Excerpt from:
Struppeck, Jules. "The Creation of Sculpture". Newcomb College School of Art, Tulane University. Henry Holt and Company, NY 1952. Pgs. 8-18

Note to students: I have changed or defined a couple of words in this text to update the language. If you are having trouble reading the sentences try reading the words like you are in a 1950's detective movie. Despite the age of this text, these ideas hold up and are worth your time reading them. Really think about the examples, draw pictures of them to help grasp the concepts-and don't forget the last page, it sums everything up.

Three-Dimensional Design

A good design results from, or along with, a good idea; and the design is good only in terms of its materials. Ideally, the entire synthesis of these elements takes place in the mind, before the actual object is started. This rarely happens, however, and it is just as well, since, if it did, the sculptor would miss much of the pleasure and excitement of seeing his creation unfold. What usually happens is this: one has a more or less vague and flexible synthesis in mind when beginning, and as the sculpture progresses it becomes clearer and more positive. It is in this working phase that a knowledge or feeling for three-dimensional design is most helpful. There are many decisions to make, and one must have a basis for deciding on them.

Three-dimensional design is a construction of ***expressive order in space***. To help understand its importance and place in sculptural problems, let us consider for a moment the "seeing process". Our eyes are not as efficient as most people think. We see two-dimensionally, except for the small amount of binocular vision, which results from our eyes being set apart, so that each presents a slightly different picture to the brain. The third dimension is known in the mind partly through binocular vision, partly through composites of two-dimensional views gathered as we move about an object, but mostly through our sense of touch and our own existence and movement in space. We have a feeling for depth and a knowledge of it, but we do not literally *see* it. Then, too, we see only in terms of light reflected from planes. We can see surfaces, but not the underlying structure nor the significant inner life. This is learned from experience and intuition. Thus, we find that there is much discrepancy between what we see and what we know.

A three-dimensional design presupposes an idea from which a system of ordered can be derived. This order is made visually expressive, enabling us to show (to some extent) what is known.
Order within a design creates a greater awareness of existence. A sculptor sometimes has a preference for a particular natural form and will make a number of studies of it. Consciously or unconsciously, he finds in it an inner significance of universal order, which he tries to express through various modifications in his design.
For the sake of clarity, then, we will say that the purpose of three-dimensional design is twofold, but we will find upon closer study that both ends are fulfilled simultaneously. First, we are faced with the problem of presenting to the mind a three-dimensional form through a series of relatively two-dimensional views; and second, we want to express certain feelings or truths through the arrangements of the parts of the form. In the process of designing, we must relate to

the views so that they are easily linked together in the mind, making one mental image rather than isolated aspects of several things. Each view must fit into the order of the whole and be a vital part of it. At the same time and in conjunction with this problem, the unity of expression is fulfilled; a form cannot be seen as one thing if it expresses something different from various views. For instance, in a sculpture of a woman weeping, the entire form must be expressive of grief whether seen from the front, side, or back. If not, the sculpture will present conflicting stimuli to the brain and the result will be a weak, meaningless mental image. In other words, good three-dimensional design presents an object to the mind which speaks of the same thing from all views.

Certain means are used to create expressive design. To begin with, the substance of which the design is made exists relatively in space. Just as sound and silence exist only in relation, space and substance activate each other. In music varying degrees of emphasis are placed on sound and silence; in sculpture both substance and space contribute to the expression in varying degrees. The design may be primarily space-displacing, as most stone carving, or space-enclosing, as some metal sculptures. Each design is seen through, and in relation to, its "atmosphere", the activated space in and around the form. Then, the manner in which the space is activated gives us the basis for a particular expression. We "feel" the weight of space-displacing mass; or we "feel" the control, the "taming" and realness of volume of enclosed space. In the former, we establish mass with planes, both flat and convex, pushing out into space; in the latter, our means are basically lines and concave planes, drawing around and pulling space inward.

Planes

Geometrically, a plane is defined as a surface such that, if any two of its points are connected by a straight line, that line always lies wholly on the surface; or every point in that line is on the surface. However, for our purposes we need not be so exacting. Sculpturally, planes are areas of surface defined by a more or less abrupt change in direction, and may be either flat or curved-that is, two-dimensional or three dimensional. The planes of a cube are six flat areas of equal size defined by right-angle turns; a sphere has only one continuous convex area which constitutes its one plane. Often a thin mass, such as a sheet of metal or a board is referred to as a plane when the proportions are such that the thickness is negligible. In most organic form changes in direction are so subtle and varied that in our process of seeing we tend to organize toward simpler geometric shapes. We think of apples as being spherical and mountains as conical or pyramidal. By geometricizing form we present a sharper spatial statement because directions, and therefore dimensions, are clearer.

When a mass in a three-dimensional design is composed of many subtle changes in direction, these planes are often organized so that a simple, over-all form "envelope" results. In many carvings, for instance, one can still see the shape of the original block. This "envelope" is composed of what we will call ***virtual planes***-that is, planes partially defined and partially imagined. These virtual planes are important both in studying natural form and in constructing design. With them we establish three-dimensional references within which we can get at more subtle qualities.

Lines

Lines do not exist in the third dimension. The phenomena that we see as lines are of three kinds: 1) Outlines or the extremities of silhouettes, which are the two-dimensional extensions of planes in space from a fixed point of view, 2) Junctions of planes, and 3) the axes of three-

dimensional shapes in which the length is much greater than the width and depth. Very thin shapes of the latter kind, such as wire and rods, are usually seen and therefore referred to as lines. ***Virtual lines***-that is, lines which seem to exist between two or more points that are closely related-are as important in the clarification of our perception as virtual planes. We often use them as a frame of reference in establishing mental pictures.

Texture

Textures are the surface qualities of substances. We develop our knowledge of them through a synthesis of tactile and visual stimulation. We learn what visual characteristics mean-hardness, softness, stickiness, etc.-and we sense how the texture would feel if we touched it. Our eyes become quite keenly trained with experience so that we recognize most substances immediately from visual qualities; but very often we find ourselves touching their surface to get a fuller perception of texture.

Sculpturally, we are interested in several aspects of texture: 1) texture as it expresses the structural characteristics of our materials, such as wood grain, metal sheen, etc.; 2)texture as it expresses our control over the shaping of the material, such as modeled surfaces in clay, tool marks on stone or wood; 3) translated textures-that is, textures inspired by our subject matter and interpreted in our material; and, finally, 4) the light-reflecting capacities of textures, such as the emphasizing of projections by polishing and the enlivening of recessed areas by breaking up the surface into small highlights and shadows.

Color

The ***chiaroscuro***, or pattern of light and dark in a sculpture, is sometimes referred to as color. This, however, is a matter of plane organization; our use of the word here is in its more usual sense of hue.

As a plastic element, color plays a much smaller part in sculpture than it does in painting. In the third dimension we do not have the degree of control over light that one finds in a two-dimensional design. Unless the form has a constant light source and is viewed from a fixed position, the color relationships continually change. Local colors-that is, the actual colors of materials-are modified by the quantity, quality and position of the light source. For this reason, most sculpture is done in a uniform local color. This simplifies the problem of unifying tonal relationships of light and shadow. Polychromatic (more than one color) form, even on a limited scale, greatly complicates the designing process. One must be constantly aware of the numerous ways color and shape affect each other under varying light conditions and shifting points of view.

Masses and Volumes

For our purposes, masses or solids are three-dimensional, space-displacing shapes defined by planes; volumes are virtual negative masses or three-dimensional areas of space partially enclosed by planes or lines. In our terms then, a mountain is a mass and a valley is a volume. We also consider a group of closely related solid shapes, such as fingers in a clenched fist, a mass. A design is said to be massive when its form is predominantly solid shapes organized in a simple over-all mass. In a volume, definiteness in the shape of the space depends on the degree of enclosure, but since we are concerned only with the visual aspects, much of the definition of the area must depend on virtual planes. For example, looking at a hollow hemisphere, we see a volume defined by a curved actual plane and a flat virtual plane. If the shape is changed so that if becomes more of a complete sphere, the size of the virtual plane

diminishes and the visual effectiveness of the volume is decreased proportionately. However a complete spherical volume can be described by lines created with wire or rods provided they are spaced so that the enclosed space can be seen through the virtual planes between the lines.

Unity and Variety

With the elements of planes, lines, textures, and color we can set about organizing masses and volumes into a design. First let us see what the controlling factors are in organizing the third dimension. All good designs are unified-that is, each part is an essential contribution to the whole, and this whole determines the character of each part. To explain further what we mean by unity, let us use as examples two geometric shapes, the sphere and the cylinder. The sphere is the simpler, since its surface is one consistently curved plane. A sphere could be reconstructed accurately from a small area of its surface. The cylinder is much more complex because it involves a variable relationship between two independent dimensions. In other words, all spheres are identical except for size, but there are different *kinds* of cylinders. We can say then that whereas the sphere automatically has a mathematical oneness, we have to establish this quality in a cylinder, and, in a very limited sense, some expression of unity enters into its construction. If the difference between height and width is great, as in a piece of wire, the visual identity of the cylinder is lost because of a lack of unity in proportion. On the other hand, if the height and width are equal, the cylinder concept is clearer but the shape is uninteresting. In both cases there is a tendency for the mind not to respond to the shapes. In the first case, most people will see not a cylinder but a line, and in the second, the proportion is simply too monotonous to hold our attention. Sculpturally, then, unity should be a balance between visual clarity and interest.

To simplify problems in discussions, however, we will refer to these two aspects of unity at times as “unity” in the sense of oneness and “variety” as meaning variations in relationships. In these terms we can say that as organic form approaches geometric, it becomes more easily comprehended in space and more unified; and as geometric form approaches the organic, it becomes more varied and gains interest and meaning. Our form problem, then, is one of balance between unity and variety.

Principles of Order

We create unity and variety in a design through various principles of order. Before we go into these, it might be wise to advise the reader that these principles are suggested aids for beginners, and not criteria for designs. We must judge designs as total visual expressions; if the whole is bad then none of the parts is right. These principles of order may help us in finding the right visual solution, but they are not ends in themselves and following them will not guarantee good results. We must also remember that the whole is more important than the parts, and that the application of these principles is controlled by the total concept.

Balance

We are concerned with two aspects of balance in sculpture; the relationship of mass to support (law of gravitation), and the distribution of interest or the balance of attraction (attention-value of our four elements: planes, lines, texture, and color). In both cases our own sense of physical balance is involved. We “feel” the effect of the arrangement of masses and support as we feel the effect of gravity on our own bodies in various positions. Balance of attraction is closely related to two other principles discussed later: contrast and movement. Some parts of a form

attract more attention than others through contrast of parts or through a pattern of movements. The method of balancing this interest is one of the expressive means of design.

The possibilities of arrangements are of two kinds: ***symmetrical*** or ***asymmetrical***. In symmetrical balance, the masses, volumes, and interest are equally distributed around vertical or horizontal axes. Geometric forms, for instance, are symmetrically balanced. The effect of this kind of arrangement is usually cold, static, and dignified; unity is easily attained, but it is apt to be more monotonous. Asymmetrical balance is achieved by organizing the parts so that a dynamic equilibrium results. It is a more interesting and expressive way of arranging shapes. A large mass may be balanced with smaller masses and solids balanced with space. Parts may be off balance, provided that the contribute to the over-all balance of the total design.

The only rule for balance is to judge by eye and try to feel for the right arrangement. We can say, however, that usually symmetrically balanced designs tend toward expressions of repose or contained tension, while asymmetrically balanced designs are more dynamic and expressive of agitation or explosive vitality.

Proportion

Proportion pertains to size relationships: 1) of the total form, height to width to depth and 2) within the design, relative sizes of the parts to the whole. Each design determines its own laws of proportion; and the reference point is the sculptural concept, not nature itself. While nature is our greatest teacher of proportion, we must remember that once we isolate a part of nature, tear it from its contest, so to speak, and transfer it to another material, we must make certain compensations. In other words, natural proportions usually give us a starting point for a system of size relationships which we work out in developing our sculptural concept.

There are various rules of mechanical measurement, such as the system of dynamic symmetry used by the Greeks, which assure good proportions. However, mechanical methods have a very limited-that is, a two-dimensional-value in sculpture, since there is constant distortion in the depth dimension. It is helpful to know that equal divisions and 1:2 rations are usually monotonous, and 3:5 ratios are more interesting. But the final judgment of proportion must be based on a question:”Does the proportion express what I have to say?”

Exaggeration in proportion, through expansion and contraction, is part of the expressive language of form. In the development of our visual symbols, size relationships are an important factor. We tend to exaggerate what is significant to us and sometimes eliminate less meaningful elements altogether. In our designing, then, we may make use of proportion to attain emphasis.

Material demands must be met with certain shape proportions. A leaf carved in stone cannot have the same proportions as a natural leaf. If we study our materials in their raw states, as they exist normally in nature, we can find many clues to the kinds of proportions they demand. Then the study of organic form will offer us shapes which, exaggerated to greater or less degree, will fit these proportions. Or we may start from another point: the organic shape idea may come first and the proper material, the material which can truthfully contain these proportions, is then selected.

Movement

We may define movement in sculpture as the visual stimulation in a static form which produces a sensation similar to actual movement in space. This may be achieved in a number of ways: 1) along the axes of elongated forms, 2) along a progression of planes, 3) along a series of points or areas of contrast, 4) along the path of lines, and 5) by representational associations. Movement in a design serves a double edged visual function. It activates space in such a way that we "see" what the eyes do not see-that is, we are made aware of a life force that is not actually there, and it creates a greater awareness of existence in space by enabling our eyes to see more of the third dimension than we ordinarily see. It links together the two dimensional pictures our eyes send to the brain. Many of the expressive characteristics in a design are established by the qualities of its dominant movement. Straight vertical movements produce effects of strength; horizontal movements, of repose; and flowing movements, of grace. Nature again, is our guide to expressive movements. The actual movements of an animal can be seen abstractly in his form even when he is still; the smooth gracefulness of a deer's movements and the lumbering steps of the elephant can be seen in every part of their respective bodies. This unity of form expression is easily seen in humans; when we are dejected we fall in to a pose of descending movements; when agitated, into zig-zag movements; and so on. Seen in a piece of sculpture, these movements recall corresponding feelings in our own bodies. We react empathically to them.

Repetition

Similarity might be a better term for our purposes here, since we do not necessarily mean exactness in using the word *repetition*. The strongest unifying factor in a design is the likeness of parts to the whole. In plant and animal life we find repetition of shape characteristics; the leaf is similar to the tree, and animal shapes have the character of the whole animal.

Walking around a sculpture, we build up a total image in our minds. If shapes, movements, and textures are recalled, the various views will seem to belong together and will form a more integrated and meaningful image. In some cases, to obtain rhythm or emphasis, we may want to use rather exact repetition, but we must avoid monotony. Parts may be identical in shape but different in size; movements may vary only slightly from each other; the same patterns of texture may be repeated in areas of various sizes and shapes. Balance, proportion, and visual judgment must be our guides in repetition of this kind.

Contrast

To some extent we can say that contrast is the opposite of repetition, and yet often it serves the same function. For instance, emphasis may be achieved through either repeating or contrasting. The two also work hand in hand creating variety within unity; a solid shape may be recalled in an open shape, and two masses may be repeated in shape but contrasted in size. Contrast is the inflective quality in our sculptural language. As we increase it we raise the volume, so to speak, and as we decrease it, we create subtlety. From our original idea we establish an over-all tone which is to be carried out in the design-that is, we decide whether it will be loud or soft in key. Then within this tone, contrast becomes a relative matter. In a subtle form, sufficient contrast should be used for emphasis but not to the extent that unity is destroyed. In a more bombastic (exaggerated, over the top) kind of design, subtleties would be lost, and the unity can be maintained only by charging each part with enough contrast to hold its own.

Unity of the Principles of Order

As we have seen, these principles of order cannot be treated as isolated rules. Besides controlling the elements of planes, lines, colors, and textures, they must be thoroughly interlaced. We establish balance of movement, contrast of movement, repetition or contrast of proportion, etc. We have also found that these principles are implicit in nature; we might say that as all manmade objects contain sculptural problems, all natural forms contain solutions to these problems.

Summarizing three-dimensional design, we can thus say:

With ***planes, lines, texture,*** and ***color,***

we create ***unity*** and ***variety***

of ***masses*** and ***volumes***

through ***balance, proportion, movement, repetition*** and ***contrast***.