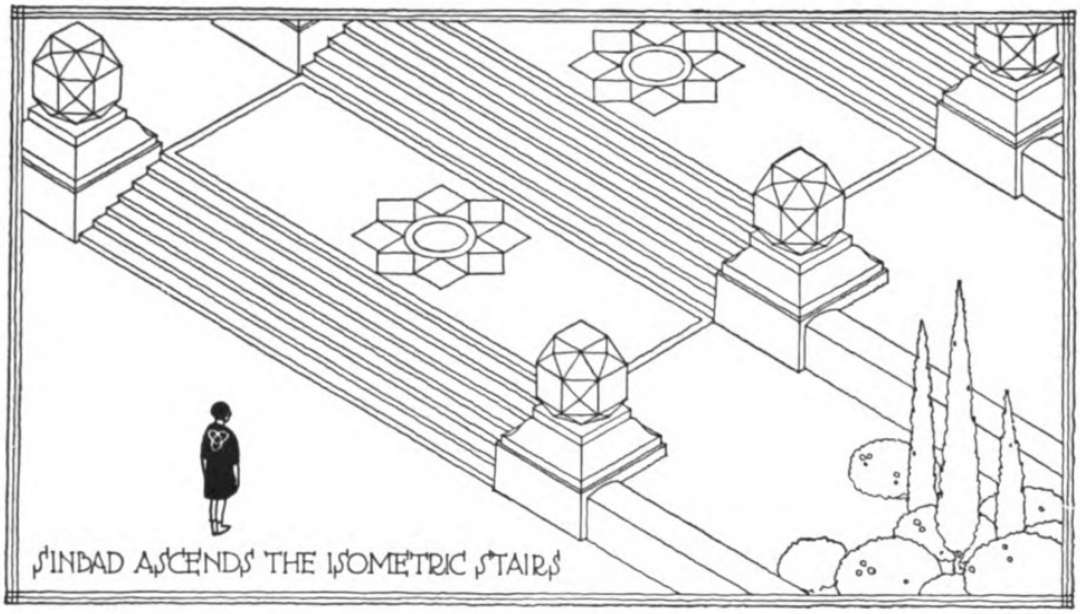


SINBAD ASCENDS THE ISOMETRIC STAIRS

VI

ISOMETRIC PERSPECTIVE

ARCHITECTURE, having to do pre-eminently with solids, the architectural designer should accustom himself to think always in terms of three dimensions rather than of two. And because perspective is the science of representing solids in plane projection — three dimensions through the mediumship of two — it should form part of his equipment no less than the knowledge and employment of regulating lines.

Many palpable faults and shortcomings of contemporary architectural practice can be traced to the all but universal custom of designing in elevation instead of in perspective — to *the lack of three-dimensional visualization,* a power which the practice of perspective brings. Through lack of mastery of the method, time pressure, or sheer indolence, it too often happens that a building is developed two-dimensionally and the task of making a perspective of it delegated to some subordinate or to a specialist, after the designing is done instead of while still in process; and this with an eye only on its selling value, so that the professional

renderer, or perspective expert, has come to stand in much the same relation to the designer as does the "song plugger" employed by music houses to the composer of songs.

The advantage of a more liberal use of perspective than is common among architects generally was brought home to me only after I had entered the field of theatrical production. For a stage scene does not lend itself as readily as does a building to representation by means of plan, elevation, and section; it can be adequately represented only in model form. Models, however, are difficult to make, cumbersome, and expensive; above all, they take time, and in the theater, of all places, everything must be done at top speed. Now the perspective drawing of a scene, though not fulfilling all the uses of a model, can sometimes be made to serve as its substitute. It possesses this advantage over a model, that human figures and stage properties are so easily represented — an important consideration when it is realized that a scene exists solely for the actors, that it is not so much a matter of background as of *environment,* the properties being often of more importance than the backdrop. Under the stimulus of necessity I acquired what might be called the perspective habit, and I am sure it would be an excellent thing if architects were forced from the very start to dramatize their conceptions in this way rather than by the plan-and-elevation method.

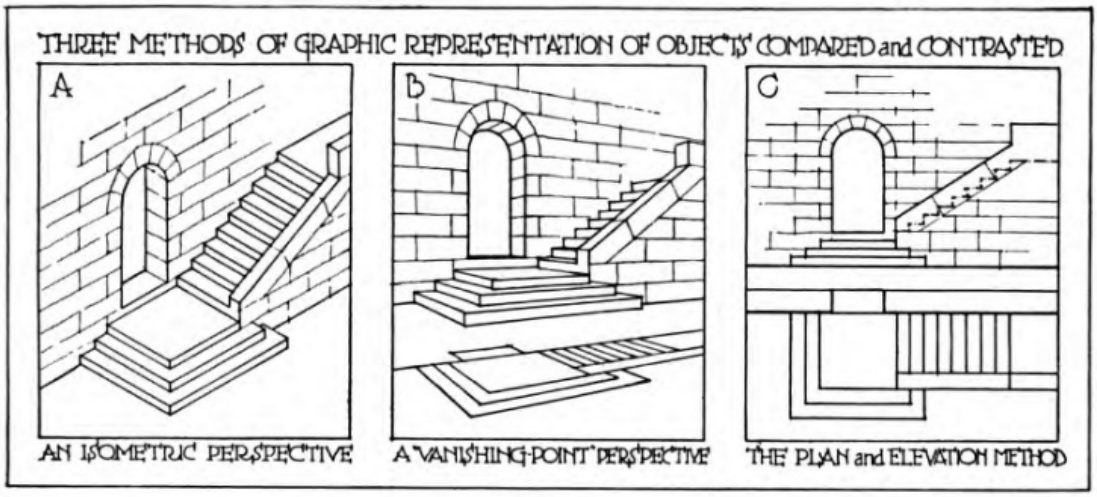
But the ordinary type of perspective drawing is both difficult and awkward to make and sometimes involves problems in projection not easily solved. This is the chief reason why the art is not more universally practiced. There is, however, a type of perspective, known as *isometric,* which is rapid, easy, direct; shows things truly and clearly, is "of equal measure" in all three dimensions, and requires no other paraphernalia than working drawings require.

Isometric perspective might be a great aid to the architectural designer — as it was to me in my theatrical work — first, as an easily achieved projection of the mental image, conveying the sense of three-dimensionality without going through the tedious process of point perspective; second, as an interpreter of working drawings to the artisan, an isometric drawing being a *realistic* working drawing — plan, elevation, and section all in one; and, third, because of its being true to scale in all

three dimensions it becomes in some cases a more clear and effective working drawing than any other kind.

For purposes of comparison there are shown in Illustration 27 three different methods of representing the same architectural subject — a stairway and an arch in a wall — in plane projection. A is an isometric drawing, the advantages of which are under discussion; B is a pictorial, or vanishing-point perspective; C shows the subject in plan and elevation — that is, in ordinary working-drawing form. A combines the advantages of B and C in that it is sufficiently realistic to be understood at a glance, which is true of B but not of C, and A is true to measurement along the lines of its three perpendiculars, which is true of C but not of B.

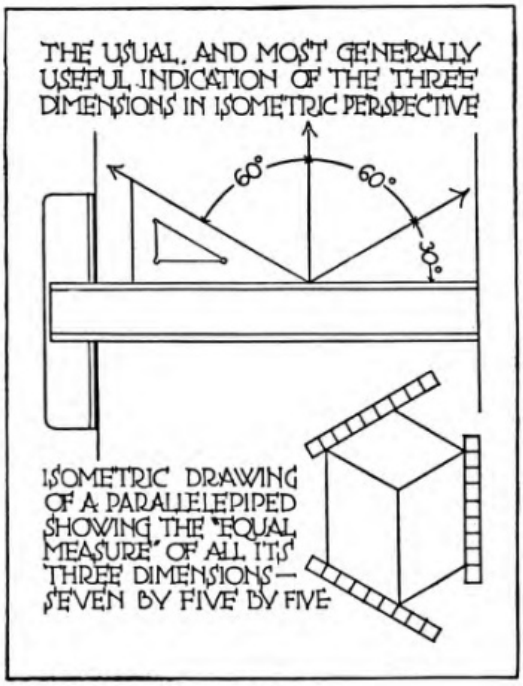
Aerial photography, which shows things as they appear from high up and far away — in bird's-eye view — is making this aspect of the world increasingly familiar. When in contact with the earth, one's vision is limited: near objects loom large, concealing those more remote. But as one rises above the earth, that which had been *behind* appears as *beyond;* and things are seen more nearly in their true relations — the picture, without ceasing to be a picture, takes on some of the characteristics of *a map.*



27

Now an isometric perspective is curiously like an airplane view in that the vanishing-point is far removed — is at infinity, in point of fact — and consequently such a perspective, though itself a distorted image, is free from that order of diminishment and distortion to which ordinary

perspective is subject, for that aims to reproduce the *optical image* in which the size of objects diminishes in proportion to their distance away, and parallel lines converge, which, though true to appearance, is contrary to fact. Isometric perspective, on the other hand, less faithful to appear-



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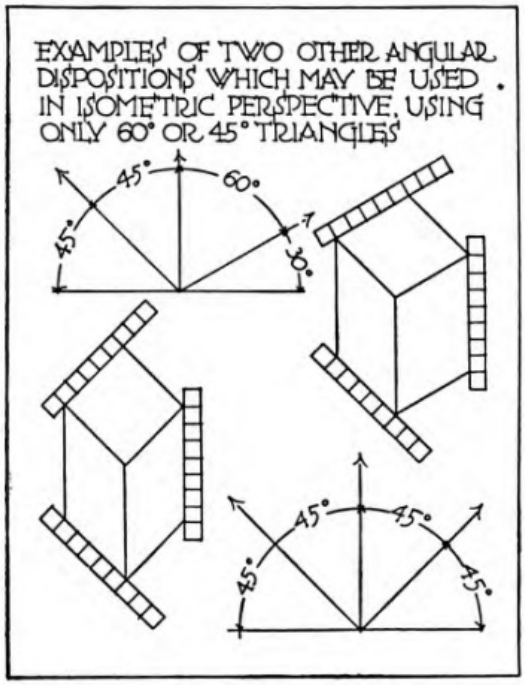
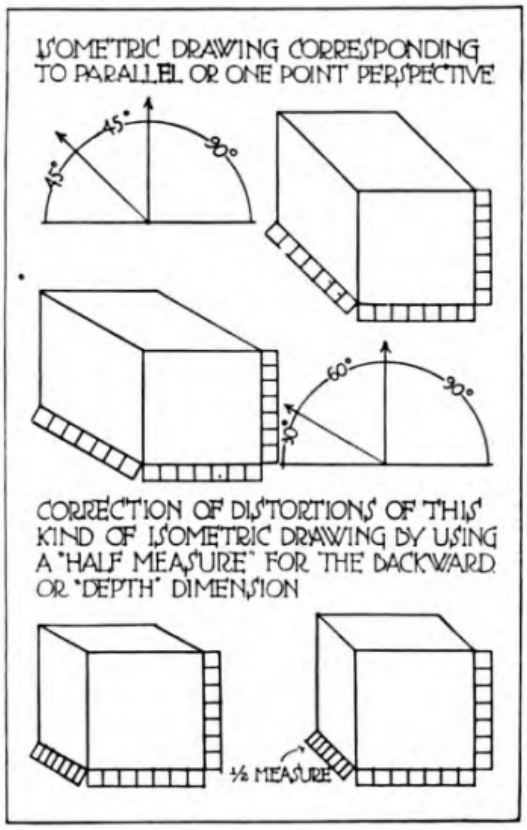


29

ance, is more faithful to fact; it shows things more nearly as they are *known to the mind:* Parallel lines are *really* parallel; there is no far and no near, the size of everything remains constant because all things are represented as being the same distance away and the eye of the spectator everywhere at once. When we imagine a thing, or strive to visualize it in the mind or memory, we do it in this way, without the distortions of ordinary perspective. Isometric perspective is therefore more intellectual, more archetypal, it more truly renders *the mental image* — the thing seen by the mind's eye.

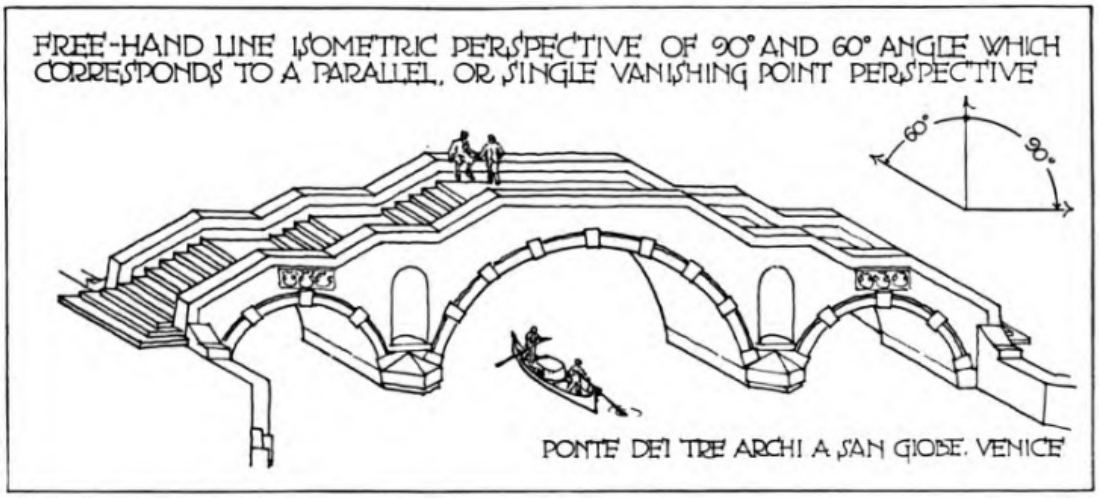
The isometric method is so simple that it scarcely needs verbal explanation, which is perhaps the reason that I have found so little written about it. There are no vanishing-points and consequently no diminishments; a thing does not change its size or dimensions by reason of



30

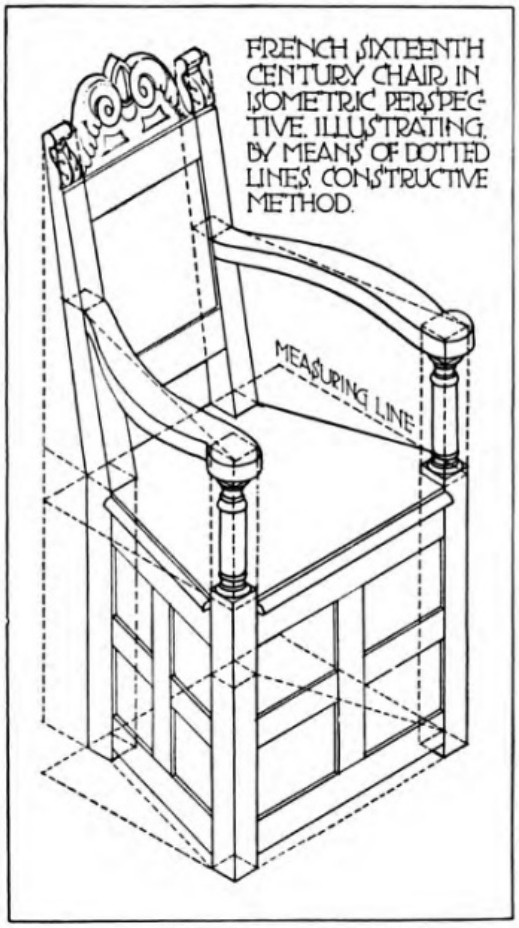
position or distance, because the vanishing-points are at an infinite distance and the eye of the observer at all places at once. To anyone at all skilled in point perspective isometric perspective presents no difficulties, and even without that knowledge the method should be clear by a careful study of the accompanying diagrams. What it amounts to is the correlation in a single drawing of plan and elevations, but in a somewhat distorted form. The drawing will be true to scale on all three perpendiculars, but right angles will have become obtuse or acute and circles (except those parallel to the picture plane) will have become ellipses, just as in point perspective.

Illustrations 28, 29, 30, and 31 yield the necessary initial data. The



31

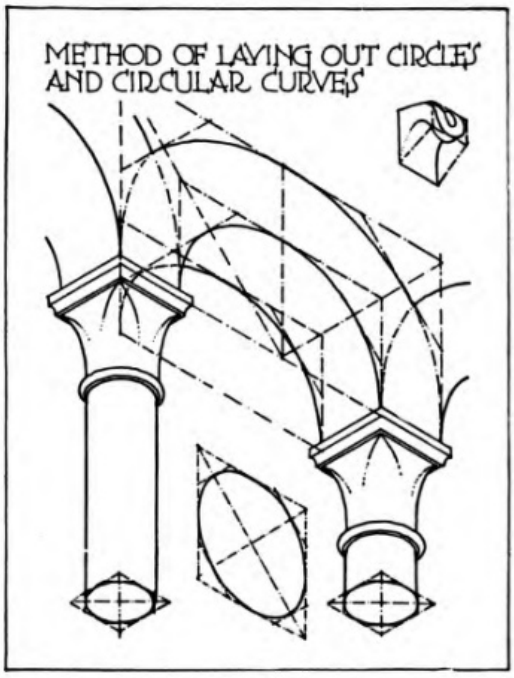
first thing to establish is the three perpendiculars. The line representing *height* will invariably be vertical, and the other two — length and breadth



33

Having established the three perpendiculars, represented by a vertical and the two lines subtending the chosen angle, and corresponding to the dimensions of height, length, and breadth, each becomes a measuring line upon which and by means of which the various elements of a design may be plotted to scale. Herein lies the great advantage of the isometric method, both for simplicity in making and — will be expressed by the two sides of an angle, chosen arbitrarily, ranging from a minimum of ninety to a maximum of one hundred and fifty degrees.

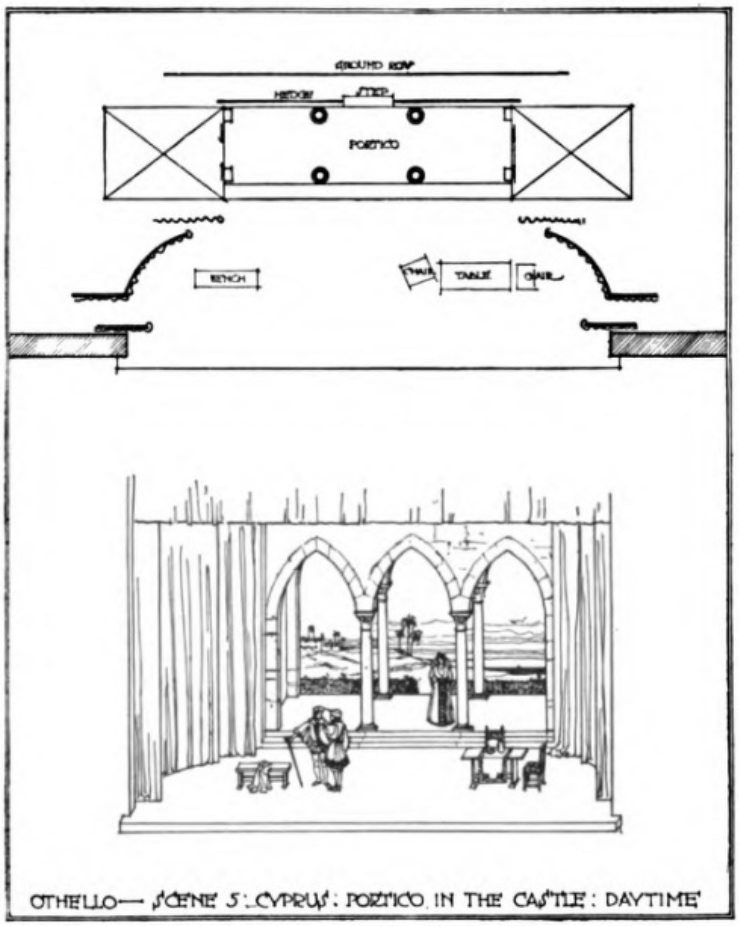
Because the triangles in common use by draughtsmen are of " thirty-sixty " and forty five degrees, the angles usually selected are such as can be worked with these two triangles in conjunction with a T-square. The angles shown in Illustrations 28 and 30 are the ones most commonly employed, but the two others shown in Illustration 29 are useful for special purposes, where it is desired to make the *plan* clear and prominent.



32

for convenience in a reading: the drawing is to scale on all perpendiculars — of " equal measure," as the name itself implies.

The approved method of procedure is to establish first the plan in perspective, then the main rectilinear solids, subjecting these afterwards to such subdivisions or additions as the necessities of the case demand, proceeding always from the larger to the lesser, from the simple to the more intricate. Pursuant of this method, a circle is first established as a square with a width equal to the circle's diameter; this square is translated into an octagon, within which and tangential to it, an ellipse, representing the circle in perspective, can easily be drawn free-hand (Illustration 32). In Illustration 33, representing a chair in isometric perspective, the dotted lines indicate the preliminary construction and measuring lines. Confusion is avoided by always beginning with the perspective *plan,* and building upward from that into the vertical dimension.



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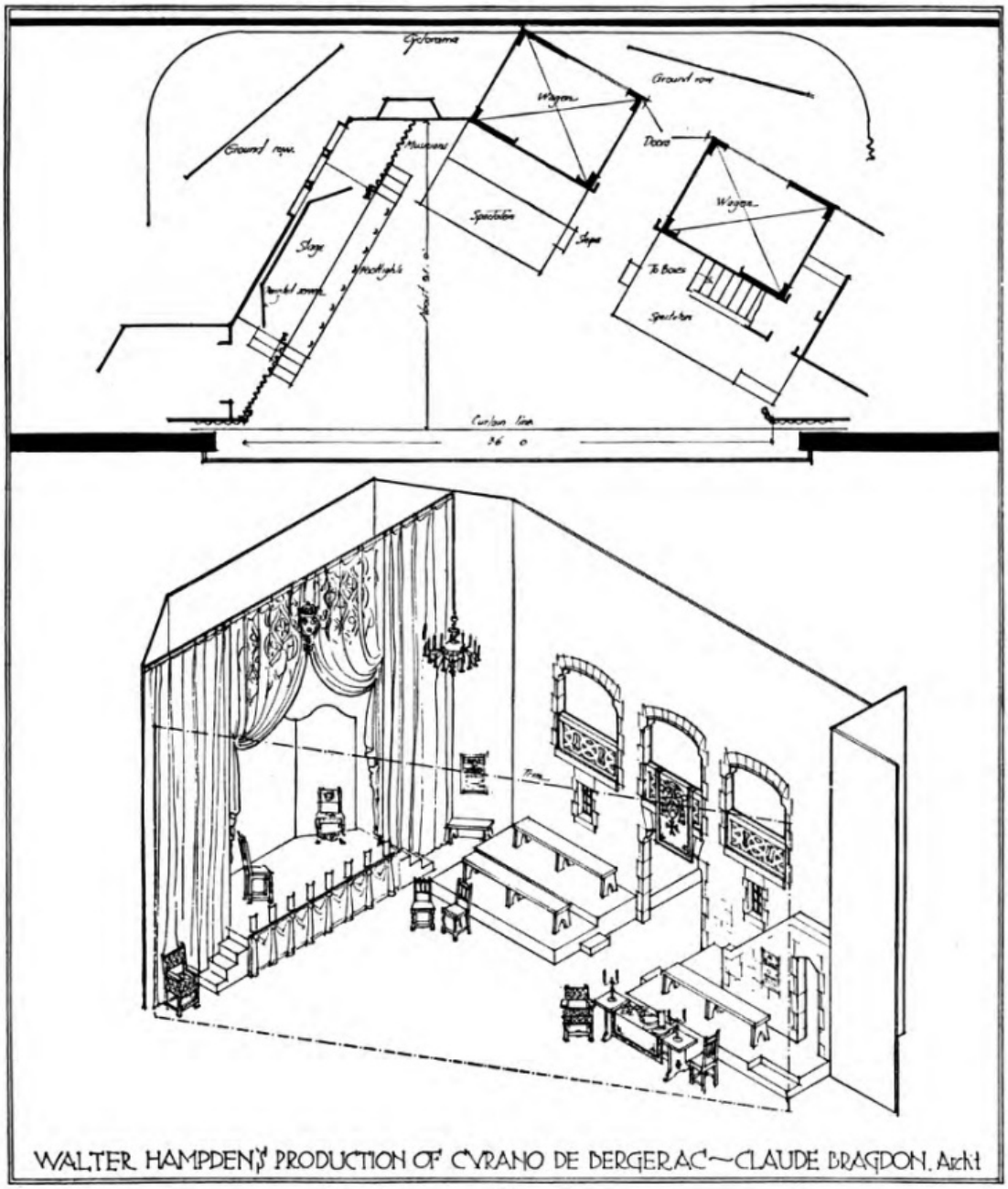
The one-hundred-and-thirty-five-degree and the one-hundred-and-fifty-degree isometric perspectives (Illustrations 30 and 31) correspond to the single-vanishing-point, or parallel perspective, so called. This type of isometric drawing is most happily and easily achieved for the reason that it involves only the adding of the third or depth dimension to a straight



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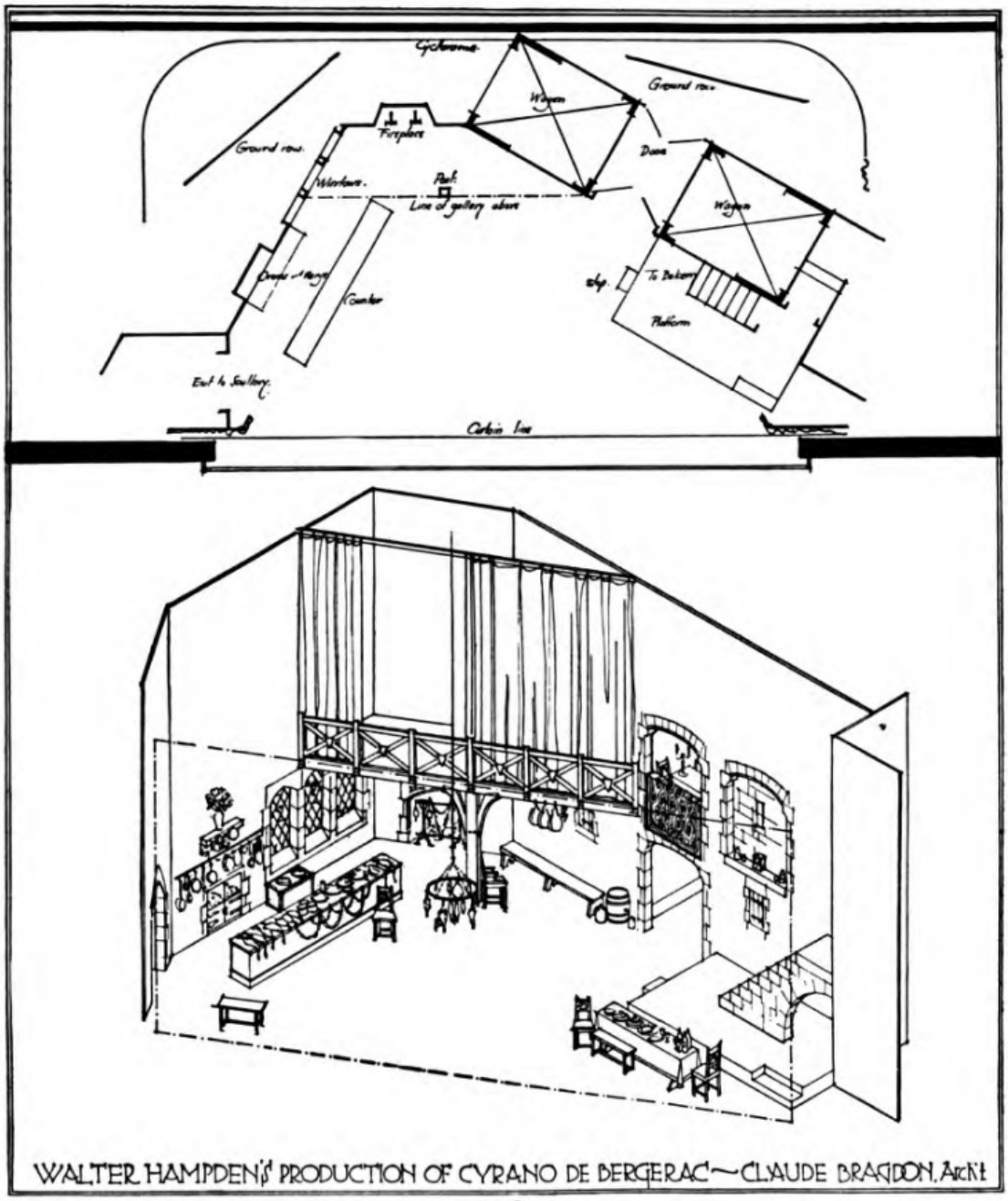
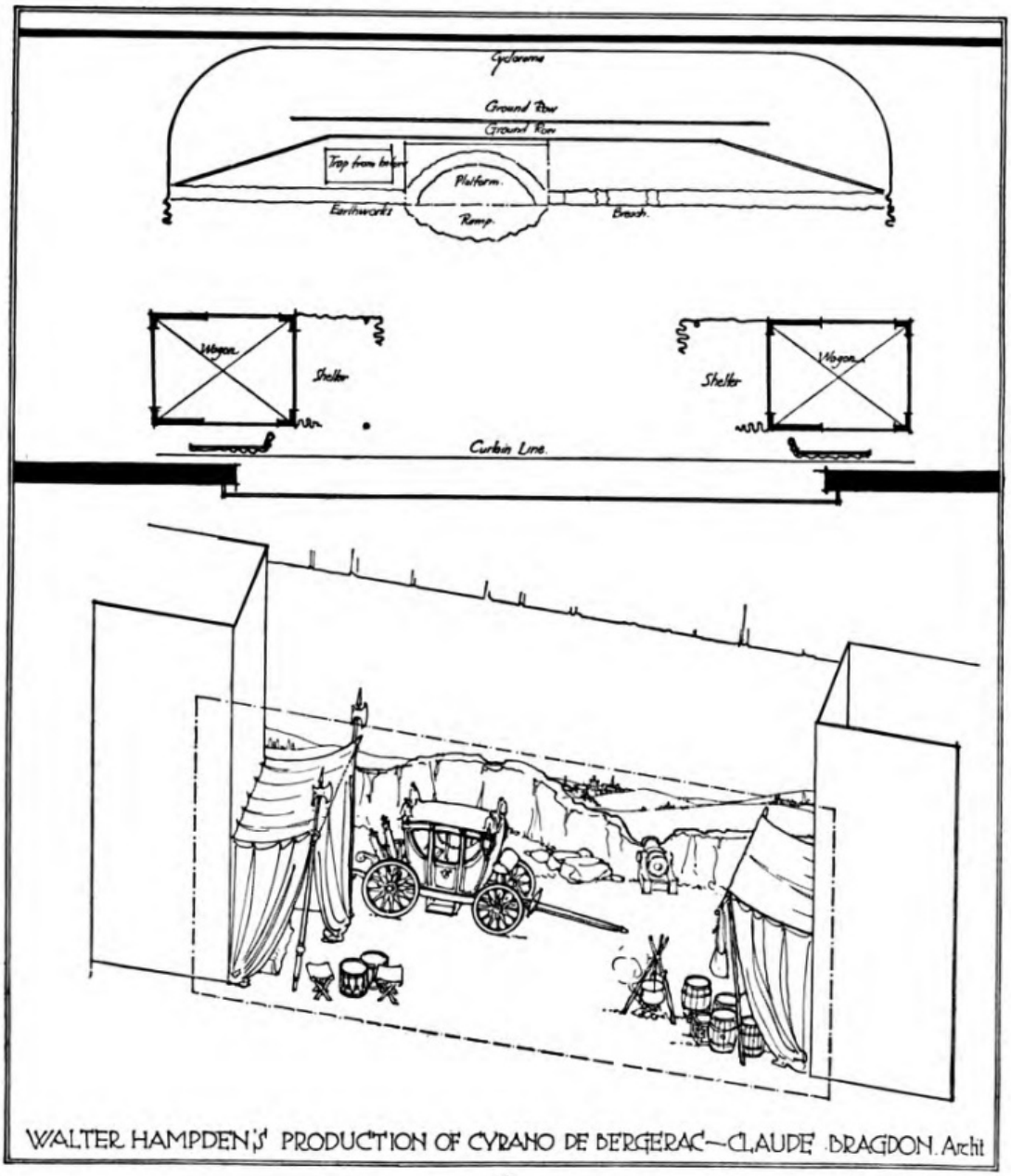
elevation. The objection to it dwells in the fact that this third dimension, if "equal measure" is adhered to, appears excessive, and the distortion consequently extreme. To overcome this I conceived the idea of making all measurements on the retreating perpendicular (the depth



WALTER HAMPDEN'S PRODUCTION OF CYRANO DE BERGERAC—CLAUDE BRAGDON, ARCH'T

36

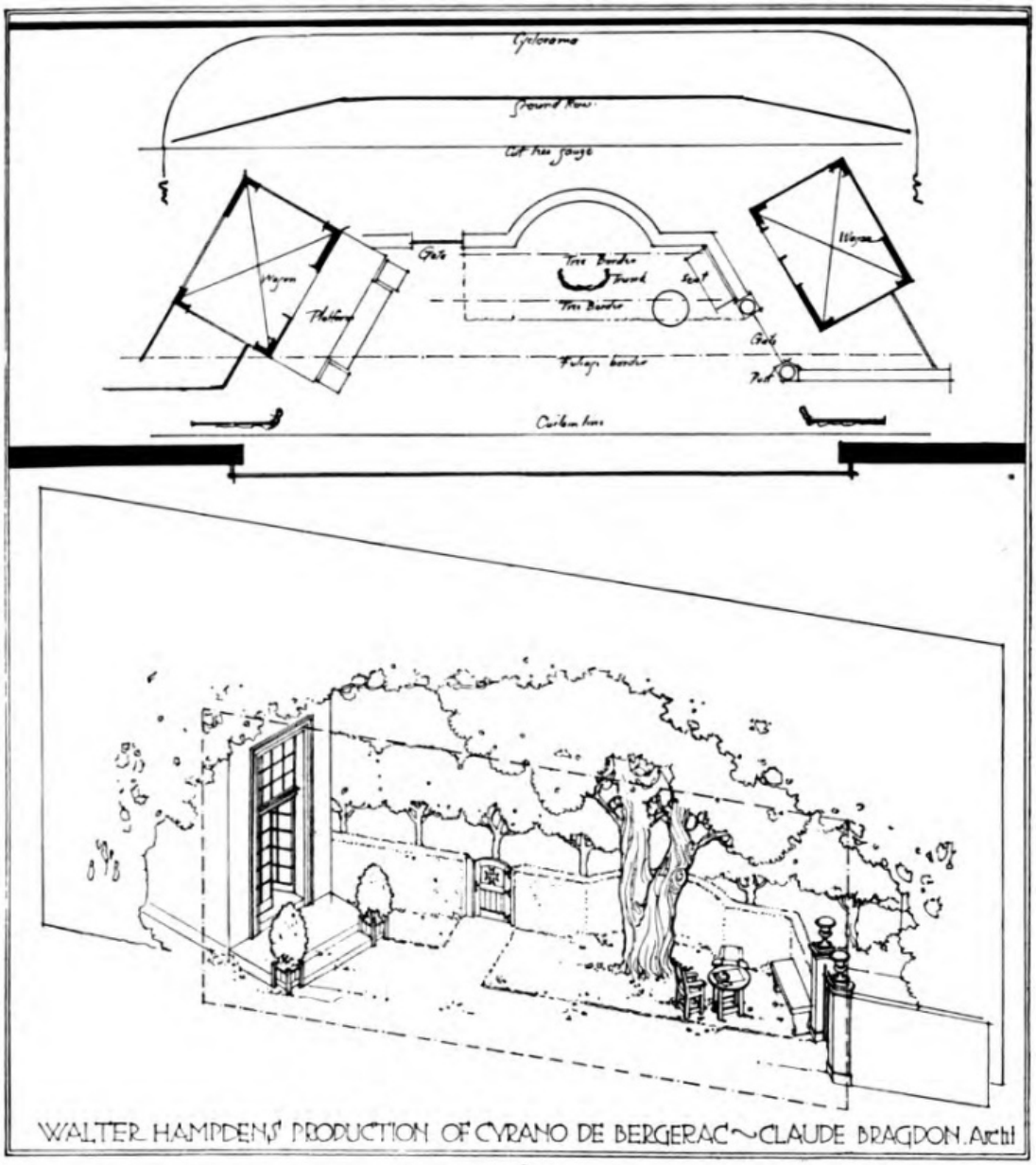
dimension) *one half* of what, according to the isometric rule, they should be, as shown in the lower diagram of Illustration 30. Presentations of objects made according to this rule closely approximate true optical perspectives, while the labor is much less. I found this compromise extremely



WALTER HAMPDEN'S PRODUCTION OF CYRANO DE BERGERAC—CLAUDE BRAGDON, Archt

37

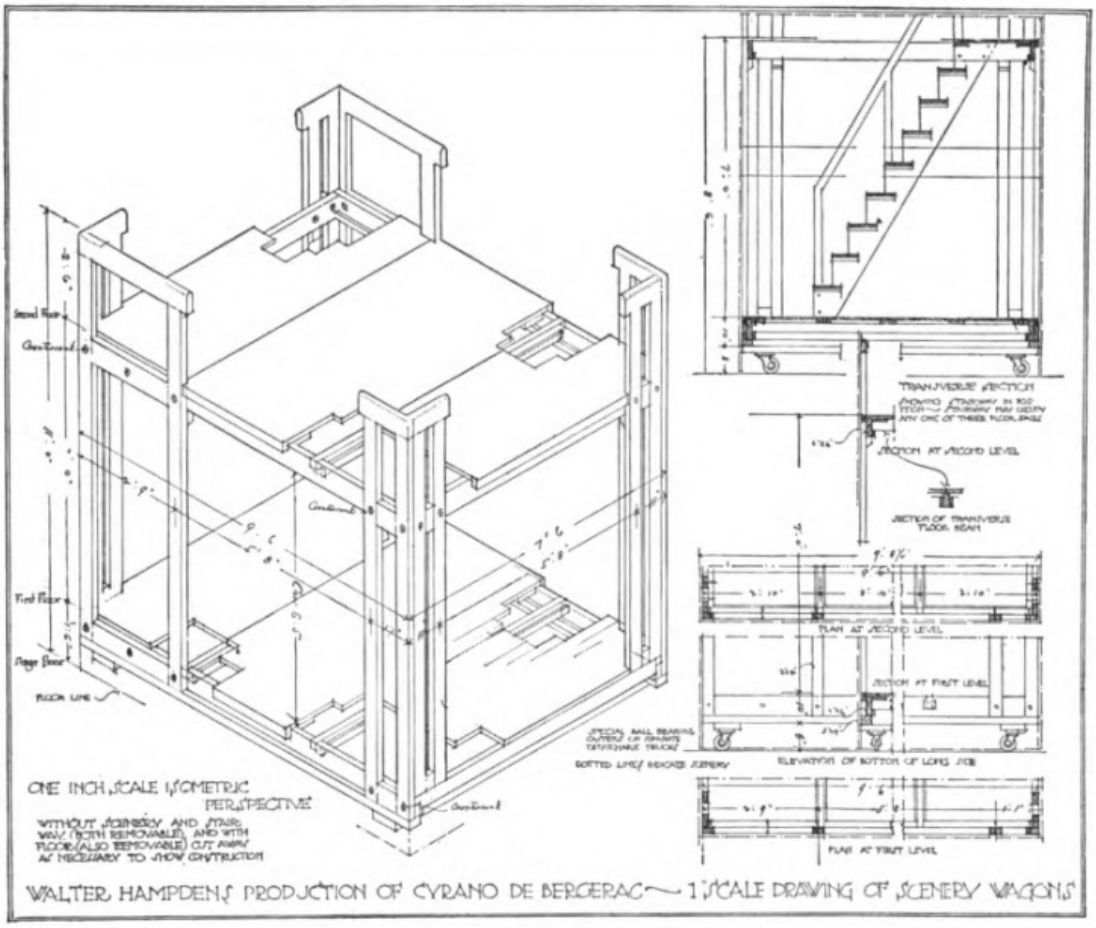
useful in my work in the theater, for by these means I was able to make a wholly intelligible and quite realistic picture of a stage-setting with scarcely more labor than goes to the making of a straight elevation. Illustration 34 shows a scene in Walter Hampden's production of *Othello*



38

made according to this method, as is also the "Geometrical Garden" which heads the penultimate chapter of this book.

Illustrations 35 to 38, made for Walter Hampden's *Cyrano de Bergerac* production, exemplify some of the higher reaches of the art of isometric perspective, and I would call particular attention to Illustration



39

39 because it so well shows forth the value of isometric perspective as a *correlator* of plan, elevation, and section, making the whole intelligible at a glance.

With the aid of this exposition and these examples anyone, with a little practice, should be able to master this useful and amusing art.