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SPACE-TIME PROBLEMS

SOCIAL CONDITIONS, THE ARTS, SCIENCES, the development of an industrial technology with prefabrication, new materials, and new processes are the determining factors to realize the new architectural development. From them the architect and planner will draw inspiration and factual knowledge, resulting in a changed conception of space. Every great period in human civilization organically creates its particular spacial conception. Though such space conceptions were utilized in the construction of shelter, they were also frameworks for the articulation of visual arts, play, dancing, lighting; in fact, for the mastery of life in every detail.

The history of articulated space, the special space conceptions of different periods, have been determined by the grasp of one, two, three or more dimensions.

The magnificence of the Egyptian Temple could be comprehended by walking through a basically one-dimensional straight line, the sphinx alley, leading towards its façade.

Later the Greek architects of the Acropolis designed a two-dimensional approach to the temple so that visitors had to move through the Propylæa, between the Erechtheion and Parthenon, around the colonnades toward the main entrance.

The gothic cathedral also applied this concept most intriguingly to the interior. The spectator was placed in the midst of the nave, vaults, balcony, and choir and became the center of coordinated space cells of all directions.

The renaissance and the baroque brought man into closer contact with the inside and outside of the building. Apart from the “hanging gardens” of Semiramis and the Moorish-Spanish architecture, these were man’s first attempts to integrate building and nature, not merely fit building into its surroundings. In our age of airplanes architecture is viewed not only frontally and from the sides, but also from above—vision in motion. The bird’s-eye-view, and its opposites, the worm’s and fish-eye-views, have become a daily experience. Architecture appears no longer static but, if we think of it in terms of airplanes and motor cars, architecture is linked with movement. The helicopter, for example, may change the entire aspect of town and regional planning so that a formal and structural congruence with the new elements, time and speed, will manifest itself.

Already the great spans of large airplane hangers require a new departure for space articulation since the columns, which former architecture used as a most effective means in modulating and articulating space, have been eliminated. But the problem of space articulation in contemporary architecture is a simpler affair in comparison with the complex problems of planning a new space comprehension caused by the infinite acceleration of speed.

Rendering Motion (Space-Time) on the Static Plane

Motion in space can be grasped if its reality is perceptible through the senses. Difficulties arise only if illusionist motion has to be perceived, as in the cubist paintings which rendered objects as if the spectator were moving around them.

These interpretations of vision in motion denote not only an artistic achievement but also an important practical step in visual perception as well as in the skill of rendering. The mass construction of war planes, for instance, called for complex working instructions. But the workers could not comprehend their tasks through references contained in the customary blueprints. Factories had to resort to new methods of visualization called *production illustration* mainly derived from the findings of contemporary painters, photographers, and motion picture men, all of whom tried to translate the space-time sequence of production into visually perceivable language. In this way a speeding up of the work was accomplished. This process is only in its infancy. Photomontage, superimpositions, diagrams, explosion, phantom, x-ray, cut-away techniques, stroboscopic motion projecting, and other combinations may enlarge its scope tremendously.

Speed

Motion, accelerated to high speed, changes the appearance of objects and makes it impossible to grasp their details. There is clearly recognizable difference between the visual experience of a pedestrian and a driver in viewing objects. The motor car driver or airplane pilot can bring distant and unrelated landmarks into spatial relationships unknown to the pedestrian. The difference is produced by the changed perception caused by the various speeds, vision in motion. To prove this, Jean Carlu, the eminent French poster designer, made an experiment in 1937. He mounted two posters on two conveyor belts which moved at different speeds. The one poster, made by Toulouse-Latrec around 1900, was moved at six to seven miles per hour (the approximate speed of a horse and buggy); the other, a contemporary poster, was moved at fifty miles per hour (the speed of an automobile). Both posters could be read easily. Then Carlu accelerated the speed of the Toulouse-Latrec up to fifty miles per hour, and at this speed the poster could only be read as a blur. The implications are obvious. The artist, architect, advertising and display man, must count with the quickly moving vehicles requiring a new orientation toward spatial organization and communication. A new viewpoint in the visual arts is a natural consequence of this age of speed which has to consider the moving eye. (And what an improvement it would be if the signmakers of streets and highways were also aware of this fact).

Jean Labatu had the task of preparing effective outdoor advertising for a factory site half a mile long, situated along a highway with heavy motor traffic. Studying the problem, he found that the required water displays, fountains, light, even the shape of the pool which had to mirror the buildings, had to be related to the speed, that is the rapidly

changing position of the spectator at the wheel. On the basis of calculations as to time and vista, he suggested a “time-façade.” It consisted of continuous mobile light and water displays placed so that they could be perfectly seen in thirty to sixty seconds, the time it took a car to drive along the site at thirty to sixty miles per hour. Such an approach translates the static meaning of advertising into a kinetic process, “shooting at a moving target.”

Photography, motion pictures, the speed studies of futurism and cubism handled such aspects intuitively, anticipating the vision in motion of a motorized world long before an actual need existed for a new visual education based upon scientific standards. Safe air travel, for instance, is greatly dependent on the skill and visual alertness of pilot and navigator. Their vision in motion—especially when landing—the flashquick ability to identify small details within vast areas, has to be conditioned to the new validities of speed since even radar or other mechanical equipment can fail.

Analysis of Speed

Speed itself can become the subject of a visual analysis. We know of innumerable photographic shots of arrested motion such as sport scenes, jumps, and dives. On the other hand we can observe slowly unfolding buds, moving clouds taken at intervals; similarly the effect of time exposures of moving objects on streets and merry-go-rounds. Experiencing speed that can be arrested, rendered, stretched and compressed, in short, articulated, we can state that we have possession of it, that we are approaching a new vocabulary of space-time.

Harold Edgerton found a new way to render speed in stroboscopic photography. The relationship between velocities of the dissected movements gave him the clue to improving the action of golfers, turbines, spinning wheels and various kinds of machinery. These pictures are juxtaposed details of frozen movements analyzable and in relationship to each other and the whole cycle of motion. They clearly show that space-time can not only be articulated but also employed as a means of expression. These speed photographs are of more recent date, but they are astonishingly similar to futuristic paintings. In fact, they are their exact repetitions: for example, *Dog on a Leash*, 1912; *Speed*, 1913, both by Balla; *Nude Descending a Staircase*, 1912, by Marcel Duchamp. They all show the same juxtaposition of frozen movement.

The problem of futurism is similar to that of cubism. The difference is that cubism takes to motion as a means of better grasp of the object in space; futurism is interested in motion for the sake of motion. Although both used superimpositions, most of the futurist paintings seem merely a new naturalism beside the spatial sophistication of cubism.

Around 1910 the futurists had begun to emphasize movements, saying “The world’s splendor has been enriched by a new beauty—the beauty of speed....” “We shall sing,” they continued, “of the man at the steering wheel.... Who can still believe in the opacity of bodies since our sharpened and multiplied sensitiveness has penetrated the obscure

manifestations of the medium? Why should we forget in our creation the double power of our sight, capable of giving results analogous to those of the x-rays?" Umberto Boccioni in *Power of the Street*, 1912, projects such a double power of sight and such a fusion of the manifold elements of a street, into one simultaneous, expressive representation. Pablo Picasso did the same in the mural of the bombing of Guernica, the Basque city. The painting is a monument of human torture and a powerful symbol of the agony of the heroic Spanish loyalists. Visiting him in 1937, before the painting was placed in the Spanish Pavilion at the Paris World's Fair, he said that he had attempted to render "*the inside and outside of a room simultaneously.*"

Among the Guernica studies which Picasso made there are a number of drawings that record not only the space-time visualization of the successive changes of physical motion, but also the psychological space-time, the emotional metamorphosis caused by horror in the doomed creatures.

In the old arts, horror was usually rendered through the distortion of the facial muscles, distortion of the open mouth, by enlarging and protruding eyeballs. Picasso intensified this approach by moving and distorting the usually immovable and un-distortable elements of the body, such as the eyes, ears, and nose. In *Guernica* he shifted the eyes away from their normal position; he turned the ears upside down. In the studies for the mural he transformed the eye into a cup and the lower eyelid into a saucer from which tears poured. He exposed the tongue of a screaming, horror-stricken victim as a flame, at other times as a dagger to signify despair. In one of these studies he showed a dozen variations of a face, changing the profile of a young mother under the impact of unspeakable suffering—into the distorted, crumbled features of an old woman. This was done through interweaving the features of a panicky, quickly aging, hideous creature, each expression growing out of the other without breaking the oneness. The same etching, if looked at upside down, solved the enigma by displaying the deteriorated, piggish visage of Hitler, the cause of the bestial destruction. The old technique of the trashy "double image" postcards was used here with unusual subtlety to make the psychological space-time as transparent as an x-ray photograph.

Transparency and Light

The passion for transparencies is one of the most spectacular features of our time. In x-ray photos, structure becomes transparency and transparency manifests structure. The x-ray pictures, to which the futurist has consistently referred, are among the outstanding space-time renderings on the static plane. They give simultaneously the inside and outside, the view of an opaque solid, its outline, but also its inner structure. They have to be studied to reveal their meaning; but once the student has learned their language, he will find them indispensable. In my pictures I have tried to follow this line of space-time articulation by painting on waterclear, transparent plastics, introducing direct light effects, mobile reflections and shadows, indicating a trend away from the

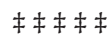
static pigmentation of surfaces toward a kinetic “light painting.” The problem is only in how to control these colored “light paintings” with the same precision as the painter of yesterday controlled the effects of his pigments.

Photographic Practice

Different space and time levels usually appear in photographic rendering as superimpositions. The reflections and transparent mirrorings of the passing traffic in the windows of motor cars or shops are one example. Mirroring means in this sense the changing aspects of vision, the sharpened identification of inside and outside penetrations. In such renderings there is a blending of independent elements or events into a coherent whole. Superimpositions of photographs and distortion by reflection, as frequently seen in motion pictures, can be applied as a new visual language to represent dreams, acting as a space-time symbol, even synonym.

Photomontage has a similar connotation. The final effect is a synopsis of actions, composed of originally unrelated space and time elements juxtaposed and fused into a unity.

A cameraless picture (photogram) can also be understood as vision in motion since it is a diagram of the motion of life, creating the space-time continuum which literally is the photogram.



We are heading toward a kinetic, time-spatial existence; toward an awareness of the forces plus their relationships which define all life and of which we had no previous knowledge and for which we have as yet no exact terminology. The affirmation of all these space-time forces involves a reorientation of all our faculties.

Space-time stands for many things: relativity of motion and its measurement, integration, simultaneous grasp of the inside and outside, revelation of the structure instead of the façade. It also stands for a new vision concerning materials, energies, tensions, and their social implications.

This conception is still unpredictable in its consequences for the improvement of the affairs of mankind though the artist as well as the designer already experiment with it on a new level of consciousness. The designer has to think in terms of integrated processes of materials and production, sales, distribution, financing, and advertising; the contemporary artist consciously or intuitively tries to express the substance of his specialized field as the result of forces in space and time and to integrate it with the social reality. He prepares a new and creative vision for the masses, and with it a new orientation for a healthier life plan. But in order to benefit society, the artist's work must penetrate everyone's daily existence. ■