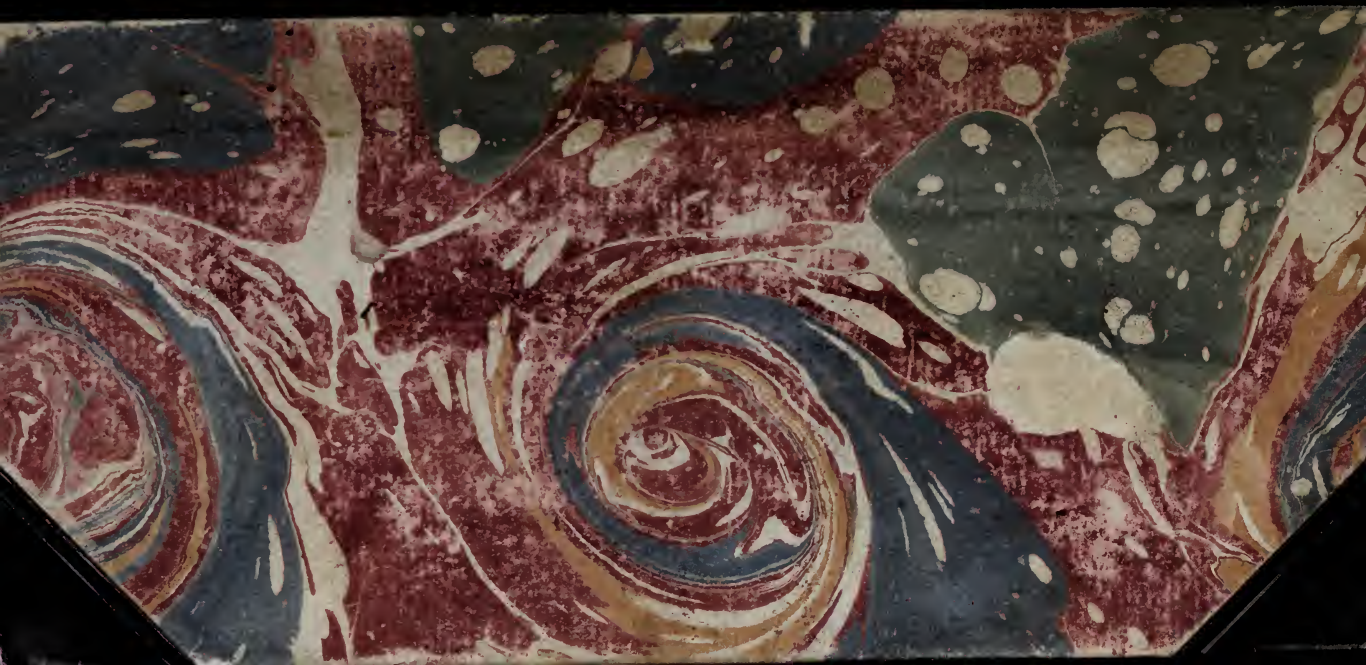

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THE

ART OF DRAWING

IN

Perspective:

WHEREIN

THE DOCTRINE OF PERSPECTIVE IS CLEARLY AND CONCISELY TREATED OF

UPON GEOMETRICAL PRINCIPLES:

AND

A MECHANICAL METHOD OF

PERSPECTIVE AND DESIGNING,

Invented for the Benefit of those who are Strangers to Mathematics.

ILLUSTRATED WITH A VARIETY OF EXAMPLES ON THREE COPPER-PLATES.

THE TENTH EDITION,

WITH CONSIDERABLE IMPROVEMENTS.

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THE

ART OF DRAWING

IN

PERSPECTIVE, &c.

THE PRINCIPLES, *&c.* OF PERSPECTIVE.

CHAPTER I.

Of Perspective in general.

PERSPECTIVE is the art of delineating objects on a plain surface, such as they would appear at a certain distance and height, upon a transparent plane, placed perpendicular to the horizon between the objects and the eye.

Hence this art is absolutely necessary for such as would properly understand that of drawing; and is of great consequence in the arts of engraving, etching, carving, and painting; yet perspective of itself cannot be called an exclusive rule in these arts; but is to be used with judgement and discretion; for, being well un-

 derstood,

derstood, if it be applied too rigidly, the practitioner may, indeed, effect such things as are strictly within the rules of art, yet the work will not always have that agreeable effect, that apparent excellence and simplicity, which a less rigorous observance of the rules might produce: therefore the young artist is to adhere to the precepts of perspective no farther than as they lead to the perfection of his work or design; judgement and taste being his other guides.

CHAPTER II.

Definitions in Perspective.

1. THE *horizontal line* is that line which is supposed to be drawn parallel to the horizon through the eye of the spectator; or rather, it is a line which separates the heaven from the earth, and which limits the sight. Thus A, B, see the plate fig. 1,* are two pillars below the horizontal line C, D, by reason the eye is elevated above them; in fig. 2, they are said to be equal with it; and in fig. 3, raised above it. Thus,

* At the end of this book.

according

according to the different points of view, the objects will be either higher or lower than the horizontal line.

2. The *point of sight*, A, fig. 4, is that which makes the centrical ray on the horizontal line *a*, *b*; or it is the point where all the other visual rays, D, D, unite.

3. The *points of distance*, C, C, fig. 4, are points set off in the horizontal line at equal distances on each side of the point of sight A.

4. And, in the same figure, B B represents the *base*, or fundamental line.

5. E E is the *abridgment of the square*, of which D D are the sides.

6. F F, the *diagonal lines* which go to the points of distance C C.

7. *Accidental points* are those where the objects end: these may be cast negligently, because neither drawn to the point of sight, nor to those of distance, but meeting each other on the horizontal line. For example, two pieces of square timber G and H, fig. 5, make the points I, I, I, I, on the horizontal line; but go not to the point of sight K, nor to the points of distance C C; these accidental points serve likewise for casements, doors, windows, tables, chairs, &c.

8. The *point of direct view*, or of the front, is when we have the object directly before us; in which case it shews only the fore-side; and if below the horizon,

horizon, a little of the top; but nothing of the sides, unless the object be polygonous.

9. The *point of oblique view*, is when we see an object aside of us, and as it were aslant, or with the corner of the eye; the eye, however, being all the while opposite to the point of sight; in which case, we see the object laterally, and it presents to us two sides or faces. The practice is the same in the side points, as in the front points; a point of sight, points of distance, &c. being laid down in the one as well as the other.

10. *Ichnography* is the figure of the platform in perspective, or the plan any thing is to be raised upon.

11. *Orthography*, in perspective, is the figure of the front or fore-side of an object, as a house, &c. or it is the figure of such an object directly opposite to the eye. As the ichnography represents the plan, the orthography represents the side opposite to the eye.

12. *Scenography* is what exhibits the object quite perfect, with all its diminutions and shadows, front, sides, height, and all raised on the geometrical plan.

CHAPTER III.

General Rules, or Laws, in regard to Perspective.

LET every line which is the object or geometrical figure, if straight, perpendicular, or parallel to its base, be so also in its scenographic delineation, or in the description thereof, in all its dimensions, such as it appears to the eye; and let the lines, which in the object return at right angles from the fore-right side, be drawn in like manner scenographically from the point of sight.

Let all straight lines, which in the object return from the fore-right side, run in a scenographic figure into the horizontal line.

Let the object you intend to delineate, standing on your right hand, be placed also on the right hand of the point of sight; and that on the left hand, on that hand of the same point; as also that which is just before, in the middle of it.

Let

Let those lines which, in the object, are equidistant from the returning line, be drawn, in the scenographic figure, from that point found in the horizon.

In setting off the altitude of columns, pedestals, and the like, measure the height from the base-line upward in the front or fore-right side; and a visual ray down that point in the front, shall limit the altitude of the column, or pillar, all the way behind the front side, or orthographic appearance even to the point of sight. This rule must be observed in all figures, as well where there is a front or fore-right side, as where there is none.

In delineating ovals, circles, arches, crosses, spirals, and cross-arches, or any other figure in the roof of any room, first drawn ichnographically, and so, with perpendiculars from the most eminent points thereof, carry it up to the ceiling, from which several points carry on the figure.

The centre, in any scenographic regular figure, is found by drawing cross-lines from the opposite angles, for the points where the diagonals cross is the centre.

A ground-plane of squares is alike, both above and below the horizontal line, only the more it is distant either above or beneath the horizon, the squares will be so much the larger or wider.

In drawing a perspective figure, where many lines come

come together, you may, for the directing of your eye, draw the diagonals in red, the visual lines in black, the perpendicular in green, or other different colour from that which you intend the figure should be of.

Having considered the height, distance, and position, of the figure, and drawn it accordingly, with side or angle against the base, raise perpendiculars from the several angles or designed points from the figure to the base, and transfer the length of each perpendicular from the place where it touches the base to the base on the side opposite to the point of distance, so will the diametrals, drawn to the perpendiculars in the base, by intersection with the diagonals, drawn to the several transferred distances, give the angles of the figures; and thus will lines, drawn from one point to another, circumscribe the scenographic figure.

If in a landscape there be any standing waters, as rivers, ponds, and the like, place the horizontal line level with the farthest sight or appearance of it.

If there be any houses or the like in the picture, consider their position, that you may find from what point in the horizontal lines to draw the front and sides thereof.

In describing things at a great distance, observe the proportion, both in magnitude and distance, in the

the draught, which appears from the object to the eye.

In colouring and shadowing every thing, you must represent the same in your picture that you observe with your eye, especially in objects lying near; but according as the distance increases, so the colours must be fainter, till at last they lose themselves in a darkish sky-colour.

CHAPTER IV.

Of Designing.

THE design is the first idea of a large work drawn roughly and *small*, with an intention to be executed and finished at *large;* and this design, according to the rules of mathematicians, makes the object of perspective.

The art of drawing or painting has been, by some of the greatest masters, divided into the design or draught, the proportion, the expression, the claro obscuro, the ordonnance, the colouring, and the perspective.

The

The design is the simple contour, or outlines, of the figures intended to be represented, or the lines that terminate and circumscribe them; such design is sometimes drawn in crayons, or ink, without any shadows at all; sometimes it is hatched, that is, the shadows are expressed by sensible outlines, usually drawn across each other with the pen, crayon, or graver. Sometimes, again, the shadows are done with the crayon, rubbed so as that there do not appear any lines; at other times the grains or strokes of the crayons appear as not being rubbed: sometimes the design is washed, that is, the shadows are done with a hair-pencil in Indian ink, or some other liquor: and sometimes the design is coloured, that is, colours are laid on much like those intended for the grand work.

The essential requisites of a design are correctness, taste, elegance, character, expression, and perspective. Correctness depends on the justness of the proportions, and knowledge of anatomy. Taste is a certain manner of correctness peculiar to one's self, derived either from nature, masters, or studies, or all of them united. Elegance gives a delicacy that not only strikes persons of judgment, but communicates an agreeableness that pleases universally. The character is what is peculiar to each thing, wherein there must be diversity, insomuch that every thing has its peculiar character

to distinguish it. The expression is the representation of the parts of a painting or a figure, according to the situation they are in with regard to the point of sight.

The design or draught is a part of the greatest import and extent in drawing. It is acquired chiefly by genius and application, rules being of less avail here than in any other branch of the art, as colouring &c. The principal rules that regard design are, that novices accustom themselves to copy good originals at first sight; not to use squares in drawing, lest they stint and confine their judgment; to design well from life before they practise perspective; to learn to adjust the size of their figures to the visual angle, and the distance of the eye from the model or object; to mark out all the parts of their design before they begin to shade; to make their contours in great pieces, without taking notice of the little muscles and other breaks; to make themselves masters of the rules of perspective: To observe the perpendicular, parallel, and distance, of every stroke; to compare and oppose the parts that meet and traverse the perpendicular, so as to form a kind of square in the mind, which is the great, and almost the only, rule of designing justly: To have a regard not only to the model, but to the part already designed, there being no such thing as designing with strict justness, but by comparing and proportioning

portioning every part to the first. All other rules relate immediately to perspective.

There are several methods invented of designing mechanically. The following is the method of the learned Sir *Christopher Wren*, and may be put in practise with great ease. A, fig. 6, is a small sight with a short arm B, which may be turned round about and moved up and down the small cylinder C D, which is screwed into the piece E D, at D: this piece E D moving round about the centre E, by which means the sight may be removed either towards E or F. E F is a ruler fastened on the two rulers G G, which rulers serve both to keep the square frame S S S S perpendicular, and by their sliding through the square holes T, T, they serve to stay the sight either farther from, or nearer to, the said frame; on which frame is stuck on, with a little wax, the paper O O O O, whereon the picture is to be drawn by the pen I. The pen I is, by a small brass handle V, so fixed to the ruler H H, that the point I may be kept very firm, so as always to touch the paper. H H is a ruler that is constantly, by means of the small strings *aaa*, *bbb*, moved horizontally or parallel to itself; at the end of which is stuck a small pin, whose head P is the sight which is to be moved up and down on the outlines of any object.

The contrivance of the strings is this: The two strings *aaa*, *bbb*, are exactly of an equal length:

two

two ends of them are fastened into a small leaden weight, which is employed in a socket on the back side of the frame, and serves exactly to counterpoise the ruler H H, being of an equal weight with it. The other two ends of them are fastened to two small pins H H, after they have rolled about the small pullies M M, L L, K K, by means of which pullies, if the pen I be taken hold of, and moved up and down the paper, the string moving very easily, the ruler will always remain in an horizontal position.

The manner of using it is thus: Set the instrument upon a table, and fix the sight A at what height above the table, and at what distance from the frame S S S S, you please. Then looking through the sight A, holding the pen I in your hand, move the head of the pin P, up and down the outlines of the object, and the point of the pen I, will describe on the paper O O O O, the shape of the object so traced.

Another mechanical method of designing much practised is, by means of the camera-obscura; being a machine that represents an artificial eye, wherein the images of external objects are exhibited distinctly in their native colours, either invertedly or erect. The camera-obscura, or darkened room, is made after two different methods: one, the camera-obscura, properly so called; that is, any large room made as dark as possible, so as

to

to exclude all light but that which is to pass through the hole and lens in a ball fixed in the window of the said room.

The other is made in various forms, as that of a box, whose sides fold out, &c. for the conveniency of carrying it from place to place.

For the construction of a camera-obscura.—1. Darken the room E F, fig. 7, leaving only one little aperture open in the window at V, on the side I K, facing the prospect A B C D. 2. In this aperture fit a lens, either plane, convex, or convex on both sides. 3. At a due distance, to be determined by experience, spread a paper or white cloth, unless there be a white wall for the purpose: Then on this, G H, the desired objects A B C D will be delineated invertedly. 4. If you would have them appear erect, place a concave lens between the centre and the focus of the first lens, or receive the image on a plane speculum inclined to the horizon under an angle of 45°, or by the means of two lenses included in a draw-tube instead of one. If the aperture does not exceed the size of a pea, the objects will be represented without any lens at all. And thus the objects may be drawn or copied to the greatest degree of accuracy.

For a farther explanation upon this head, as also for several other mechanical methods of taking draughts, &c. we refer the reader to *The Artist's*

Assistant—The Art of Drawing and Painting in Water-Colours, and *The Art of Drawing without a Master,* published by the Proprietor of this work, in Fleet Street, London.

N.B. The Art of Painting in Oil, and *The Art of Painting in Miniature and Wax-Crayons;* also *Gilding on Glass,* are new works, published as above, since the first edition of this pamphlet.

CHAPTER V.

The Foundation, Method, &c. of Perspective.

PERSPECTIVE is either employed in representing the ichnographies, or ground-plot of objects, or the scenographies, or representation of the objects themselves.

The foundation of perspective may be thus conceived: Suppose the pentagon A B D E F, fig. 8, were to be represented by the rules of perspective on the transparent plane V P, placed perpendicularly on the horizontal plane H R, dotted lines are imagined to pass from the eye C to each point on the pentagon, C A, C B, C D, &c. which are supposed in the passage through the plane P V, to

to leave their traces or vestiges in the points *a*, *b*, *d*, &c. on the plane, and thereby to delineate the pentagon *a b d e f;* which, as it strikes the eye by the same rays that the original pentagon A B D E F does, will be a true perspective representation of it.

The business of perspective, therefore is, to lay down geometrical rules for finding the points *a*, *b*, *d*, *e*, *f*, upon the plane.

By the following examples it will appear, that the whole practice of perspective is built upon the foundation already laid down.

Thus, to find the perspective appearance of a triangle A B C, fig. 9, between the eye and the triangle, draw the line D E, which is called the base or the fundamental line; from 2 draw 2 V, representing the perpendicular distance of the eye above the fundamental line, be it what it may; and through V draw, at right angles to 2 V, H K parallel to D E: Then will the plane D H K E represent the transparent plane, on which the perspective representation is to be made. Next, to find the perspective points of the angles at the triangle, let fall perpendiculars, A 1, C 2, B 3, from the angles, to the base D E; set off these perpendiculars upon the base, opposite to the point of distance K, to B, A, C. From 1, 2, 3, draw lines to the principal point V; and from the points A, B, and C, in the fundamental line, draw the right lines A K, B K,

B K, C K, to the point of distance K; which is so called because the spectator ought to be so far removed from the figure or painting, as it is distant from the principal point V. The points *a*, *b*, and *c*, where the visual lines V 1, V 2, V 3, intersect the lines of distance A K, B K, C K, will be angular points of the triangle *a b c*, the true representation of A B C.

By proceeding in this manner with the angular points of any right-lined figure, whether regular or irregular, it will be very easy to represent it in perspective: However, in practice, several compendious methods will occur to every artist.

Again, if the scenographic appearance of any solid were to be represented; suppose of a triangular prism, whose base is the triangle *m n o*, fig. 10, you need only find the upper surface of it, in the same manner as you found the lower, or base; and then, joining the corresponding points by right lines, you will have the true representation of the solid in perspective. So that the work is the same as before; only you take a new fundamental line, as much higher than the former as is the altitude of that solid whose scenographic representation you would delineate.

But there is still a more commodious way, which is this:—Having found, as above, the base or ichnographic plane *m n o*, let perpendiculars be erected to the fundamental line from the three angular points

points which will express the altitudes of those points. But because these altitudes, though equal in the body or solid itself, will appear unequal in the scenographic view, the farthest off appearing less than those nearer the eye, their true proportional heights may be thus determined. Any where in the fundamental line, let A B be erected perpendicularly, and equal to the true altitude; or, if the figure has different altitudes, let them be transferred into the perpendicular A B; and from the points A and B, and from all the points of intermediate altitudes, if there be any such, draw right lines to the point of sight V: Those lines A V, B V, will constitute a triangle with A B, within which all the points of altitude will be contained. Through the points *o n m*, draw parallels to the fundamental line; and from the points *a a a*, &c. erect perpendiculars to those parallels; and the points where they intersect the lines A V, B V, as in *a a*, *b b*, *&c.* will determine the apparent height of the solid in that scenographic position to the eye in V.

In practice, these parallels and perpendiculars are easily drawn by means of a good drawing-board, or table fitted for the purpose.

To exhibit the Perspective of a Pavement consisting of square stones viewed directly. Divide the side A B, fig. 11, transferred to the fundamental line D E, into as many equal parts as there are

square

square stones in one row. From the several points of division draw right lines to the principal point V, and from A to the point of distance K, draw a right line A K, and from B to the other point of distance L, draw another line L B. Through the points of the intersections of the corresponding lines, draw right lines on each side, to be produced to the right lines A V and B V. Then will A *f g* B be the appearance of the pavement A FG B.

To exhibit the perspective appearance of a square A B D C, fig. 12, seeing obliquely, and having one of its sides A B in the fundamental line. The square being viewed obliquely, assume the principal point V, in the horizontal line H R, in such a manner as that a perpendicular to the fundamental line may fall without the side of the square A B, at least may not bisect it: and make V K the distance of the eye. Transfer the perpendiculars A C and B D to the fundamental line D E; and draw the right lines K B, K D; as also A V and V C: Then will A and B be their own appearances: and *c* and *d* the appearances of the points C and D. Consequently, A *c d* B is the appearance of the square A B D C.

If the square A C B D be at a distance from the fundamental line D E, which yet rarely happens in practice, the distances of the angles A and B must likewise be transferred to the fundamental line,

line, and even the oblique view itself is not very common.

The reason why objects appear the smaller as they are at the greatest distance is, that they appear according to the angle of the eye wherein they are seen; and this angle is taken at the eye, where the lines terminating the object meet.

The eye A, fig. 13, for instance, viewing the object B C, will draw the rays A B and A C, which give the angle B A C; so that an object viewed under a great angle will appear large, and another under a less angle smaller: For, among equal objects, those at the greatest distance appear smallest; and, consequently, in all perspective that the remotest objects must be made the smallest, will be manifest from the figure; the objects B C, D E, F G, H I, and K L, being all equal, but at different distances from the eye, it is evident that the angle D A E is less than the angle B A C, that F A G is less than D A E, that H A I is less than F A G, and that K A L is less than H A I. Hence the second, third, fourth, and fifth, objects will appear smaller and smaller, though really all equal, inasmuch as the angles diminish in proportion as the objects recede.

If the eye, on the other hand, were removed to M, K L would appear the largest, and B C no bigger than N O.

Hence

Hence it follows, that, as objects appear according to the angle they are seen under, if several lines be drawn between the sides of the same triangle, they will appear equal: Thus all the lines comprised between the sides O N and O P, fig. 14, of the triangle N O P, will appear equal to each other: and, as objects comprehended under the same angle seem equal, so all comprehended under a greater angle must seem greater, and all under a smaller angle, less.

Thus much being premised, if there be a number of columns or pilasters to be ranged in perspective on each side of a hall, church, or the like, they must of necessity all range under the same angle, and all tend to one common point in the horizon O, fig. 15. For instance, if from the points D E, the eye being placed at A, and viewing the first object D E, you draw the visual rays D O and E O, they will make the triangle D O E, which will include the columns D E, F G, H I, K L, M N, so as they will all appear equal.

What has been said of the sides is likewise to be understood of the ceilings and pavements; the diminution of the angles of remote objects, placed either above or below, following the same rule as those placed laterally. Trees, being ranged by the same law, have the same effect as the columns, &c. for being all comprehended in the same angle, and the two rays having each its own angle, and all the

angles

angles meeting in a point, they form a third, which is the earth, and a fourth, which may be supposed the air, and thus afford an elegant prospect.

To exhibit the perspective of a circle, I. If the circle be small, circumscribe a square about it: Draw diagonals and diameters *h a* and *d e*, fig. 16, intersecting each other at right angles; and draw the right lines *f g* and *b c* parallel to the diameter *d e* through *b* and *f*; as also through *c* and *g* draw right lines meeting the fundamental line in the points 3 and 4. To the principal point V draw right lines V 1, V 3, V 4, V 2, and to the points of distance L and K, draw the right lines L 2 and K 1. Lastly, connect the points of intersection *a, b, d, f, h, g, e, c*, with the arches *a b*, *b d*, *d f*, &c. Thus will *a b d f h g c a* be the appearance of the circle.

If the circle be large, on the middle of the fundamental A B, fig. 17, describe a semicircle, and from the several points of the periphery C, F; G, H, I, *&c.* to the fundamental line let fall perpendiculars, C 1, F 2, G 3, H 4, I 5, *&c.* From the points A, 1, 2, 3, 4, 5, *&c.* draw right lines to the principal points V; as also a right line from B to the point of distance L, and another from *a* to the point of distance K. Through the common intersections draw right lines as in the preceding case: Thus we shall have the points *e, f, g, h, c*, which are the representations of these, A, C, F, G, H, I, which, being connected as before, give the projection of the circle.

Hence appears not only how any curvilinear figure may be projected on a plane, but also how any pavement, consisting of any kind of stones, may be delineated in perspective.

CHAPTER VI.

Of the general Practice of Perspective as it regards Drawing.

THE practical part of perspective is only the application of these rules to the actual description of objects. But, as this part is purely mathematical, its assistance towards drawing is only what can be performed by rule and compass, and can therefore strictly serve only for finding the images of points of which they are composed; and, as they are infinite, it is endless to find them all by the strict rules; whence it becomes necessary, after a sufficient number of them are found, to complete the image by the help of drawing; to the better effecting of which, these points serve as a guide. Thus, when a circle is to be described, the practical rules serve to find a sufficient number of points in the circumference, which, being neatly joined by hand, will perfect the image, so that, in strictness, nothing in this image is found in mathematical rules, save the few particular points: the rest owes its being to the hand of the drawer.

Thus,

Thus, also, if any complicated figure be proposed, it may not be easy to apply the practical rules to the description of every minute part; but, by inclosing that figure in a regular one, properly subdivided, and reduced into perspective, that will serve as a help, whereby a person skilled in drawing may, with ease, describe the object proposed. Upon the whole, where the boundaries of the proposed objects consist of straight lines and plain surfaces, they may be described directly by the rules of perpective; but when they are curvilinear, either in their sides or surfaces, the practical rules can serve only for the description of such right-lined cases as may conveniently inclose the object, and which will enable the designer to draw them within those known bounds with a sufficient degree of exactness.

It is, therefore, in vain to seek, by the practical rules of perspective, to describe all the little hollows and prominences of objects; the different light and shade of their parts; or their smaller windings and turnings; the infinite variety of the folds in drapery; of the boughs and leaves of trees; or the features and limbs of men and animals; much less to give them that roundness and softness, that force and spirit, that easiness and freedom of posture, that expression and grace, which are requisite to a good picture: For the rules designed to answer these purposes, the reader is desired to consult *The Art of Drawing*, already referred to.

Perspective, then, must content itself with its peculiar

culiar province of exhibiting a kind of rough-draught to serve as a ground-work, and to ascertain the general proportions and places of the objects, according to their supposed situations, leaving the rest to be finished, beautified, and ornamented, by a hand skilful in drawing.

The perspective principle is essential where it is most wanted, and where a deviation from its rules would be most observable, as in describing all regular figures, pieces of architecture, and other objects of that sort, where the particular tendency of the several lines is most remarkable: the rule and compass, in such cases, being much more exact than any description made by hand; but still the figure described by the perspective rules will need many helps from drawing; the capitals and other ornaments of pillars, and their entablatures, the strength of light and shade, the apparent roundness and protuberance of the several parts, must owe their beauty and finishing to the designer's hand: But, with regard to such objects as have no constant and certain determinate shape or size, such as clouds, hills, trees, rivers, uneven grounds, and the like, there is a much larger latitude allowable, provided the general bulk, or natural shape, of those objects be in some measure observed, so as not to make them appear unnatural or monstrous.

But, although the strict and practical rules of perspective are in a great measure confined to the description of right-lined figures, yet the knowledge of

of the general laws of that science is of great and necessary use to inform the judgment after what manner the images of any proposed lines should run, which way they should tend, and where terminate; and thereby enables it the better to determine what appearance any objects ought to put on, according to their different situations and distances; it accustoms the eye to judge with greater certainty of the relations between real objects and their perspective descriptions; and the hand to draw the same accordingly; and directs the judgment readily to discover any considerable error therein, which might otherwise escape notice. Besides that, when the ground or general plan, and the principal parts of a picture, are first laid down according to the rules, every thing else will more naturally fall in with them, and every remarkable deviation from the just rules will be the more readily perceived, and the easier avoided or rectified; so that although it may be infinitely tedious, or absolutely impracticable, to describe every minute part of a picture by the strict mechanical rules, yet the employing them, where they can be the most commodiously used, will give the picture in general such a look, as will guide the artist in drawing the other parts, without any obvious inconsistency.

CHAPTER VII.

A Mechanical Method of Perspective.

FOR the benefit of such as are unacquainted with mathematics, we propose to lay down the following directions, whereby they may lay any plan in perspective, and raise pillars or buildings to due heights, according to their proper distances.

Suppose, **L L D B A**, fig. 18, a square piece of pavement, consisting of twenty-five pieces of marble, each a foot square: it must be measured exactly, and laid regularly down upon paper; and, for the sake of a more distinct notion how every particular square will appear when you have a true perspective view of them, mark every other stone, or marble, black; or else number each of them, as in the figure, which is divided into squares, every other one of which may be made to appear black, like the three at the bottom marked **B C D**; or **1 2 3 4**, answering to those which are marked in perspective with the same numbers.

Now, to lay your plan in perspective, fix your point of sight as you observe in the figure; or more or less to the right or left, as you think proper: Then draw the line **K K** parallel to, and at what distance you will from **L L**; and raise a line on each side

side from L to K, to form the figure you see as a frame to your picture; then draw a line from the corner K, which is the point of distance to the opposite corner L; and this line will regulate your work. Thus far done, draw lines from the squares of your plan to the point of sight, as exactly as possible; and wherever your line of distance cuts those lines, there draw lines parallel to the line L L, which will give you the squares in perspective, or the true figure of every square: Thus D in the perspective plan answers to D in the measured plan, and 1 2 3 and 4, answers to their corresponding squares in the same plan.

Now it remains to direct you how to raise either pillars, trees, houses, or any other bodies, according to their respective heights at different distances and proportions on the plan you have laid down.

Having your plan measured out in perspective into squares of a foot, or any other measure, let one of these squares, 1, 4, in fig. 19, serve for the base of a pillar a foot thick. Mark the line L K, by the scale of the ground plan, into equal proportions or feet, *a*, *b*, *c*, *d*; which being so many feet high, and standing on the base, are uprights, not in perspective. Then draw a line 4, 5, parallel to 1 *c*. Join c and 5, and then you have the front of a body three feet high and one foot wide, being that which you was to raise. From 4 draw a line with a black-lead pencil, to the point of sight, and from 3 raise a line parallel to 4, 5, till it touches the penciled line passing from 5 to the point of sight, which will give you the

the side appearance of the column or body, as you will see it from the place where you stand.

Then, with a pencil, from *c* draw a line to the point of sight, which will determine the line 6, 7, that bounds the perspective view of the column at top. Afterwards from 2 raise a penciled line parallel to *a c* or L *c*, till it touches the line drawn from c to the point of sight; draw then 6, 7, parallel to *c* 5, and you will have the square of the top of the column, as observed from A, which is supposed to be the place where you stand.

It is to be observed, that the line drawn from 2 to 6 is only an imaginary line, and in consequence is to be rubbed out; because, not being seen from the place where you stand, it must not appear in the drawing. The same may be understood of the line drawn from 1 to 2; but it is necessary that they appear in the draught, on account that they direct you how to regulate the top of your column, and to place it with certainty upon its base.

Lastly, finish your column with lines only, that is from 1 to *c*, from 4 to 5, from 3 to 7, from *c* to 5, from 6 to 7, and from 1 to 4, whereby you will have the true representation of the column, as in fig 20.

When this is done, you may erect another column on any one of the squares in the same manner, observing to fling your shades all on one side; and, being able to master these few examples, which may cost you very little trouble, you will be capable of doing any thing in this way.

To

To put a Street in Perspective; see plate II. *fig.* 1.

A BARE sight of the figure may suffice to shew the method, which is exceeding easy.

All you have to do is to make a plan of simple squares the common way; and to take one, or two, or three, of the squares for the breadth or length of each house, and in such breadths, &c. to set off the measures of the doors and windows, and to get the diminutions by drawing lines from the several measures to the point of distance; as here from B C D E and F.

The first angle of each house may serve for a line of elevation, as the angle G in the first house.

If you require any cross streets, one, two, or three, squares, according to the width of the street, are to be left vacant, and nothing upon them, as described at H I.

Fig. II. This figure is to show that, where houses are to be made to advance or fall back, you have only to place their elevation forwarder or backwarder on the plan of their squares.

Thus L advances a square further than K, and M further than I., and so of the rest.

To find the Perspective of a double Cross.

Let L H, fig. 1 plate 3, be the *horizontal* line, A D the *ground* line, L the *centre*, H the point of distance, A B C D the extent of the cross-bar, B C its

its thickness; draw A L, B L, C L, D L, and from A draw A H, gives the point *b*, *e*, E; through these points draw lines parallel to A D, for *a g* on A L, and *d* on D L; on the point B set the perpendicular B G; with the height of the parts required; then on the points *b*, *c*, *e*, *f*, in the plan of the upright post, raise perpendiculars at pleasure, and through the points on B G, draw G L, K L, I L, cutting *b o* at *q r*; draw through the point *r* a line parallel to the ground line, cross the perpendicular lines *c b*, as *m*, *r*, *s*, *t*, and another parallel to it through *q*, I K; K *n* is the end of one of the cross-bars, draw K L and I L: Perpendicular on *a*, *g*, *d*, F, will determine the points *m*, *q*, *t*, &c. where the line I Q intersects *f*, *p*, draw a line parallel to *m t*; from *t m* draw lines from the point L; a perpendicular on *g*, will finish the side *m* L.

The Representation of a Bureau with the Flap open.

h i k is the circle described by the flap opening, P L the *horizontal* line, L the centre, O O X the *vanishing* line of the plane B A *i*, O O two points to draw the circle by; X the point of distance on O L X, A K M N, the flap, A N the joint it turns on. See fig. 2.

FINIS.

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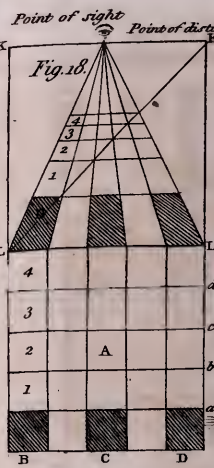
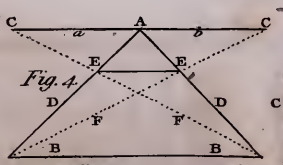

Point of sight
Point of distance
Fig. 18.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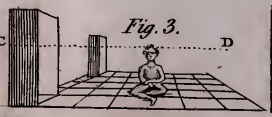
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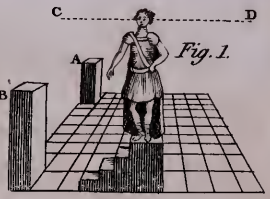
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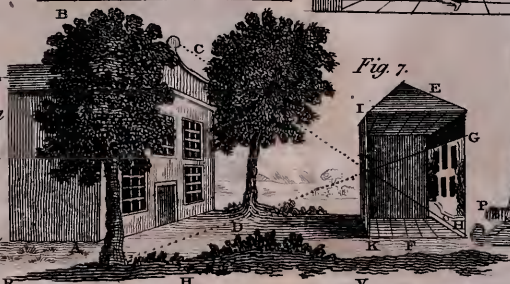
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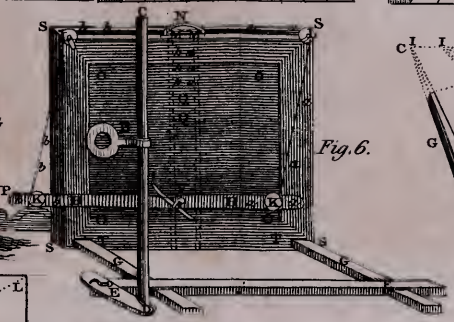
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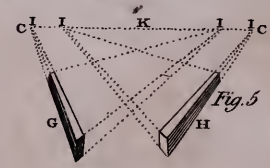
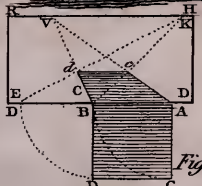


Fig. 5


Fig. 20.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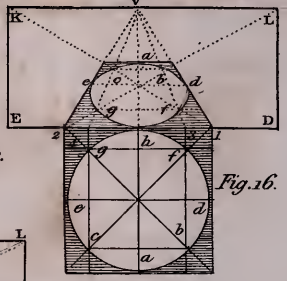
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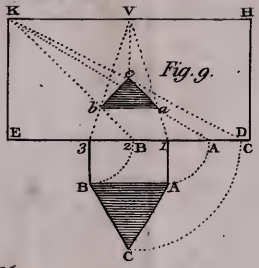
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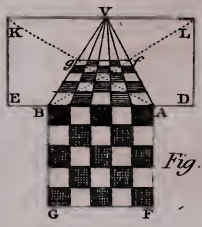
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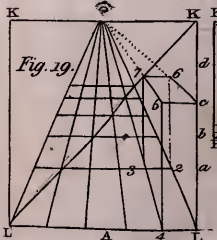
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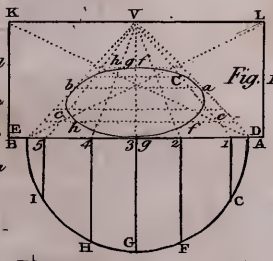
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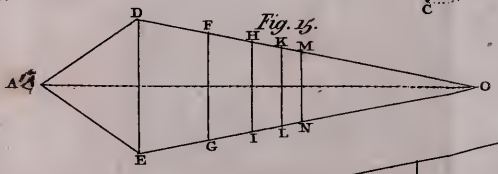
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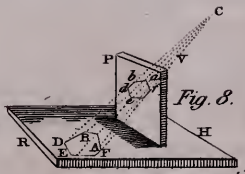
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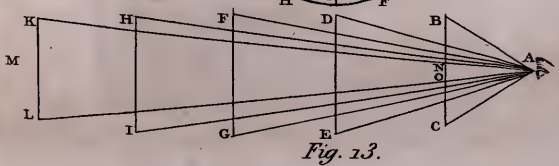
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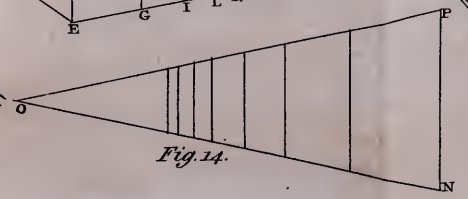
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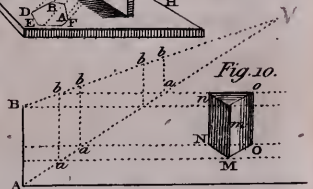
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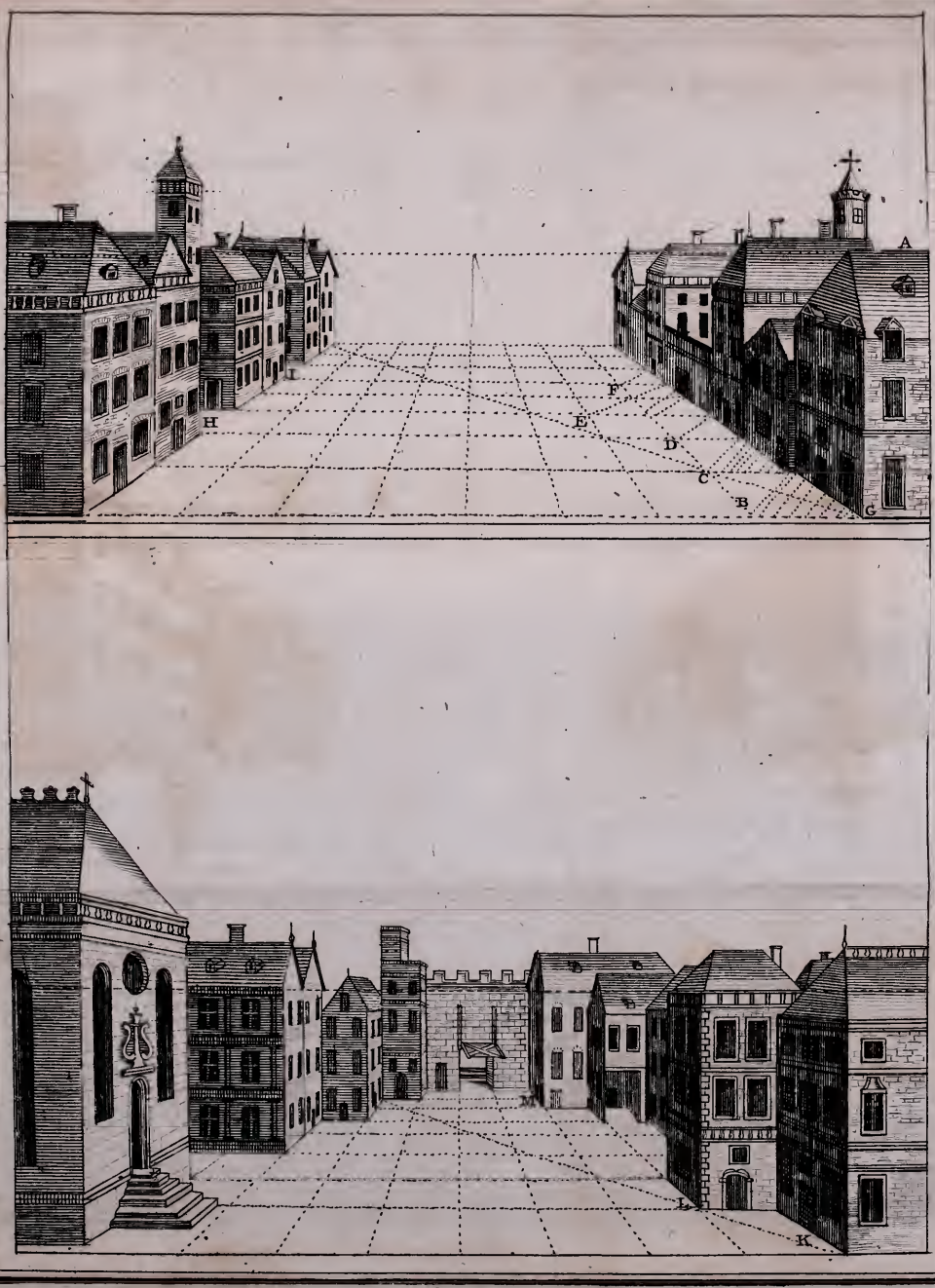

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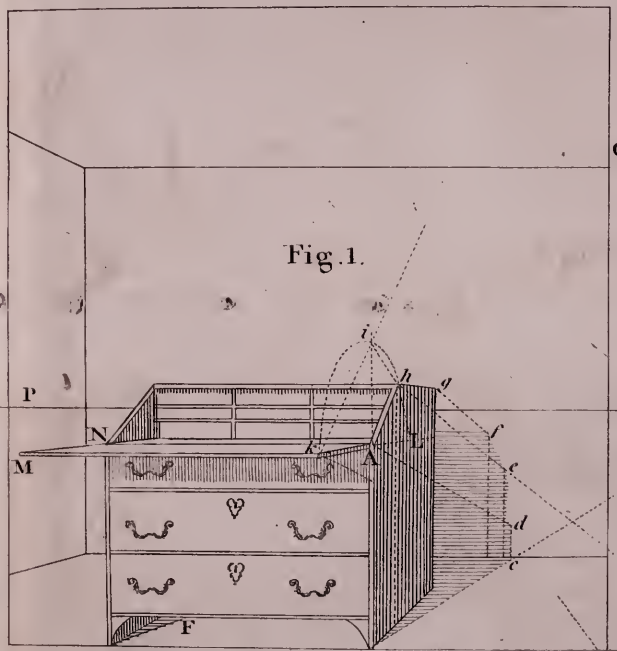

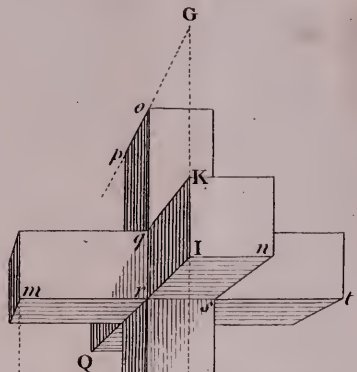

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