camera obscura to that in the eye. In another he spoke of the pupil as receiving the objects by means of light and immediately referring them to the intellect on an axis passing to the optic nerve.<sup>2</sup> "Therefore," Kepler concluded, after investigating the relation between the anatomy of the eye and the action of light within it, "vision occurs through a picture of the visible thing [being formed] on the white, concave surface of the retina."<sup>3</sup> Descartes subsequently borrowed from Kepler for his *Optics*, published an illustration of Kepler's discoveries and joined Leonardo in likening the eye to a camera while stopping short of

Kepler's conclusion. If vision occurred from pictures, Descartes reasoned, this would lead to an infinite regression of pictures and eyes receiving them.<sup>4</sup> Locke, however, returned to Leonardo by compared the "understanding" to a camera obscura, a dark room with pictures coming into it, and by the time of Odgen Rood, the American physicist whose writings influenced Seurat and the other neo-Impressionists, Descarte's caution was lost. Optics, cameras and seeing were but facets of a single truth.<sup>5</sup>

Rood had much company in his belief that minute perspective pictures of the outer world, cast by the lenses on the rods and cones lining the retinas, were not only the precipitate cause but sum of what we see. As these pictures were inherent to sight, as they were data ingested by the mind to comprise the whole of sight, the meaning of linear perspective derived from the laws of physics, from the consequent generation of perspective images and from what could be called the machinery of perception (for perception was conceived in mechanistic terms). The penultimate if not final answer to the question of meaning was discerned, for of optics, perspective and the behavior of light a great deal was known. The realm of inquiry certainly was plain. It was the realm Cassirer had in mind, in his monumental *The Philosophy of Symbolic Forms*, from which the epigram for this section is taken, when he mentioned the philosophy of nature.

One reason for the shift Cassirer wrote of, from nature to culture, is that since Rood's day the linking together of optics, perspective, the behavior of light and visual perception has fallen into disrepute. No longer is it accepted that perception follows from perspective pictures. Instrumental to improved understanding of their inadequacy as a model for vision have been studies of two kinds of visual movement, the constant minute tremor known as physiological nystagmus, too fine to be readily observable, and the grosser, jerking movements of scanning and fixation, called saccadic. By mounting a tiny picture on a stage affixed to a tiny stalk, affixed in turn to a contact lens in a subject's eye, so that the picture follows every movement of the eyeball, the minute tremor can be negated, the pattern of light on the retina stabilized. When this is done perception quickly decomposes into momentary blindness.<sup>6</sup> What this research tells us is that usually perspective pictures as such never lodge on the rods and cones, for these nerve cells are incessantly in motion. They are scanning whatever stands before them. As for the implications of saccade, it again seems the brain does not passively receive the external world whole and, so to speak, pre-pictured, as if in a photograph, but, rather, actively construes the external world by jumping between and fixating upon its salient features.<sup>7</sup> And in the visual cortex researchers find nothing but vastly complex patterns of neural excitation and repose.<sup>8</sup> Never is there a picture as such anywhere in the bodily system.

In a recent introductory text on visual perception the history of perspective-as-sight and its overthrow is summarized thus:

Physics made possible an understanding of light and of the laws of optical transmission in the air and eye. It became clear that vision is not due to the emission of energy from the eye, and it was understand how objects in the external world were represented as images on the retinal

surface. The laws of optics were also employed in art through linear perspective. Once the similarity between perspective pictures and optical images was appreciated the problem of perception was conceived in terms of extracting information from a two-dimensional scene. The retinal image was considered to be a static picture, with profound effects upon both theory and experiment. Pictorial representations of objects were treated as adequate experimental substitutes for the objects themselves, with the result that the dynamic aspects of vision were too readily ignored. Because our eyes are in constant motion, the retinal image is an abstraction.<sup>9</sup>

That perspective pictures are unlike perception will be taken as a principle sufficiently established to allow using it here as a starting point. The question of what perspective means, not to be as easily resolved as was formerly thought, then lies open, and is complex. Light passing through the lenses and falling on the retinas involves the same geometry as that used for linear perspective; sight depends on this fact; yet perspective pictures do not token perception; yet people make such pictures, look at them, and often think of them as true to what they see. The range is from involuntary, somatic activities to the conscious symbolization referred to by Cassirer in the title to his magnum opus. And since an equivalency of perspective and perception presumed to occur at the somatic level has just been disallowed we cross from one realm of inquiry to another, taking this new realm, also, as a starting point. The search for what perspective means will be conducted neither in physics, nor in optics, nor in experimental psychology, but in the logic of signs and symbols.

Which statement serves to introduce scientist-turned-philosopher, Michael Polanyi. Aided by Harry Prosch, who completed the 1975 book they entitled *Meaning*, Polanyi showed how that for which we thirst issues from various language or language-like relations.<sup>10</sup> After two early chapters analyze these and attend to the most elaborate among them, metaphor, later chapters ambitiously apply the thinking to art, myth, religion and political life. Though Polanyi does not discuss perspective his approach can be applied to the topic, and is, indeed, the foundation and frame of the present effort, which accordingly falls into four parts: (1) this introduction, (2) a reprise of Polanyi, (3) the fitting of Polanyi's ideas to the central furnishing of the post-fifteenth century mind with which we are here concerned, and (4) a conclusion.<sup>11</sup> Linear perspective, the thesis runs, is a semantic structure having as its meaning the images it yields.

## 2

Though there may seem at first to be no connection, everything in this part of the essay will be applied to perspective. Polanyi's wealth of illustration and ancillary detail must be discarded, but his italic emphases can be kept. With an invitation to readers to consult the worthwhile source, I begin a very compressed account of Polanyi with the kind of knowing he calls from-to knowing. We look through a stereo viewer and see two slightly different photographs combine in a single image. Our attention moves *from* the individual pictures *to* their joint appearance. The individual pictures become *subsidiary* to

their *focal* combination, and, on being combined, are *phenomenally transformed*. This transformation is their joint meaning. "The subsidiaries of from-to knowing bear on a focal target, and whatever a thing bears on may be called its meaning. Thus the focal target on which they bear *is the meaning* of the subsidiaries. We may call this an act of sense-giving and recognize it as the *semantic aspect* of from-to knowing."

Having established this language, Polanyi points out that as we read a sentence our attention moves from the words to their sense. The words are subsidiary to a sense that combines them and is the focal target. They acquire a different coloration when united in their sense than when encountered alone or as unknown words. That is to say, they have a *functional* relation to their sense, they are phenomenally transformed when subsumed to the whole of which they are parts, and that gain of whole from parts is, again, a semantic one -- a gain of meaning. An important corollary is that the stereo pair of photographs and the words in the sentence vanish in their respective targets. Superseded as distinct items by their joint import, they become bodiless, or transparent. They are lost in their meaning.

Polanyi then mentions using a probe to explore a cavity or a stick to feel one's way in the dark. Such activities exemplify from-to knowing because attention moves from the butt of the probe or stick in our hand to the far end touching an obstacle. The sensation of the butt pressing into our hand is subsidiary, the sensation of the far end touching an obstacle, focal. The one is lost in the other. Also, we no longer behold the probe and stick as external objects, for they become extensions of our body. Shifting our capacity for touch outward to the tip of the probe or stick, we pour ourselves into them. We dwell in them. Thus Polanyi describes from-to knowledge through *indwelling*.

Rarely do we attend the pair of photos rather than their image, the stick in our hand rather than its tip touching pavement, the words in a sentence rather than their gist. As Polanyi puts it, the pair of photos, the stick and the words have *minor intrinsic interest* compared to the *major intrinsic interest* of their meaning.

Now if the stereo pictures are subsidiary to their joint image so are we as looker. If words are subsidiary to the gist of a sentence so are we as reader and thinker. If our hand gripping the stick is subsidiary to its tip touching the floor so are we as navigator. In other words, the subsidiaries of these integrations includes "all the bodily and mental clues in which we dwell." Such integrations can be described as *from* the self as a center of integration *to* the object of focal attention. They are *self-centered integrations*.

Such is Polanyi's terminology, such, at least in outline, the thinking that supports the terms. The terms and thinking may now be considered in regard to sign, symbol and metaphor.

A word is a cipher or vocalization that signifies its meaning. As a vocalization or as a sequence of cryptic marks, the word has minor intrinsic interest compared to the major intrinsic interest of its sense. The vocalization or cipher points the way, in a simple,

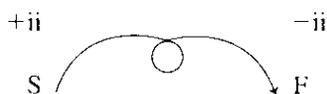
linear fashion, to a meaning it indicates. These are the characteristics of a sign, and Polanyi diagrams them thus:



Turning from signs to symbols, when we look at the flag of our nation our belonging to the nation is subsidiary while the flag itself is focal, as with a word, but intrinsic interest is reversed. Our interest is in belonging to a nation rather than in a mere piece of colored cloth. Meaning rebounds from the (focal) colored cloth to the (subsidiary) nation we are part of. Standing for the nation and our life in it, the flag is not a sign for a meaning it points to but instead embodies all that our country and our life in it call to mind. "Symbolization therefore entails something quite different from designation or indication. To designate the United States by its name is structurally the very opposite of symbolizing the United States by a flag. To designate the United States is to integrate a name to a country, while to symbolize the United States by a flag is to integrate a country to a flag."

In contrast to signs, when we regard the flag we do not look beyond ourselves, as centers, to an object of focal interest that seems to stand apart from us. All of our existence as carried forth in our country is invested in the piece of cloth that symbolizes it. Our self is accordingly given to the focal object. That is why, when we look at the flag, we are inclined to abandon ourselves to it. We are transported by the symbol of our nation, and are carried away. Here the integration is *self-surrendering*. "It is only by virtue of our surrender to it that this piece of cloth *becomes* a flag and therefore becomes a symbol of our country."

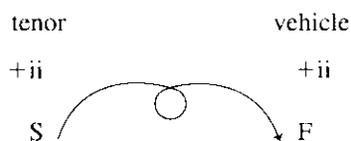
These structural characteristics Polanyi diagrams by placing intrinsic interest opposite that of a sign and by having the arrow somersault to indicate transport of the self:



As for metaphor, "[it] consists in giving a thing a name that belongs to something else," Polanyi quotes Aristotle as saying. A metaphor is made of disparate parts, the thing and the name belonging to something else. When the disparate parts are combined, the yield is the metaphoric image. In the simple metaphor, "the ship plowed the seas," a vessel moving through water is given a name belonging to the preparation of soil for planting. When the share and moldboard cutting and turning soil and the ship cutting and turning sea water are combined the yield is an image of a prow slicing water as dense and heavy as earth.

As with words in a sentence and their gist, our attention shifts from the subsidiary parts of the metaphor to the focal image, and it is in this shift that the meaning of the metaphor rises. As with the two stereo pictures, the parts, when united, are phenomenally altered: a ship-as-plow is qualitatively different from a ship and plow separately. As with the flag and the country it stands for, meaning rebounds from the focal image to the subsidiary parts, the ship and plow. Metaphors would resemble symbols except that intrinsic interest rests both in the subsidiaries and the focal target. Between the ship and plow on the one hand and the ship behaving as a plow on the other intrinsic interest is shared. Such play between disparate parts that have competing intrinsic interest accounts for the fullness of metaphors and their sometimes discordant resonance.

The difference between symbols and metaphors Polanyi diagrams by placing equal intrinsic interest in both parts:



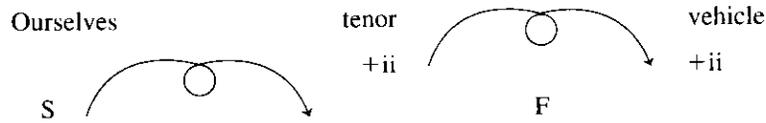
He follows I. A. Richards, who assigned the term “vehicle” to the active part of metaphors, the term “tenor” to the ostensible thrust, the part acted upon. The ship moving through water is the tenor, the ostensible thrust, the plow is the vehicle, the active part, altering the tenor. Richards anticipated Polanyi’s “phenomenal transformation” when he observed “that the vehicle is not normally a mere embellishment of a tenor which is otherwise unchanged by it but that vehicle and tenor in co-operation give a meaning of more varied powers than can be ascribed to either.”<sup>12</sup>

Polanyi quotes these lines from Shakespeare:

Not all the waters of the rough rude sea  
Can wash the balm from off an anointed king.

Here the sea assailing the balm is the vehicle, the inviolability of the king's office is the tenor. These subsidiaries are integrated in the distinctive focal image of a king lost to grandiosity in respect to the permanence of his office. This is the meaning of Shakespeare’s trope. And this meaning rebounds from the king’s grandiosity to the balm assailed by the sea, which, in their new and novel function, are phenomenally transformed. The structure is not that of a symbol -- intrinsic interest is shared between the parts -- yet the integration is self-surrendering: "All those inchoate experiences in our own lives that are related to the two parts of a metaphor are integrated into the meaning of a tenor and a vehicle as they are related to each other in a focal object (a metaphor). The result is that a metaphor, like a symbol, carries us away, embodies us in itself, and moves us deeply as we surrender ourselves to it." We occupy a metaphor, we take it up as

a point of view, we dwell in it, and so the relationship of ourselves to a metaphor is shown by Polanyi thus:



3

“Our world is a projected world, shot through with characters lent to it from our own life.”--I. A. Richards<sup>13</sup>

Turning to linear perspective, I wish to establish the parameters of the discussion by offering some illustrations and commenting on them. In what follows I hold to this distinction between images and pictures: We envision images while pictures are images realized and made concrete. A picture embodies and casts off an image; an image might become but is not yet a picture. The two terms will be used alternately but not interchangeably.

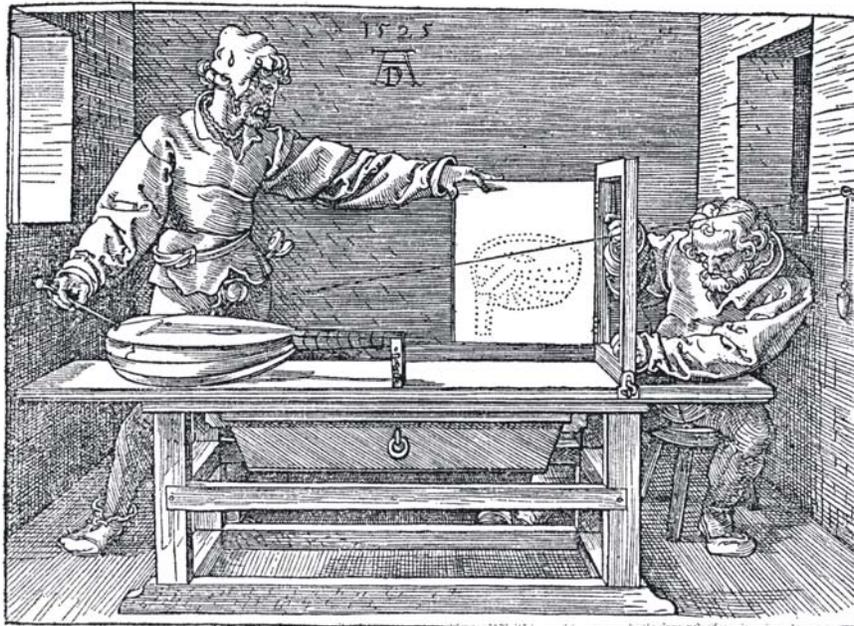


Figure 2. From Albrecht Dürer's *Unterweisung der Messung*. Perspective has two aspects, discursive and figurative. The two men demonstrate how the discourse can be manipulated to produce the figure on the hinged door.

First is Albrecht Dürer's woodcut of a perspective device (Fig. 2). Using a pointer joined to a weight by a thread that passes through a "needle with wide eye," two men touch the pointer to various places on an actual thing, a lute, fix the results with crossed threads on a frame and transfer same to a "tablet," thereby making a picture. Compared to a perspective construction, the needle's eye is equal to the viewing point, the string and pointer describe in their movements the visual pyramid, and the frame and tablet are equal to the plane of section.<sup>14</sup>

Dürer's woodcut beautifully exemplifies what I have elsewhere called the two aspects of perspective, discursive and figurative.<sup>15</sup> By discursive I meant developed logically, by figurative I meant the expression of one thing (our looking at actual things) in terms of another (the perspective picture). The discursive aspect pertains to the geometry, the rationale behind the geometry, the various diagrams and demonstrations that constitute perspective practice. The figurative aspect pertains to pictures that put discursive reasoning in abeyance, for they are immediately present to our direct, sensuous apprehension. These two aspects together make up the whole of perspective. Thus the two men making their measurements demonstrate the discursive aspect, lodged in theory, experiment, objective quantification, and the image of the lute on the tablet, which opens like a door, reveals the other aspect, the fruit of the discourse, a flat, directly apparent form.

It was Kant, to be sure, who distinguished conceptual thought from pure, disinterested contemplation of that irreducible unity, a work of art. A more proximate source is Susanne K. Langer, who entitled a chapter of her *Philosophy in a New Key* "Discursive Forms and Presentational Forms," but who often wrote as if the categories were less opposites to be reconciled, or not, than exclusive modes, with mathematics and logic on one side, music, dance, poetry and pictures on the other. In her last work, *Mind*, she used linear perspective to illustrate absolute separation. The fence she erects in the following quotations is between "discursive models" and "presentational images":

An image is not a model. It is a rendering of the appearance of its object in one perspective out of many possible ones. A model, on the contrary, always illustrates a principle of construction or operation; it is a symbolic projection of its object which need not resemble it in appearance at all . . . .

An image abstracts the semblance of its object, and makes one aware of what is there for direct perception. A model illustrates a principle of construction or function quite apart from any semblance. A model is usually based on a single systematic abstraction which can ultimately be expressed in mathematical terms. Consequently it is a model, not an image, that one works with in science.

The fact is that the draftsman who is guided by a method such as Dürer advocated in his *Unterweisung der Messung* is not merely 'cutting corners' in the process of making an image, but is making something else, namely, a model of the object, by a rule of symbolic translation . . . .<sup>16</sup>

Such remarks are consistent with the line of thought that runs from Emile Bernard to Clive Bell and Roger Fry to Clement Greenberg, and that we now call formalist. Of this movement Susanne Langer was, in philosophy, an avatar. For her, as for the critics named, the significance of the work of pictorial art was given not mainly but only in the relationships of color, shape and line that are immediately present to sight. The image, in its totality of interrelated parts, was all; science, philosophy, narrative, ethics, politics and religion - all the subjects of interest and activity that previous ages had under these or other names regarded as crucial attributes of pictures, and that according to Polanyi's thinking can be thought of as subsidiary contributors to a focal target - were extraneous distractions, to be peeled from the essential core of plastic tensions and discarded. No more would Raphael's *School of Athens* refer to the history of ideas, Delacroix's *Liberty Leading the People* to Republicanism, Poussin's *Pan and Syrinx* to the tale of a nymph metamorphosing into reeds that become the pipes of Pan; or, rather, to the extent they did, to that same extent they might be depreciated. "One of the results of the emphasis on the abstraction within modern painting," as Meyer Shapiro put it, "has been the tendency to slight the content of past art, so that even the most realistic representations are viewed as pure constructions of line and color."<sup>17</sup> It was against this background that Langer wrote of perspective as the antithesis of pictorial quality.

We might retain the formalist insight, that paintings are visual music, but wonder if delineating formal concerns by means of exclusion is too rigorous. If it is to be doubted that science purges itself of figurative thinking, no matter how much some have wished for it that it do so, neither is it clear that the formal integrity of a presentational image such as is a picture can be rid of discursive content. Linear perspective, for example, is less an illustration of the twin modalities of thought standing fenced-off in enclaves, as Langer, I believe wrongly, thought, than of their interdependence. The image of the lute, it will be appreciated, is yielded by the discourse, a causal relation Dürer comments upon by showing us the device making a product. Linear perspective, using the terms Langer employed, is a model that *produces* images. The dual aspects of the method can no more be sundered without destroying sense than can the parts of any meaningful whole. If the picture of the lute implies the process that formed it (though the process is not immediately apparent but stands over and beyond direct experience of the picture), so that the sensuous import of the picture can be fully appreciated by the viewer only when he or she understands the logic, it is equally the case that manipulating the logic apart from the pictures it makes would deprive it of the reference to a self-looking-at-a-picture that alone gives it significance. The logic is meaningless unless it implies contemplation of a picture, the picture, contemplated, is replete with its full meaning only when it resonates with the logic that shaped it.

Moreover, as the two men make a picture like the lute, so do they make the lute like a picture. Perspective enables them - and us, as their witness - to see the lute *as a*

drastic abstraction, an arrangement of flat shapes on a plane. Resemblance is a two-way street, it moves from lute to picture, and from picture to lute. The "symbolic translation" Langer refers to, the procedure of marking up a two-dimensional map of a three-dimensional object, is also a transformation of phenomena such that the lute itself is altered in appearance. The logic of perspective can carry into our present sight of actual things whenever we opt to regard them as though they were pictures. Perspective is in this case a shaper of our discernments, a beam cast onto our looking-at-things, altering all it strikes; in short, a form of perception.

It is this type of projection, the type of our leveling an idea at things, as distinct from the other type, that of things casting an image upon a surface via perspective geometry, that Richards had in mind, in the epigram for this section, when he wrote of our world as a projected one, and that Langer herself had in mind, in a by no means unrelated context, when she wrote that "a mind educated to appreciate the projected image brings the eye's habit with it. After awhile, we genuinely 'see' the thing as we apprehend it."<sup>18</sup>

This second type of projection, in which an idea fosters an appearance, will be of concern below, when attention is given to indwelling, but for now it is sufficient to have established that perspective has two aspects, discursive and figurative, that the first aspect produces the second, and that the whole of perspective, trained on actual things, can cause them to resemble their perspective picture.

Two further illustrations compliment the Dürer by laying out what it does not aim to reveal, a perspective construction (Figures 3 and 4). Here the picture is of a room, its floor set with the traditional perspective tiles, the tiles occupied by two boxes made from perspective logic alone, without reference to actual things. Unlike the lute in the Dürer, which Dürer means us to take as real, these boxes are products of thought. Under the picture is a plan of the room, a view from above; to the right an elevation, a view of the perspective construction from the side, of the sort described by Alberti, who reasoned from a beholder standing in front of the plane of section, and who established his viewing point at the beholder's height.

Linear perspective pictures are by definition projections onto a plane of section of whatever lies beyond the section. They cannot show what lies between the section and the viewing point. Alberti therefore turned this portion of the construction ninety degrees to show beholder and viewing point on a "little space" beside the picture.<sup>19</sup> Figure ten follows the Albertian scheme in combining two views, and must be read two ways. For the picture the right vertical is the right wall, the bottom horizontal is the edge of the floor, the left vertical is the left wall. For the elevation, the right vertical is the plane of section seen edge-on, from the side, the bottom horizontal is the floor also seen edge-on, from the side, and the left vertical is the rear wall of the room, again seen edge-on. In this profile view the hash-marks describe the progress of "visual rays" from the interstices of

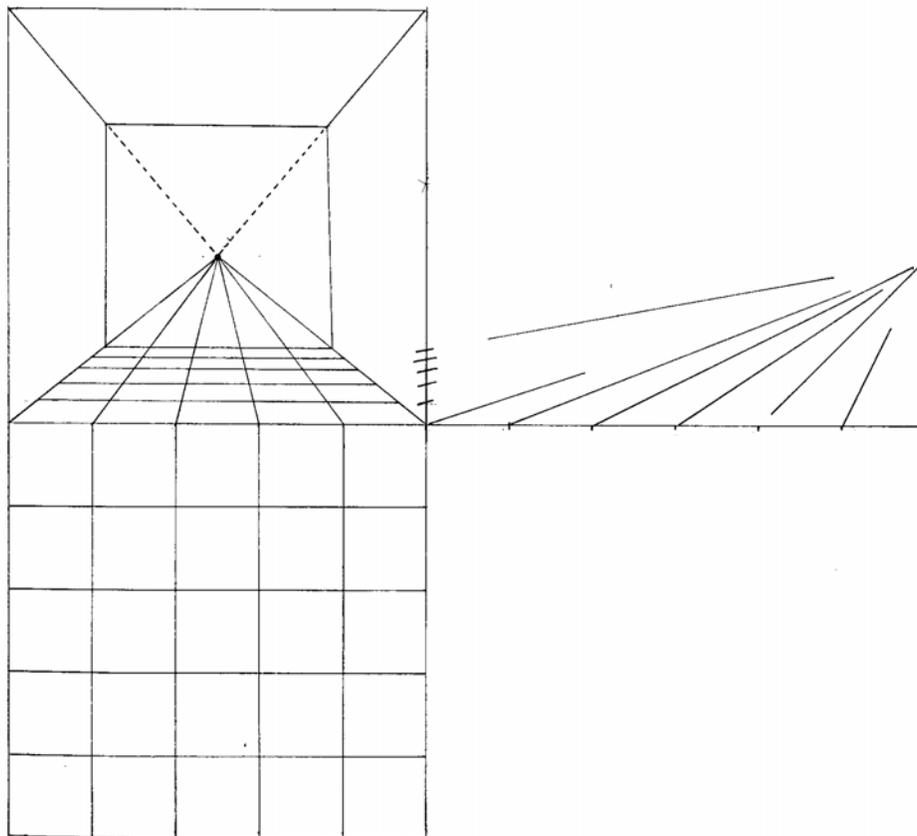


Figure 3. A linear perspective construction. Plan, elevation and picture. The elevation shows the viewing point (which mirrors the vanishing point) and the "visual rays" that bisect the section, thereby establishing the increasing smallness of intervals between the tiles.

the tiles through the section to the viewing point, thereby establishing the intervals between transversals for the frontal view, the picture.

This being said (with apologies to the reader for so technical an aside), the important point is that the plan and elevation are of a piece with the actions taken by the two men in the Dürer; they are of the discursive aspect. The logic the two men demonstrate in figure eight are diagrammed by the plan and elevation in figures ten and eleven. As for the picture of a room with floor tile and two boxes, it is of a piece with the lute-picture in the Dürer; it is of the figurative aspect. Like the lute-picture, it stands for visual experience of actual things and can be enjoyed in itself, as an immediately sensible unity, apart, though not distinct, from the logic that made it. Though the lute is meant to be real while the room is a plain fiction, let it be agreed that the case could be reversed, with the room actual and the lute a fiction, and let it be further agreed, then, that we are entitled to join lute and room in a category of that which perspective manipulates, or perspective objects. Perspective objects, real or fictional, are what we as spectators are visually attending to even as the perspective scheme acts upon them.

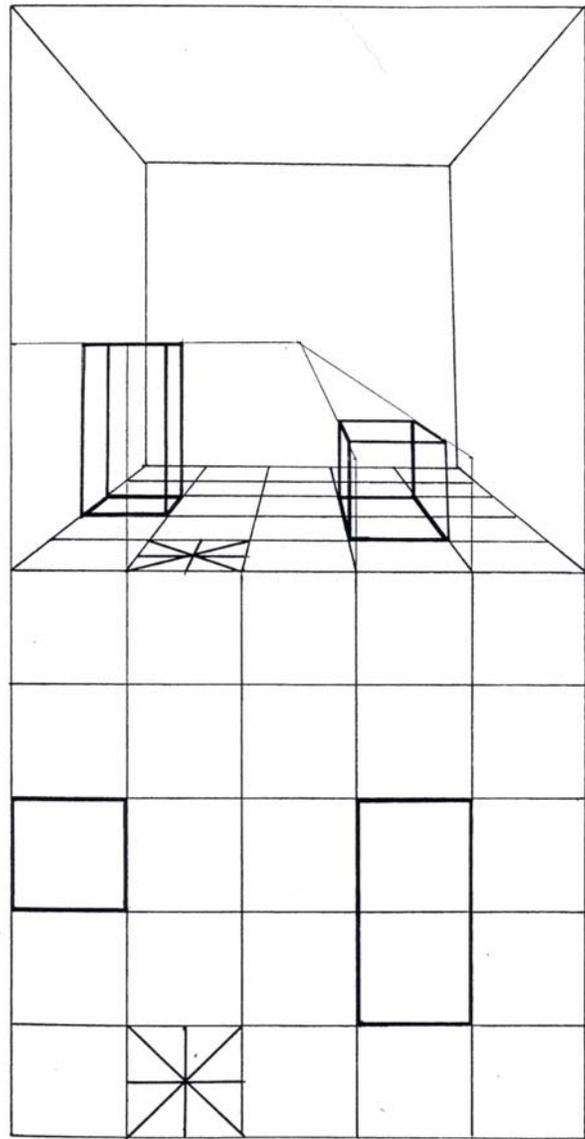


Figure 4. The construction further built up. Plan and picture. A tile design and two boxes are plotted from the plan to the fictive space. The top of the left box disappears in the horizon.

The discursive aspect of perspective has now been sub-divided into two disparate parts, manipulandum and manipulator, objects and scheme. To one side is a method of construction we train on our looking at things, to the other a figure that results as the method and our looking at things are united.

4

Noting the direction these preparations have taken, the reader will have anticipated what next will be said.

A fusion of the perspective construction and perspective objects results in a linear perspective image. The construction and objects are *subsidiary* to the image, which is *focal*, and as our attention moves *from* the construction and objects *to* the image the objects are *phenomenally transformed*. This transformation is the meaning of linear perspective. As it occurs the construction and objects are to an extent lost in the image. That is, we are at present aware of the image rather than of the thinking behind it, while the objects in themselves are superseded by a universal geometry toward which they lend a supporting role.

In that they are disparate, constituent parts that bear on a focal target, in which they meld, the relation of construction and objects to image is *functional*. In that they are not ciphers, and do not indicate their meaning in a simple, linear fashion, they are unlike words. They have *intrinsic interest*. Meaning rebounds from the (focal) image to the (subsidiary) construction and objects. We well might work the logic of perspective as a mental exercise, or examine an actual thing such as a lute, both for their own sakes.

To specify the structure further by making use of Richards' terms, the objects -- which were defined, it will be recalled, so as to include our regard of them-- may be thought of as the *tenor*, the ostensible content, and the construction may be thought of as the *vehicle*, latent but active. It is modification of our looking at things (the tenor) by the construction (the vehicle) that results in the image.

The construction and objects have to the image they produce a relation unlike the one-way relation of words indicating their sense; they are not somethings resembling signs. The construction and objects are not compared in parallel while maintaining their identities as construction and objects; they are not a something resembling a simile. The perspective image is not a focal shell packed with meaning by a subsidiary construction and objects to which all interest returns; it is not a something resembling a symbol. In short, the semantic structure of linear perspective is that of a metaphor.

Better to keep the word "metaphor" for its strictest use, though, than to give it such novel exercise as will only mislead and confuse. Another term is needed, for, structural similarities aside, there is between metaphor and linear perspective an important difference, one that may need getting used to, especially if one's background is in literary rather than visual culture. An excitation of the verbal faculty such as is caused by Shakespeare's conceit on balm, sea and kingship is not at issue, still less that wholly unrelated staple of art history, pictorial symbols -- the fish signifying Christ, the blue mantle signifying the virgin, etc. -- that have a verbal antecedent and counterpart, that illustrate those antecedents and counterparts, and that, in any case, are semantically identical to a flag. No, at issue is a metaphor-like structure that, at least in its outcome, its pictorial aspect, belongs to the realm of the visible, that demands to be seen -- that cannot be conveyed by a written description.

If a metaphor is by strict definition a play on words, a linear perspective image is a play on sights. By fusing projective geometry and things, it makes of the visible a type

of image, specifically, a perspective image. We do not expect of a metaphor that other than marginally it will change the way things look to us, but that which is demonstrated by the men in the Dürer directly alters appearances. Perspective converts the visible into an object of disinterested contemplation, a tapestry suspended in the immediate present, a flat, mathematically determined design, and when this conversion occurs the forms of lutes, boxes, angels, horses, out-thrust limbs, armor, fallen lances, buildings, halos and pavements are changed.

How this change takes place can best be described by contrasting basic vision to vision informed by perspective. Though it was agreed in the first section of this study to start with the assumption that linear perspective is not inherent to perception, the companion question this assumption elicits was left hanging. If vision is not prefigured in optical geometry, as once was thought, then what are its salient traits?

Basic vision bears on things themselves, rather than on projections made from them, and is organic rather than mathematic. It is intra-organically felt rather than arrived at by a process of inductive reasoning, whereby the exterior world is reduced to the yield of a geometry. Amassing multiple intuitions into a global awareness, rather than slicing off solitary, instantaneous “views” of things, basic vision unfolds in a temporal continuum rather than attaching to discrete nodes of time, the frozen snap-shots of perspective. Distance in basic vision is measured by the reach of the body, and by the reach of the gaze, and it radiates concentrically from the self outward, so that space, to basic vision, is not an abstract concept, disconnected from the self and its objects of fear and desire, but an elastic medium in which the self and its objects disport. If any two randomly selected points in perspective space are identical, intuitive space is neither constant nor uniform. To use more exact words, perspective space is isotropic, felt space anisotropic. Another way of putting it is to say that in the experiential manifold relative sizes and locations are discovered. They are transient, plastic features of the manifold, not determined by a rule, as is the case in perspective, but varying according to our pragmatic goals, our longings, and the attention and importance we give to things.

The paradox is that, even so, things maintain their inalienable features. A mountain viewed at a distance looms much larger in basic vision than perspective allows, in part because of a felt relation of its actual size to our size that cannot be expressed by the translation of metric distance into projected size. A plate viewed from the side appears not as a perspective ellipse but as a round form standing in a particular relation to us; and a table-top likewise appears not as a trapezoid but as a rectangle canted into distance. Its edges recede as railroad tracks recede, but such is the multiplicity of the perceptual manifold that they recede, so to speak, in parallel. To borrow a phrase from Maurice Merleau-Ponty, the table-edges are “parallel in depth.”<sup>20</sup> It cannot be said that they converge on a vanishing point on a horizon, for the vanishing point and horizon and their accompanying section of a visual pyramid are impalpable concepts absent from the

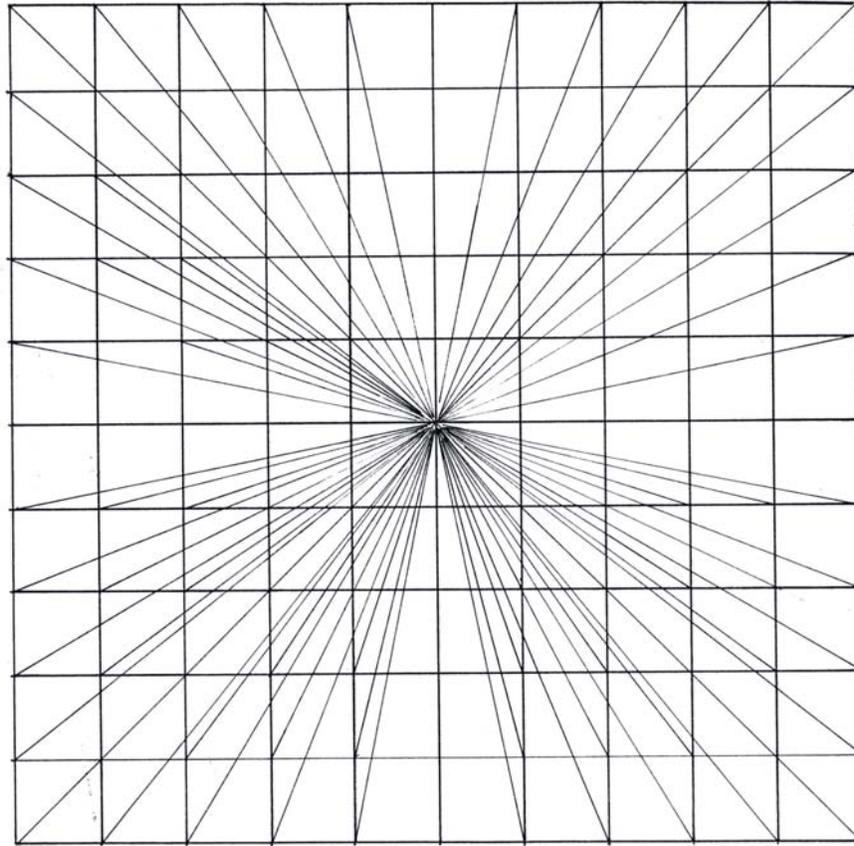


Figure 5. "A grid of infinitely equidistant points is imposed." Though the drawing of necessity represents a finite number of points and only one layer of the grid, such is the structure of perspective space.

web of experience, absent, that is, *prior* to our thinking of them, our invoking them as attributes of sight, our inserting them into the experiential matrix.

When we do this the morphology of things as we experience them undergoes an upheaval. A crystalline, mathematical clarity descends. The organic unfolding of intuitive experience in a temporal continuum is reduced to stasis, the frozen moment the section of the visual pyramid entails. A grid of infinitely equidistant points is imposed, all things and the intervals between them are fitted to this grid, and the sides of objects projecting in depth shoot in unison to a putative vanishing point or vanishing points on a horizon. The elastic space of unmediated experience is not only fixed on the section, but at the same time and by the same logic made constant and homogenous (Fig. 5). Relative sizes and locations were attributes of an incessantly varied and ongoing experiential situation; now they are determined, absolutely, *a-priori*, by metric distance from the viewing point, metric distance from the section, and metric distance from each other, so that felt intervals are supplanted by objectively measurable ones. Extension of things in depth is expressed as flat shapes on a plane, a rigorous abstraction, systematically reducing, as it

does, three dimensions to two and all parallels in depth to unified convergence. A distant mountain dwindles to the size determined by its metric distance, a plate viewed from the side turns into a singular shape, an ellipse, and the depth of a table-top is cast on the section as a vertical interval while its rectangularity is distorted into a trapezoid.

Polanyi speaks of the integration of subsidiaries in the focal image of a metaphor as a self-surrendering integration. The integration of the perspective construction and its objects in an image is likewise self-surrendering, graphically so, for such images have "point of view," or individual outlook, engraved upon them. Alberti's man, standing in profile in the "little space" and looking through the plane of section, has all four sides of the visual pyramid pointing straight at his head. If he moves, they move with him; he is the center of the visible. As the location of his head is intended for ours, he is our proxy. Our point of view, our outlook, is implicitly included. Integration proceeds *from* us as the implied center of sight, *via* the subsidiary construction and objects, *to* the locus of our interest, the perspective picture. When the logic Dürer's men demonstrate and the lute they operate on are fused in the picture on the tablet, it is we who lend ourselves, imaginatively, to the phenomenal transformation and see the lute fall into its geometrically ordained form. All our visual life, our intra-organic state of peering out at the world through the windows of our eyeballs, is localized in this moment. Thus we give ourselves to the picture, we are transported by it, we are liable to rapture. The same can be said of the elevation, plan, room, tiles and boxes fused in their picture. It is we who find that the objects are configured relative to the viewing point, we, with our individual history and make-up, who dwell in the viewing point as if it offered a "real" view, as if the picture were indeed an "actual fact" of the immediate present. Because the picture embodies a mathematical construction of space, and, moreover, one with a history of utility in optics, we dwell in a geometry of optics as well, entering into it as if it were natal, taking it up with our eyes. The picture embodies our looking as the flag embodies our life in our nation; it "embodies us in itself." Hence the legendary capacity of perspective pictures to induce imaginative participation in an ideal, mathematized world.

That perspective, like metaphor, involves a self-surrendering integration already brings in the question of indwelling. Before proceeding with it I should note, if it is not already evident, that the language employed in these pages is meant not to banish perspective from sight but to establish when and how perspective informs sight. Positing a hypothetical vision that is antecedent to cultural imperatives, words such as "inherent," "natal" and "basic" suggest a ground upon which the cultural ingression takes shape. The aim is to include perspective in sight, but as an acquisition the individual gains from the culture, a learned means of imposing on experience a type of pictorial order.

At the mildest, most diffuse extreme, perspective imagery so pervades the Zeitgeist through still photography, movies and television that among the general population expectations of "truth," "likeness" and "realism" are vaguely determined by

this near-to-universal norm. Here indwelling is marginal. Consistent with basic vision, appearances remain close to the native state. Things mostly look unpictorial.

At the other extreme, under conditions that involve willed acts of picturing, and remote from the demands of everyday life, highly trained people can readily see things “in perspective.” These visual specialists, called artists, have internalized the reasoning. They can project the projection.<sup>21</sup> When linear perspective is thus taken up by the self, so that it becomes a modality of sight, indwelling becomes paramount and deep. Actual things can not only be seen as picture-like, but crystallized into perspective structure, and this is done voluntarily. No device such as the men in the Dürer demonstrate is needed, for the construct has become a visual counterpart to extension of the body via a probe or stick. It is attributed to sight as probes and sticks are attributed to touch.

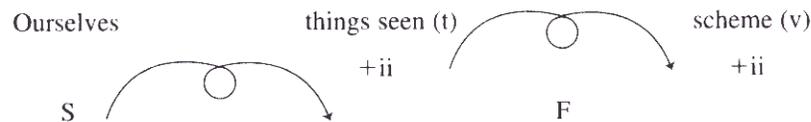
Nowhere is this truth more vividly encountered than in a beginning drawing class. Faced with a still-life and asked after suitable instruction to draw it in perspective, novices are at first unable to perform. For them the table-top is imbued, primarily, with its full depth and width. Drawing the interval from near to far edge so as to allow for this depth, they increase it over what perspective allows, at the same time drawing the sides not at the acute angle demanded by convergence on a vanishing point but closer to a ninety-degree angle. In short, they express their basic vision by approximating the actual shape.<sup>22</sup> To do otherwise they must learn to set aside a primary interest in the objective characteristics of things in favor of an over-riding geometry. They must reduce the fullness of basic vision, of which they are so poignantly aware, to a latent aspect of it, a fictional "single instant." From the experiential manifold they must abstract flat shapes on a section, the surface they are drawing on. Gradually, by dint of much practice, they train themselves to discard the everyday world of the explored and known, where a table top has ninety-degree corners and is two feet wide, and adapt to the pictorial, one-eyed, instantaneous world of optical geometry. Then they see the table-top as a flat trapezoid, its far edge lowered (because, they now see, it stands away from them in space), its sides converging, for they have internalized as a form of perception the mathematically determined rule. The sequence of drawings done by such students shows the moment when they round a corner and grasp what is asked of them not as a logical proposition, but as what is palpably visible. Then there is no turning back. They have poured themselves into the perspective mold. The morphology of objects has been altered, and will never be quite the same.

They find that orthogonals converge on a point on a horizon, that below the horizon convergence is upward, above the horizon downward. This, they learn, is how things appear when drawn in perspective, and this is what, to a man and a woman, they see. These results obtain because the discursive aspect of perspective is brought into play. The much-vaunted objective aspirations of the method are discovered again, awarded to the eyes, lived out in acts of sight. The students are confreres of the men in the Dürer,

proto-scientists both, and of scientists in general, who replicate their empirical endeavors and employ them as scientific techniques with confidence in the outcome.

But the students must neither move their heads nor alter the position of their two eyes, for their two eyes are meant for one, and that held to a peep hole. They must pretend Leonardo’s window, a transparent screen, stands between them and the table, upon which the table casts its outlines. Doing these things they take the perspective scheme as a guide, much as an actor takes a script, a musician a score, and, with their bodies, minds and the necessary props, they play a role. This *way* of seeing (in the sense of path), with its required bodily and mental role, guided by the scheme, are a special case of sight, instanced by perspective form, and remote from basic seeing, which does not involve acts of posturing with eye and head, mentally converting actual things into images and pictures or pretending one is a camera.

The semantic structure of linear perspective can now be diagrammed, after Polanyi, after his diagram for metaphors. In this diagram the spectator is subsidiary to a focal picture made of two aspects: objects looked at (the tenor), a scheme that acts on them (the vehicle). As the objects are phenomenally transformed, so is the spectator transported, and taken out of him or herself, in adopting a perspective view of them:



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In the first part of this study Cassirer was cited on the shift from a philosophy of nature to one of culture. As a corollary, he held that myth, art, language and science are symbols, “not in the sense of mere figures which refer to some given reality by means of suggestion and allegorical renderings, but in the sense of forces each of which produces and posits a world of its own.”<sup>23</sup> And it was he who so extensively influenced Erwin Panofsky when the great art historian wrote “Perspective as Symbolic Form.”

In his seminal essay Panofsky describes the two aspects of perspective when he writes that it

creates distance between human beings and things . . . ; but then in turn it abolishes this distance by, in a sense, drawing this world of things . . . into the eye. Perspective subjects the artistic phenomenon to stable and even mathematically exact rules, but on the other hand, makes that phenomenon contingent upon human beings, indeed upon the individual: for these rules refer to the psychological and physical conditions of the visual impression, and the way they take effect is determined by the freely chosen position of a subjective ‘point of view.’ Thus the history of perspective may be understood with equal justice as a triumph of the

distancing and objectifying sense of the real, and as a triumph of the distance-denying human struggle for control; it is as much a consolidation and systematization of the external world, as an extension of the domain of the self.<sup>24</sup>

In that perspective creates distance between human beings and things, subjects the artistic phenomenon to mathematically exact rules, obtains a distancing and objectifying sense of the real, and is a consolidation and systematization of the external world, it belongs to the realm of discourse and is claimed by science and technology. With perspective we describe possible machines so completely and exactly that real ones are built from the drawings. In that perspective abolishes distance by drawing the world of things into the eye, makes the artistic phenomenon contingent upon the individual human being, is a triumph of the distance-denying struggle for control, and extends the domain of the self, it belongs to the realm of figuration and is claimed by art. As we discovered, perspective represents, gives a picture of, our looking at things, and, in doing so, confers perspective form on that activity, causing to appear what previously was not there. It joins a geometry and objects in an image that transforms them.

Yet if perspective thus operates like a metaphor it is also a symbol, of the sort Cassirer meant, for it is emblematic of all the complimentary aims listed by Panofsky. Binding all those meanings unto itself, it reflects meaning back on them. It stands for the centrality of man, for individual perception as the seat of the visible, and for men catching sight of a visual geometry that, in its perfection, reveals the hand of God. As Panofsky so justly claimed, though not in these words, perspective gives concrete expression to the aspirations of a people and their time, and is subject to the impetus and the vagaries of style. Belonging to culture at least as much as to nature, rooted in geometry yet existing in men's eyes, it is a force which "produces and posits a world of its own."

Armed by Polanyi we can better understand the dynamic of such complex representation, its workings, neither as a study in optical geometry, nor as a history of style, but as a semantic structure. We can understand how the intersubjective self, stamped by the culture that nurtured it, can be united with external, measurable actualities in the perspective picture, and how that picture in turn implies the cognitive powers appropriate to the objectifying aims of science while inviting the disinterested state of pure contemplation appropriate to art, proceeding from the self, directed toward the immediately present aesthetic object, the congregation of simultaneous parts integrated in a functional whole. And we can understand how that functional whole, that integration made up of so many diverse concerns, embodies the intellectual and artistic life of the community that produced it, symbolizing those concerns.

We then possess an understanding of perspective implicitly contradicting the variety of formalism that seeks to peel the aesthetic object of extraneous matters, for we have a semantic mechanism that uses discursive means to aesthetic ends. We have an imagery that carries in its very matrix a geometric rationale, a centering of the visible in

individual perception, and a view of God's work as manifest to man. The import of such an understanding for other subsidiaries of other kinds of picture is rich in possibility. Thus linear perspective, treated as a trope that fuses a scientific geometry and things in an image, which is their meaning, can be used as an exceptionally defined, precise and logical model for further investigations of the content of pictorial form.

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Notes

1. Ernst Cassirer, *The Philosophy of Symbolic Forms*, vol. 3, trans. Ralph Mannheim, New Haven and London, 1955, p. 143.
2. See Leonardo da Vinci, *The Literary Works of*, pp. 30-31 (sec. 51); 44-45 (sec. 71).
3. David C. Lindberg, *Theories of Vision from al-Kindi to Kepler*, Chicago, 1976, pp. 193-202. Lindberg discusses Leonardo as well as Kepler.
4. Rene Descartes, *The Philosophical Writings of Descartes*, trans. John Cottingham, Robert Stoothoff, Dugald Murdoch, vol. 1, New York, 1985, pp. 166-167; 171 (fig. 9). As to infinite regression, "Now, when this picture thus passes to the inside of our head, it still bears some resemblance to the objects from which it proceeds. We must not think that it is by means of this resemblance that the picture causes our sensory awareness of these objects--as if there were yet other eyes within our brain with which we could perceive it."
5. John Locke, *Essay Concerning Human Understanding*, Book II, Chap. XI, sec. 17; Ogden N. Rood, *Students' Text-book of Color; or Modern Chromatics*, New York, 1899.
6. See Pritchard, Heron and Hebb, "Visual Perception Approached by the Method of Stabilized Images," *Perception: Selected Readings in Science and Penomenology*, ed. Paul Tibbetts, New York, 1969, 191-204.
7. See David Noton and Lawrence Stark, "Eye Movements and Visual Perception," *Scientific American*, June 1991, pages 35-43.
8. .See John P. Frisby, *Seeing: Illusion, Brain and Mind*, Oxford, 1980, Chapter 3.
9. Nicholas Wade and Michael Swanston, *Visual Perception: an Introduction*, London and New York, 1991, page 191.
10. Michael Polanyi and Harry Prosch, *Meaning*, Chicago and London, 1975.
11. Introducing M. H. Pirenne's work on perspective, Polanyi briefly discussed some of the ideas that are to be found in *Meaning*, and that are central to the argument presented here, but applied

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them to the undistorted appearance of perspective pictures from many positions rather than to perspective itself. (Michael Polanyi, "Forward by Michael Polanyi," in Pirenne, *Optics, Painting, and Photography*, pp. XV-XIX.)

12. I. A. Richards, *The Philosophy of Rhetoric*, New York, 1936, p. 100.

13. Richards, *Philosophy of Rhetoric*, p. 108.

14. See Albrecht Durer, *The Painter's Manual*, pp. 391, 393.

15. "Some Questions About E. H. Gombrich on Perspective," *Journal of Aesthetics and Art Criticism*, vol. 50, no. 2, Spring, 1992.

16. Susanne K. Langer, *Mind: An Essay on Human Feeling*, vol. 1, Baltimore, 1967, pp. 59, 67-68, 95.

17. Meyer Schapiro, "Style," *Aesthetics Today*, ed. Morris Philipson, New York, 1961, p.87.

18. Susanne K. Langer, *Philosophy in a New Key: A Study in the Symbolism of Reason, Rite and Art*, Cambridge, 1957, p. 80.

19. Edgerton's translation (see Samuel Y Edgerton, Jr., *The Renaissance Rediscovery of Linear Perspective*, pp. 43-49; n. 19, p.170.) Grayson renders the Latin, *areola*, as "a drawing surface" (see Leon Battista Alberti, *On Painting and On Sculpture*, ed., Cecil Grayson, London and New York, 1972, pp. 56-57; 113.)

20. Maurice Merleau-Ponty, *The Phenomenology of Perception*, London, 1962, p. 261.

21. As has been known for some time: "Hence, a draughtsman with a trained, a correct eye, could put in perspective all that he draws, without the aid of geometric operations; . . . ." (Charles Blanc, *Grammar of Painting and Engraving*, trans. Kate Newell Dodggett, Hurd and Houghton, New York, 1874, p. 52.

22. Thus informally confirming the experimental result obtained by R. H. Thouless, discussed in chapter one. See R. H. Thouless, "Phenomenal Regression to the 'Real' Object," *British Journal of Psychology* XXI (1931), 339-359, and XXII, 1-30.)

23. Ernst Cassirer, *Language and Myth*, trans. Suzanne K. Langer, New York, 1953, p. 8. "Thus the special symbolic forms are not imitations, but organs of reality, since it is solely by their agency that anything real becomes an object for intellectual apprehensions, and as such is made visible to us."

24. Erwin Panofsky, *Perspective as Symbolic Form*, trans. Christopher S. Wood, New York, 1991, pp. 67-68.