III

When work on certain artistic problems has advanced so far that further work in the same direction, proceeding from the same premises, appears unlikely to bear fruit, the result is often a great recoil, or perhaps better, a reversal of direction. Such reversals, which are often associated with a transfer of artistic "leadership" to a new country or a new genre, create the possibility of erecting a new edifice out of the rubble of the old; they do this precisely by abandoning what has already been achieved, that is, by turning back to apparently more "primitive" modes of representation. These reversals lay the groundwork for a creative reengagement with older problems, precisely by establishing a distance from those problems. Thus we see Donatello grow not out of the pallid classicism of the epigones of Arnolfo, but out of a decidedly Gothic tendency. Likewise, the powerful figures of Konrad Witz had to be supplanted by the more elegant creatures of Wolgemut and Schongauer before Dürer's *Four Apostles* became possible. And between antiquity and modern times stands the Middle Ages, the greatest of those "recoils." The art historical mission of the Middle Ages was to blend what was once a multiplicity of individual objects (no matter how ingeniously linked to one another) into a true unity. This new unity – and this is only apparently a para-

dox – was arrived at only by way of smashing the existing unity: that is, by consolidating and isolating objects which were once bound by corporeal and gestural as well as spatial and perspectival ties. At the close of antiquity, and in conjunction with the increase of Eastern influences (whose appearance here, to be sure, is less a cause than a symptom and instrument of the new development), the freely extended landscape and the closed interior space begin to disintegrate. The apparent succession of forms into depth gives way again to superposition and juxtaposition. The individual pictorial elements, whether figures, buildings or landscape motifs, until now partly the contents, partly the components of a coherent spatial system, are transmuted into forms which, if not yet completely leveled, are at least entirely oriented toward the plane. These forms stand in relief against a gold or neutral ground and are arrayed without respect to any previous compositional logic.

This development can be followed almost step by step between the second and the sixth centuries.[30] A work like the Abraham mosaic from San Vitale in Ravenna (Plate 5) is especially noteworthy, for here we can observe quite plainly the disintegration of the perspectival idea: not merely plants, but indeed the formations of the earth, which in the Odyssey landscapes were cut off by the edge of the picture as if by a window frame, must now accommodate themselves to the curve of that edge. It can hardly be expressed more clearly that the principle of a space merely excised by the picture's edge is now beginning to give way to the principle of the surface bounded by the picture's edge, a surface that expects not to be seen through but rather filled. The "foreshortenings" of Greco-Roman art, finally, lose their original representational meaning – that of creating space – and yet retain their fixed linear forms; they thus undergo the most curious, but often uncommonly expressive, reinterpretations: the former vista or

"looking through" begins to close up. At the same time it can be seen how precisely here the individual pictorial elements, which had almost completely lost their gestural and corporeal dynamic relationship and their perspectival spatial relationship, could be joined in a new and, in a certain sense, more intimate relationship: in an immaterial but unbroken tissue, as it were, within which the rhythmic exchange of color and gold or, in relief sculpture, of light and dark, restores a kind of unity, even if only a coloristic or luminous unity. The particular form of this unity once again finds its theoretical analogue in the view of space of contemporary philosophy: in the metaphysics of light of pagan and Christian neoplatonism. "Space is nothing other than the finest light," according to Proclus;[31] here, just as in art, the world is conceived for the first time as a continuum. It is also robbed of its solidity and rationality: space has been transformed into a homogeneous and, so to speak, homogenizing fluid, immeasurable and indeed dimensionless.

Thus the very next step on the path toward modern "systematic space" had to be the refashioning of the world – now unified but still luminously fluctuating – into a substantial and measurable world; substantial and measurable, of course, not in any antique sense, but indeed rather in a medieval sense. Already in Byzantine art, even if much impeded and even here and there repulsed by a constantly reemerging partiality for antique illusionism, a tendency to follow through with the reduction of space to surface declares itself ("follow through," because the world of early Christian and late antique art is not yet a purely linear and two-dimensional world, but rather still a world of space and bodies, even if everything is oriented to the surface). Byzantine art, moreover, tended to exalt that element which within this new two-dimensionality could alone provide stability and system: line. But even Byzantine art, which in the end

never really severed itself from the antique tradition, failed to carry this development through to a fundamental break with the principles of late antiquity (just as, conversely, it never actually arrived at a "Renaissance"). Byzantine art could not decide, as it were, to form the world in a completely linear rather than a painterly fashion; thus its adherence to mosaic, whose nature it is to hide the inexorably two-dimensional structure of the bare wall by spreading a shimmering coat over it. The paths of light and furrows of shadow of antique and late antique illusionism are indeed hardened into line-like forms; but the original painterly meaning of these forms is never so completely forgotten that they become mere lines. Likewise where perspective is concerned: Byzantine art may have ended up treating landscape motifs and architectural forms as mere stage scenery before a neutral background; but these motifs and forms never ceased somehow to suggest space, even if they no longer encompassed space. Thus Byzantine art – and for our purposes this is especially important – managed, for all the disorganization of the whole, nevertheless to preserve the individual components of antique perspectival space, and so to hold them in readiness for the Western Renaissance.[32]

The art of northwest Europe, whose frontier in the Middle Ages was not so much the Alps as the Apennines, transformed the late antique tradition far more radically than did southeast European Byzantinism. After the comparatively retrospective and for that very reason preliminary epochs of the Carolingian and Ottonian "renaissances,"[33] emerged that style which we usually call "Romanesque." The Romanesque, fully mature by the middle of the twelfth century, completed the renunciation of antiquity which Byzantine art never quite carried out. Now line is merely line, that is, a graphic means of expression sui generis which finds its meaning in the delimitation and ornamentation

of surfaces. Surface, meanwhile, is now merely surface, that is, no longer even the vague suggestion of an immaterial space, but rather the unconditionally two-dimensional surface of a material picture support. This style was then extended along the same lines, that is, made still more systematic and tectonic, by the succeeding epoch. How the Romanesque destroyed the last remnants of the antique perspectival view may be clarified by the well-known example (one among countless) of the metamorphosis of the perspectivally foreshortened River Jordan, in representations of the Baptism, into a "water mountain."[34] In Byzantine and Byzantinizing painting, as a rule, the form of the river bank converging into depth and the shimmering transparency of the water are still clearly recognizable. Pure Romanesque (the transition declares itself already around the year 1000) reshapes with ever-greater resolve the painterly waves into a plastic and solid mountain of water, and the space-defining convergence into an "ornamental" surface form. The horizontally foreshortened river which permits the body of Christ to shimmer forth becomes a perpendicularly rising coulisse behind which he disappears (or on occasion even a mandorla which in a sense frames him). The flat bank which carried the Baptist, meanwhile, becomes a staircase which he must climb.

With this radical transformation, so it would appear, all spatial illusionism was abandoned, once and for all. And yet this transformation was precisely the precondition for the emergence of the truly modern view of space. For if Romanesque painting reduced bodies and space to surface, in the same way and with the same decisiveness, by these very means it also managed for the first time to confirm and establish the homogeneity of bodies and space. It did this by transforming their loose, optical unity into a solid and substantial unity. From now on, bodies and space are bound to each other, for better or for worse. Subsequently, if

a body is to liberate itself from its attachment to the surface, it cannot grow unless space grows with it at the same rate.

This process, however, is carried out most vigorously and with the most enduring effects in high medieval sculpture. For sculpture undergoes the same process of revaluation and consolidation that painting does; sculpture, too, sheds all vestiges of antique illusionism and transforms a painterly and agitated surface, a surface broken up by light and shadow, into a stereometrically condensed surface, a surface articulated by linear contours. Sculpture, too, creates an indissoluble unity between figures and their spatial environment, that is, the background surface, with the difference that this unity does not preclude a three-dimensional swelling forward of form. A relief figure is now no longer a body standing before a wall or in a niche; rather, figure and relief ground are manifestations of one and the same substance. Thus emerges for the first time in Europe an architectural sculpture which is not so much set in or on the building, like the antique metope relief or the caryatid, as it is a direct "efformation" or development out of the building material itself. The Romanesque portal statue is a plastically developed doorpost, the Romanesque relief figure a plastically developed wall. Thus the style of pure surface which painting had worked out found its sculptural counterpart in the style of pure mass. Sculpture again possesses three-dimensionality and substantiality: but not, as in antique sculpture, the three-dimensionality and substantiality of "bodies," whose coherence (if we may repeat our own words) is guaranteed for the purposes of artistic effect by an association of distinguishable parts with individually defined extension, form and function (that is, "organs"). This is rather the three-dimensionality and substantiality of a homogeneous substance, whose coherence is guaranteed for the purposes of artistic effect by an association of indistinguishable parts, with

uniform (or infinitely small) extension, form and function (that is, "particles").

Now, the art of the high Gothic again differentiates this "mass" into quasi-corporeal forms; it permits the statue to reemerge out of the wall as an independently developed structure and the relief figure to resolve out of the ground almost like freestanding sculpture. Certainly this renaissance of a feeling for the body can be interpreted as a kind of rapprochement with antiquity; indeed, in many places it was actually accompanied by a newly profound desire for an artistic reception of antiquity. For this was the same high Gothic which through Vitellio, Peckham and Roger Bacon revived antique optics, and through Thomas Aquinas (even if with significant alterations) revived Aristotle's doctrine of space.[35] But the end result was not a return to antiquity but rather the breakthrough to the "modern." For the architectural elements of the Gothic cathedral, conceived once again as bodies, together with its statues and relief figures unfolded back into plasticity, nevertheless remained components of that homogeneous whole whose unity and indivisibility was secured once and for all by the Romanesque. Thus alongside the emancipation of plastic bodies is achieved – one would like to say automatically – the emancipation of a spatial sphere comprehending these bodies. An expressive symbol of this is the high Gothic statue, which cannot live without its baldachin; for the baldachin not only connects the statue to the mass of the building, but also delimits and assigns to it a particular chunk of empty space. Another is the relief which retains its deeply overshadowing arch-covering: here, too, the cover serves the purpose of securing a specific spatial zone for the now plastically emancipated figures, and making their field of activity into a veritable stage (Plate 6). This stage is still limited, just as the high Gothic church is decidedly a spatial construction and yet is still fragmented into a quantity of clearly

divided individual bays, which only in late Gothic architecture will flow into one another. Yet the stage is already a fragment of a world that, even if still built out of limited and individually added cells of space, nevertheless already seems innately capable of an unlimited extension; and within this world bodies and empty space are already considered equivalent forms for expressing a homogeneous and indivisible unity. In the same way, Aristotle's doctrine of space, enthusiastically taken up by Scholastic philosophy, was fundamentally reinterpreted, in that the premise of the finiteness of the empirical cosmos was replaced by the premise of the infinity of divine existence and influence. To be sure, this infinity – in contrast to the modern view, which begins to assert itself from around 1350 – is not yet thought of as something realized in nature. On the other hand, it does probably already represent (in contrast to the genuine Aristotelian version) a true *energeiai apeiron* (actual infinite), which at first, to be sure, remains confined to a supernatural sphere, but which could in principle take effect in the natural sphere.[36]

28

At this point we can almost predict where "modern" perspective will unfold: namely, where the northern Gothic feeling for space, strengthened in architecture and especially sculpture,[37] seizes upon the architectural and landscape forms preserved in fragments in Byzantine painting, and welds them into a new unity. And in fact the founders of the modern perspectival view of space were the two great painters whose styles, in other ways as well, completed the grand synthesis of Gothic and Byzantine: Giotto and Duccio. Closed interior spaces reappear for the first time in their works. These interiors can in the final analysis only be understood as painterly projections of those "space boxes" which the northern Gothic had produced as plastic forms; and yet they are composed of elements that were present already in Byzantine art.[38] In fact, these elements – though this has been much disputed in the literature – were available in the products of the *maniera greca*. A mosaic from the Baptistry in Florence (Plate 7) displays in a fictional projecting cornice the familiar vanishing-axis principle; indeed, it even has a perspectivally rendered coffered ceiling, although information about the floor and a clear indication of the side walls are missing.[39] A mosaic at Monreale (Plate 8), conversely, shows the side walls foreshortened into depth, but again without a floor and this time without any account of a ceiling, so that the Last Supper – if we are to interpret it realistically – appears to have been staged in an open courtyard. In a second scene from the same series (Plate 9), the floor already has a foreshortened pattern of tiles whose orthogonals converge almost "correctly," even if toward two different vanishing points. But then this tile pattern stands in no relationship at all to the other architectural components; indeed it ends, significantly, almost exactly where the figural composition begins, so that the represented objects appear to stand, for the most part, more above than on the floor.[40] Thus the spatial system of mature Trecento art (for what is true for interiors is, mutatis mutandis, also true for landscapes) was constructed retroactively, as it were, out of its elements; it merely required the Gothic sense of space to join these *disjecta membra* into unity.

The conquest over the medieval representational principle begins with this achievement of Duccio and Giotto. For the representation of a closed interior space, clearly felt as a hollow body, signifies more than a consolidation of objects. It signifies a revolution in the formal assessment of the representational surface. This surface is now no longer the wall or the panel bearing the forms of individual things and figures, but rather is once again that transparent plane through which we are meant to believe that we are looking into a space, even if that space is still bounded on all sides. We may already define this surface as a "picture

plane," in the precise sense of the term. The view that had been blocked since antiquity, the vista or "looking through," has begun to open again; and we sense the possibility that the painted picture will once again become a section cut from an infinite space, only a more solid and more integrally organized space than the antique version.

To be sure, there remained a quantity of work to be done, hardly imaginable to us today, before this goal could be reached. For Duccio's space (Plate 10) is not only a bounded space, in that it is closed in front by the "picture plane," behind by the rear wall of the room and on the sides by the orthogonal walls. It is also an inconsistent space, in that objects – for example, in our panel the table of the Last Supper – appear to stand in front of the "space box" rather than in it; and in that the orthogonals in objects viewed asymmetrically (for example, buildings or pieces of furniture standing off to the sides) still run approximately parallel, whereas in symmetrical view (that is, when the central axis of the picture coincides with the central axis of the represented object) the orthogonals are already approximately oriented toward a vanishing point or, within vertical planes, at least toward a horizon.[41] But even within such a symmetrical view, when the ceiling is divided into several sections, the central section is distinguished from the adjacent parts; for only the orthogonals of the former converge toward that common vanishing region, while those of the latter deviate more or less sharply from it.[42] At first, then, only a "partial plane" was perspectivally unified, and not yet an entire plane, not to speak of the entire space.

Thus within the next generation of artists, at least so far as it took an interest in perspective at all, a curious division set in. Evidently, the need for a certain clarification and systematization of Duccio's "perspective" was keenly felt; but it was arrived at by different routes. One group of painters – in a sense, the conservatives – schematized the vanishing-axis procedure (which Duccio had already dispensed with[43]) and developed it back into a pure parallel construction. These were the likes of Ugolino da Siena, Lorenzo di Bicci or the unknown master of a painting in Strasbourg who sought to circumvent the ominous problem of the central section of the ceiling with a turretlike addition.[44] Another group, meanwhile – in a sense, the progressives – perfected and systematized that method which in Duccio had only been applied to the central section of the ceiling; they now subjected the floor to it as well. It was, above all, the Lorenzetti brothers who took this important step. What makes a picture like Ambrogio Lorenzetti's *Annunciation* of 1344 (Plate 11) so important is, first of all, that the visible orthogonals of the ground plane are here for the first time all oriented toward a single point, undoubtedly with full mathematical consciousness; for the discovery of the vanishing point, as "the image of the infinitely distant points of all the orthogonals," is, in a sense, the concrete symbol for the discovery of the infinite itself. But the picture is equally important for the completely new meaning it bestows upon the ground plane as such. This plane is no longer merely the lower surface of a "space box" closed on the right and left and terminating with the edges of the picture, but rather the ground surface of a strip of space, which, even if still bounded at the rear by the traditional gold ground and in front by the picture plane, can nevertheless be thought of as extending arbitrarily far to either side. And, what is perhaps even more momentous, the ground plane now clearly permits us to read not only the sizes, but also the distances of the individual bodies arrayed on it. The checkerboard tile pattern – already prepared, as we have seen, in Byzantinizing mosaics at Monreale, although it appears there purely as a motif and is not exploited in this sense – now in fact runs under the figures and thus becomes an index for spatial values, and indeed as

much for those of the individual bodies as for those of the intervals. We can actually express both bodies and intervals – and thus the scope of every movement as well – numerically, as a number of floor squares. This is a pictorial motif that will henceforth be repeated and modified with a fanaticism only now entirely comprehensible. It is not too much to claim that a pattern of tiles used in this sense represents the first example of a coordinate system: for it illustrates the modern "systematic space" in an artistically concrete sphere, well before it had been postulated by abstract mathematical thought. And in fact the projective geometry of the seventeenth century would emerge out of perspectival endeavors: this, too, like so many subdisciplines of modern "science," is in the final analysis a product of the artist's workshop.

But even Lorenzetti's painting leaves open the question of whether already the *entire* ground plane was oriented toward a single vanishing point. For when the figures extend all the way to the edges and thus hide the lateral segments of space, as is the case in many other paintings,[45] it cannot be determined whether those orthogonals that would begin outside the picture frame and run past the figures at the right and left would also converge in that single point. One would rather doubt it, for in another painting by the same artist which does leave open the view onto these lateral segments of space (Plate 12), the orthogonals at the edge clearly still evade the common vanishing point of the central orthogonals.[46] Rigorous coherence is still limited to a "partial plane." And yet this very picture with its strong recession seems to prepare even more decisively the coming development. This discrepancy between the central and edge orthogonals can be illustrated with countless examples far into the fifteenth century.[47] It shows, on the one hand, that the concept of infinity is still in the making, and, on the other hand (and this is its art historical significance), that the linear disposition of the space –

however much that space, together with its contents, was felt as a tangible unity, and for all the efforts to make it felt as a unity – was nevertheless still posterior to the linear disposition of the figure composition. Things are not yet at the point where, as Pomponius Gauricus would put it 160 years later, "the place exists prior to the bodies brought to the place and therefore must first be defined linearly."[48]

The conquest of this new and at last "modern" standpoint appears to have been carried out in the north and in the south in two fundamentally different ways. The north knew the vanishing-axis method already before the middle of the fourteenth century, and the vanishing-point method by the last third of the century; in both cases France was out ahead of the other countries. Master Bertram, for example, who was under Bohemian influence, constructs his tile floors entirely according to the vanishing-axis principle; he attempts to conceal the critical central section with a foot treading on it apparently by accident, or with a bit of drapery posed with comically transparent grace (Plate 13).[49] The art of Master Francke, by contrast, can be derived directly from France; like Broederlam and other French and Franco-Flemish masters, he constructs according to the vanishing-point system of the Lorenzetti. Here, however, he is just as uncertain of the orthogonals at the edges (this is especially clear on the right side of the *Martyrdom of St. Thomas*) as were most of his contemporaries and predecessors. It is as if, at first, it actually went against the grain of the artists to turn the lateral orthogonals so far that they would aim at the same point at which the central orthogonals aim.[50]

The fully unified orientation of the entire plane – and now the vertical plane as well – seems to have been consciously realized only at about the stylistic level of the van Eycks (Plates 14, 15, 16, 17; Figure 6).[51] Here, moreover, was attempted the bold

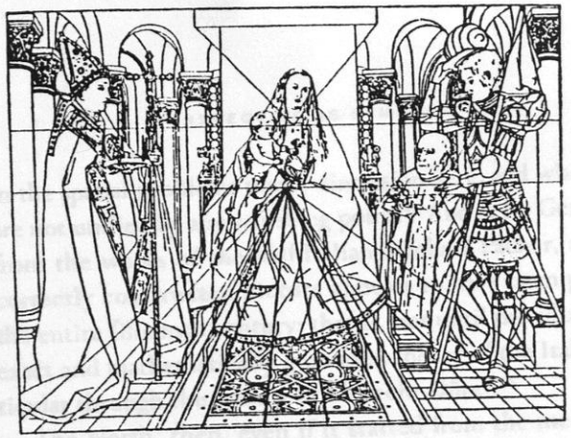


FIGURE 6. Perspectival schema of the *Madonna of Canon van der Paele* of Jan van Eyck (Bruges, Musée municipal des Beaux-Arts; 1436). (With the aid of the diagram by G. Joseph Kern.)

novelty of liberating three-dimensional space from its ties with the front plane of the picture; this was an entirely personal exploit of the great Jan van Eyck. Until now, even in the miniature shown in Plate 14 (which may be considered an authentic early work of Jan van Eyck), the represented space reached its forward termination at the picture plane, even if that space could be extended *ad libitum* to the sides and often even back into depth. In Jan van Eyck's *Virgin in the Church* (Plate 15), by contrast, the beginning of the space no longer coincides with the border of the picture: rather, the picture plane cuts through the middle of the space. Space thus seems to extend forward across the picture plane; indeed, because of the short perpendicular distance it appears to include the beholder standing before the panel. The picture has become a mere "slice" of reality, to the extent and in the sense

that *imagined* space now reaches out in all directions beyond *represented* space, that precisely the finiteness of the picture makes perceptible the infiniteness and continuity of the space.[52]

That said, the perspective of Eyckian pictures is, from a purely mathematical point of view, still "incorrect"; for the orthogonals, although they may converge to a single point within an entire plane, do not so converge within the entire space (Figure 6). This latter convergence seems rather to have been arrived at first by Dirk Bouts (Figure 7), or at the very earliest by Petrus Christus.[53] The achievement was at first neither lasting nor generally binding in the North. Even in the Netherlands there were great artists, for example Roger van der Weyden, who took little interest



FIGURE 7. Perspectival schema of the *Last Supper* of Dirk Bouts (Louvain, St. Peter, 1464–1467). (After G. Doehlemann.)

in the spatial problems under discussion here, and whose pictures are not unified by any vanishing point.[54] And as for Germany, apart from the works of the half-Italian Michael Pacher, not a single correctly constructed picture appears to have been produced in the entire fifteenth century: that is, not until the adoption of the exact and mathematically grounded theory of the Italians, in particular through the agency of Albrecht Dürer.[55]

The North, then, even if it started from the methods of the Italian Trecento, essentially arrived at "correct" construction by an empirical route. Italian perspectival practice, characteristically, appealed to mathematical theory. Trecento pictures after the Lorenzetti became, so to speak, progressively more false, until around 1420 when *costruzione legittima* was (we may as well say) invented.[56] We do not know, although it is probable, whether Brunelleschi was really the first to have produced a mathematically exact linear perspectival procedure, and whether this procedure in fact consisted of the plan and elevation construction demonstrated in Figure 1. Such a construction was only attested in writing two generations later, in Piero della Francesca's *De prospectiva pingendi*.[57] At any rate, Masaccio's *Trinity* fresco is already exactly and uniformly constructed;[58] and a few years later we find the then-preferred procedure unequivocally described: a procedure that presents itself as a direct extension of what was already known in the Trecento, even if it does rest on an entirely novel principle. Already the Lorenzetti had respected the rigorous mathematical convergence of orthogonals; but there was still no method for measuring with comparable accuracy the depth intervals of the so-called transversals (in particular, the positions of those transversals contained within a "ground square" beginning with the front edge of the picture). If we can believe Alberti, the erroneous practice of mechanically diminishing each strip of the floor by one third still held sway in his day.[59] Here Alberti

proposes his own definition, which was to remain fundamental for all succeeding generations: "The picture is a planar section of the visual pyramid." And because the perpendiculars of the final picture are already known, he needs to construct that "visual pyramid" only in side elevation, in order to make the desired depth intervals immediately legible along the vertical section, and to be able to insert them effortlessly into the existing system of receding orthogonals (Figure 8).[60]

It is probable that this more convenient and practicable procedure of Alberti's was derived from the complete plan and elevation procedure. For surely the idea of reforming normal Trecento practice by introducing the elevation of the visual pyramid was conceivable only after the systematic construction of the entire visual pyramid was understood. There is no cause for stripping Brunelleschi of the invention of this construction, the achievement of a true architect; and by the same token the fame for bringing an abstract and logical method into harmony with traditional usage, and thus facilitating its practical application, can safely be left to the dilettante painter Alberti. To an extent, of course, the two procedures coincide: since they both rest in the same way on the principle of the *intercisione della piramide visiva*, they permit not only the construction of closed spaces, but also the development of free landscape scenery and finally the "correct" deployment and measurement of the individual objects found therein.[61] In this way the Renaissance succeeded in mathematically fully rationalizing an image of space which had already earlier been aesthetically unified. This, as we have seen, involved extensive abstraction from the psychophysiological structure of space, and repudiation of the antique authorities. But, on the other hand, it was now possible to construct an unambiguous and consistent spatial structure of (within the limits of the "line of sight") infinite extension,[62] where bodies and the intervals of empty space

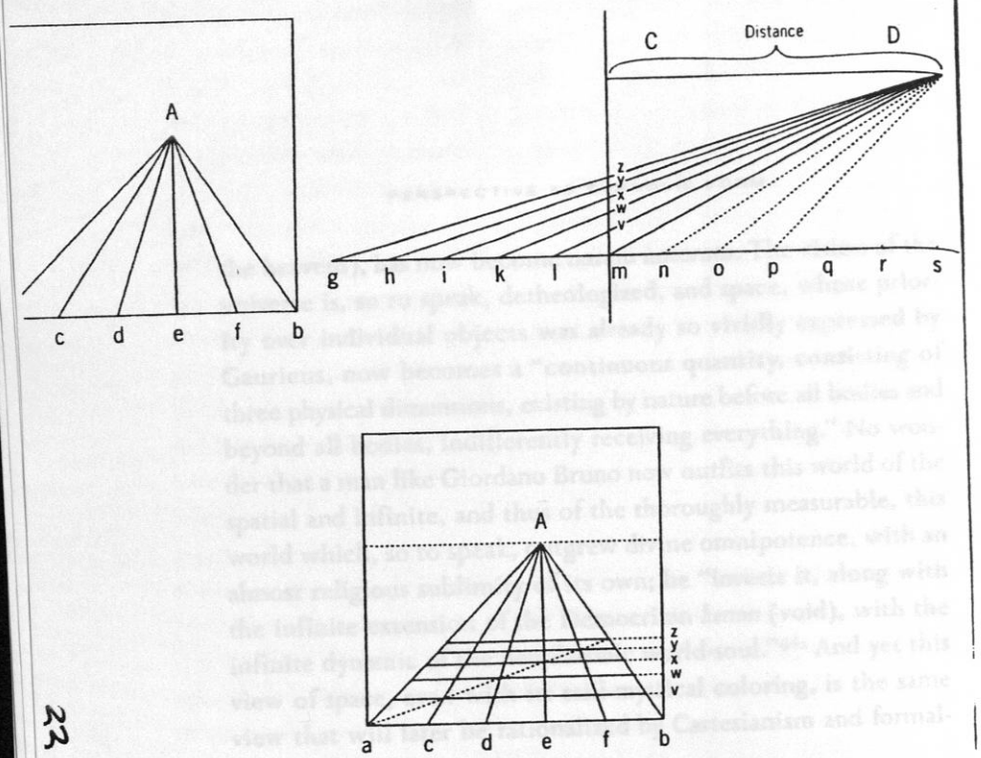


FIGURE 8. Perspectival construction of the checkerboard-type "ground square," according to Leon Battista Alberti. Above left: preparatory drawing executed on the picture panel itself, and identical to the construction of the Lorenzetti (orthogonals of the foreshortened ground square.) Above right: auxiliary drawing executed on a separate sheet (elevation of the "visual pyramid," which yields the intervals of the transversals *v*, *w*, *x*, *y*, *z*). Below: final drawing (transfer of the depth intervals obtained from the auxiliary drawing onto the preparatory drawing; the diagonal serves only to control the results).

between them were merged in a regular fashion into a *corpus generaliter sumptum*. There was now a generally valid and mathematically justifiable rule to determine "how far two things ought to stand from another, or how closely they ought to cohere, in order that the intelligibility of the subject matter is neither confused by crowding nor impaired by sparseness."[63]

Thus the great evolution from aggregate space to systematic space found its provisional conclusion. Once again this perspectival achievement is nothing other than a concrete expression of a contemporary advance in epistemology or natural philosophy. The space of Giotto and Duccio corresponded to the transitional, high Scholastic view of space; in the very years when their space was gradually being superseded by true central perspective, with its infinitely extended space centered in an arbitrarily assumed vanishing point, abstract thought was decisively and overtly completing the break – always disguised until now – with the Aristotelian worldview. This entailed abandoning the idea of a cosmos with the middle of the earth as its absolute center and with the outermost celestial sphere as its absolute limit; the result was the concept of an infinity, an infinity not only prefigured in God, but indeed actually embodied in empirical reality (in a sense, the concept of an *energeiai apeiron* within nature). "Between these two propositions: the infinitely powerful is not contradictory, and the infinitely great can be realized in action, the logicians of the fourteenth century – William of Ockham, Walter Burley, Albert of Saxony, Jean Buridan – had erected a barrier which they thought solid and impenetrable. We shall see this barrier collapse; it will not, however, crash suddenly, but rather, secretly ruined and consumed, will crumble little by little, in the time between 1350 and 1500."[64] Actual infinity, which was for Aristotle completely inconceivable and for high Scholasticism only in the shape of divine omnipotence, that is, in a *huperouranios topos* (place beyond

the heavens), has now become *natura naturata*. The vision of the universe is, so to speak, detheologized, and space, whose priority over individual objects was already so vividly expressed by Gauricus, now becomes a "continuous quantity, consisting of three physical dimensions, existing by nature before all bodies and beyond all bodies, indifferently receiving everything." No wonder that a man like Giordano Bruno now outfits this world of the spatial and infinite, and thus of the thoroughly measurable, this world which, so to speak, outgrew divine omnipotence, with an almost religious sublimity of its own; he "invests it, along with the infinite extension of the Democritan *kenon* (void), with the infinite dynamic of the neoplatonic world-soul."[64a] And yet this view of space, even with its still-mystical coloring, is the same view that will later be rationalized by Cartesianism and formalized by Kantianism.

It may strike us today as somewhat strange to see a genius like Leonardo describe perspective as the "rein and rudder of painting," and to hear a powerfully imaginative artist like Paolo Uccello answer his wife's request that he finally come to bed with the now-hackneyed phrase, "But how sweet perspective is!"[65] All we can do is try to imagine what this achievement meant then. For not only did it elevate art to a "science" (and for the Renaissance that was an elevation): the subjective visual impression was indeed so far rationalized that this very impression could itself become the foundation for a solidly grounded and yet, in an entirely modern sense, "infinite" experiential world. (One could even compare the function of Renaissance perspective with that of critical philosophy, and the function of Greco-Roman perspective with that of skepticism.) The result was a translation of psychophysiological space into mathematical space; in other words, an objectification of the subjective.

IV

This formula also suggests that as soon as perspective ceased to be a technical and mathematical problem, it was bound to become all that much more of an artistic problem. For perspective is by nature a two-edged sword: it creates room for bodies to expand plastically and move gesturally, and yet at the same time it enables light to spread out in space and in a painterly way dissolve the bodies. Perspective creates distance between human beings and things ("the first is the eye that sees, the second is the object seen, the third is the distance between them," says Dürer after Piero della Francesca[66]); but then in turn it abolishes this distance by, in a sense, drawing this world of things, an autonomous world confronting the individual, 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