

Visual Approach to Highway Planning and Design

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● VISUAL DESIGN as used in this paper is intended to have a very broad meaning. One way of indicating the breadth of this meaning is to note the several kinds of concerns about visual aspects of highways which would all be dealt with within the general phrase "visual design." The areas of concern are as follows:

1. Pleasure and satisfaction.
2. Safety and convenience.
3. Economic values.

Pleasure and Satisfaction

The concern with achieving pleasure and satisfaction and reducing ugliness and dreariness is, of course, not limited to the highways. This is a concern which extends to most aspects of urban and regional development. Nonetheless, the highways increasingly are becoming corridors along which people pass, spending a major portion of their waking and observing time in looking through car windows. The significance of what they see in terms of personal satisfactions can hardly be exaggerated in its cultural significance. All aspects of ugliness and dreariness in the urban and rural scene cannot be dealt with effectively unless highway planning and design gives major attention to achieving pleasure and satisfaction for the driver and passengers.

Safety and Convenience

A significant aspect of dreariness or monotony in highway driving is its effect on safety, but concern with safety and convenience is not limited to an interest in maintaining the alertness of the driver. There is equal concern with the driver's being able to perceive and act on signals, signs, and other guides. Confusion resulting from improper design within the right-of-way or from interference of activity outside the right-of-way may inconvenience the driver at the least, and may at the worst lead to injury or death.

Economic Values

There is increasing concern with the effect of a major new transportation unit on the economic value of surrounding properties. The elevated railroad met a transportation need, but it had a serious blighting effect on the value of property along its right-of-way.

There also is equal concern with the effect of adjacent development upon the traffic artery. Present construction of limited access highways results from experience with ordinary highways, built at great expense, whose traffic capacity was rapidly diminished by conflicting development along the margins of the road.

In both cases, there was economic waste through lack of consideration for the interacting effects of highway development and adjacent land development. By contrast, a concern for these relationships, including visual relationships, can enhance the values of both the highway and adjacent development.

Illinois Highway Commissioner Babcock has stated this total concern by declaring: "A highway is not an engineering accomplishment alone but is a tool of civilization. It is high time we considered it in the light of its over-all value."

There are many approaches to highway design which require research study and the development of applied techniques. The University of Illinois has an interdepartmental highway research committee, which represents many disciplines and which is concerning itself with such diverse questions as the following:

1. The relationships between highway patterns and the journey to work for new industrial plants.

2. Improved techniques and additional uses for origin-and-destination surveys.
3. Problems of farm value appraisal for right-of-way taking.

But among the subject areas of significant concern is the approach to visual design of highways.

The research proceeding at various points, including the Massachusetts Institute of Technology and the University of Illinois, is based on the premise that visual design principles can be developed and applied to certain problems in highway design so as to minimize ugliness and dreariness and maximize safety and convenience. It is further asserted that these same principles applied to alignment location and other aspects of highway planning would contribute toward maintaining and enhancing economic values by fitting the highway into its environment.

PROPOSED WORKSHOP ON VISUAL APPROACH TO HIGHWAY PLANNING AND DESIGN

The independent experimental studies which have been identified have proceeded to the point that a workshop of a few days' duration is advantageous. The workshop should be limited in attendance, but it should comprise, in addition to those working in various aspects of highway visual design, individuals who can contribute because of their activity in highway design and construction, in visual design, and in highway impact analysis.

The workshop technique would permit development and refinement of ideas for appropriate research approaches, including the application of techniques or procedures in other areas of research, to these visual design questions.

From a first testing workshop in this research area, a series of workshop or conference sessions over the next two years would stimulate interest in participation in such research, aid in the definition of research needs and opportunities, and strengthen independent research activities by facilitating exchange of experience and viewpoint.

EXAMPLES OF RESEARCH IN PROGRESS

For some time now, members of the Department of City Planning and Landscape Architecture at the University of Illinois have been active in formulating and exploring, with graduate and undergraduate student assistance, several interrelated aspects of research on environmental design. Although these studies serve other purposes as well, they are of immediate value to those concerned with highway design.

M. I. T. Study

Simultaneously, Professor Kevin Lynch, of the Department of City and Regional Planning, Massachusetts Institute of Technology, has devoted much attention to the problem of environmental analysis and design of the highway in the urban scene. He has summarized the scope and intentions of his program as it relates to highway planning and design as follows:

The M. I. T. study began in a preliminary way in the spring of 1957 and is to continue in its first phase through June 1958 and perhaps the following summer. The problem set was the nature of the perceptual experience received while driving or being driven on the high-speed urban highway, and the means by which this experience might be made more pleasant and meaningful. The study arbitrarily excluded both the consideration of the rural highway and the impact of the highway on the non-driving observer. The principal premise underlying the work is that movement on the highway takes a major segment of the time of many individuals, that this time might be enjoyable as well as functional, and that the highway experience will be one of the major ways in which citizens will be able to grasp the form of their extended metropolitan regions.

Two explorations have been made thus far, as follows:

1. A general inquiry into the sensations of an observer in motion, including studies in psychology and esthetics, as well as general speculation.

2. Case studies of several existing urban highways: Route 2, Boston; Fairmount Parkway, Philadelphia; and the East River Drive and New Jersey Turnpike in the New York region. These case studies were made by two observers in a car, who recorded their momentary impressions as well as making on-the-spot sketches. These recorded impressions were transcribed, then plotted on time scales and analyzed for content and interrelation in many different ways.

These experiences are now being summed up in a first-round discussion of the elements involved in this process, according to their significance and interrelationships. These include such items as perception of the spatial envelope, of motion, and of accompanying traffic; or the imageability, level of communication, or melodic character of the experience.

A study is now being planned of separate elements, such as motion perception or imageability. One part of such studies will be development of a means of representing the experience, so that the quality of any given proposal can be judged, and design alternatives can be pursued.

The conclusions will be illustrated, as far as possible, by hypothetical highway designs. These designs will attempt to deal with the sequential and temporal nature of the highway trip, and may be expressed in diagrams, movies, abstract models, or flip cards.

At the same time, a quick reconnaissance will be made of outstanding examples of highway design in the United States. This reconnaissance will produce material for the theoretical studies, and may possibly lead into a more systematic survey.

Subsequent studies may then go on to interrelate the separate perceptual elements, and to develop a technique for the complete perceptual design of a highway.

University of Illinois Visual Design Research

The Illinois studies begun in the fall of 1956 have concerned themselves with pedestrian and slow-moving vehicle situations as well as fast-moving vehicle situations on rural highways and toll roads. Urban case studies have comprised small- and medium-sized cities rather than the major metropolitan areas mentioned in the M. I. T. studies.

Attention has been directed first toward methodology for inventory and recording of visual and other perceptual elements of the street or highway environment. Secondly, attention has been concentrated on development of a "vocabulary" of words and graphic symbols to identify perceptual elements and their visual relationships (see Fig. 1).

After some preliminary studies (as varied as the central square and business streets of an Illinois county seat town and the approach to the Grand Canyon at Grand Canyon Village) analysis was concentrated in the Spring of 1957 on the main street of an Illinois town and on the 30-mile stretch of US 150 across Champaign County.

Bement Study. The first program dealt with the farming community of Bement, Ill. (under 2,500 population), typical of Illinois and small enough to allow detailed examination of its one main shopping street. Twenty-two second-year design students recorded this particular environmental situation comprising a street scene three blocks long, including pedestrian movement and subdivided by the main street and vehicular traffic. The analytical sheets recorded colors, textures, patterns, space flow, objects in space, odors, weather, and kinetics (see Fig. 2).

The second phase of the student problem dealt with redevelopment solutions which were in proportion with the funds and requirements of such a community. It is certain that the variety, invention, and the understanding of the nature of the problem was greatly improved by this method of initial analysis and by the critical selection of what was important in the scene, and why.

Route 150. Whereas the Bement studies dealt with the inter-mixture of pedestrians and vehicles, the other problem was limited to the scene as witnessed from behind the steering wheel. Twelve graduate students from architecture, city planning, and geography participated in this recording of the visual elements on US 150 as it crosses Champaign County, Illinois. (This highway is now in the process of being re-aligned and constructed as a part of the new Interstate System.)

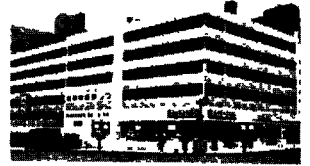
US 150 is a typical Illinois highway running through the flat corn fields, penetrating

PARKING Ground space devoted to the temporary occupation of vehicles, usually close to a building. Ornamental landscaped areas.

Salor

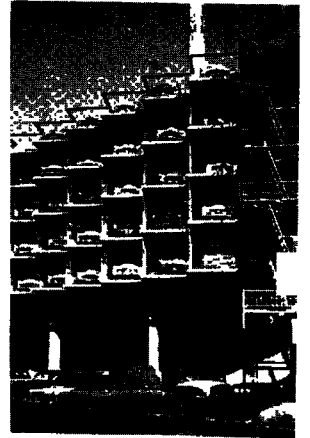
GARAGE

A building for temporarily housing automobiles, usually in congested areas, where more than one vertical level of parking is economically justifiable.



MECHANICAL

A parking structure or garage in which the motor vehicle is stored with the aid of machinery.



MULTI-LEVEL

Many levels, in an upward rising direction for the temporary storage of motor vehicles.

VERTICAL

More than one level, in an upward rising direction for the temporary storage of motor vehicles.

LOT

A specific type of off-street parking, usually an area without enclosure or structure.



OFF-STREET

Areas provided for the temporary storage of motor vehicles other than the outer lanes of streets.

METER

A meter installed at the curb in congested urban areas to charge for automobile parking time. A coin inserted in the meter sets a clock mechanism in motion. A flag shows until the time purchased has run out, at which time the flag disappears.

Reifer



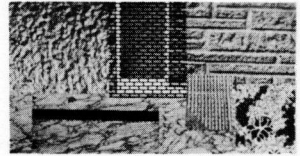
Figure 1.

TEXTURE the characteristic composition of the surface of a material or thing acquired naturally, or through a peculiar processing method, or both.

SCHNITZIUS

the interrelation of parts, manner of structure, structural quality.

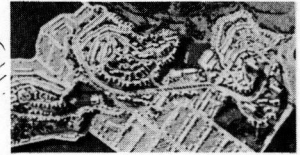
WEBSTER



TOPOGRAPHY

the surface features of a given piece of land or the description of such surface features.

NATIONAL HIGHWAY
USERS CONFERENCE



TOWER

a building or structure designed primarily to rise above its surroundings.

SCHNITZIUS

ELECTRICAL a vertical structure designed to carry or support electrical lines or wires, often of a skeletal framework.

SCHNITZIUS

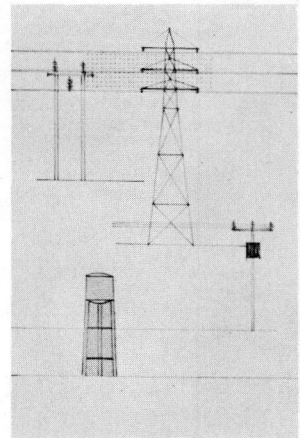
TRANSMISSION (Antenna) a vertical structure designed to support that portion, usually of wire or wires, of a radio station used for radiating and receiving signals.

Radio
T.V.

WEBSTER

WATER a tower or standpipe serving as a reservoir to deliver water at a required head, as to a fountain, etc.

WEBSTER



TRAFFIC

the flow of all types of conveyances and pedestrians along a street or highway.

WEBSTER

FLOW to move in, as in a stream; specifically in reference to vehicles and pedestrians.

WEBSTER

LANE a unit width of road surface adequate to accommodate a moving vehicle.

NATIONAL HIGHWAY
USERS CONFERENCE

LIGHT one of a set of signal lights used on highways and streets, especially at intersections, to regulate the movement of traffic.

WEBSTER

SIGNAL any device, whether manually, electrically or mechanically operated, by which traffic is regulated and controlled.

SCHNITZIUS

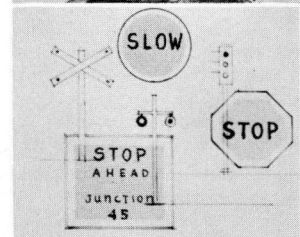
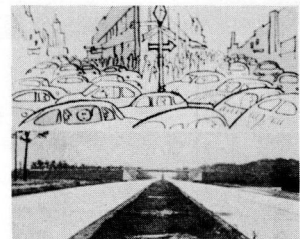


Figure 1. (continued)

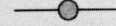
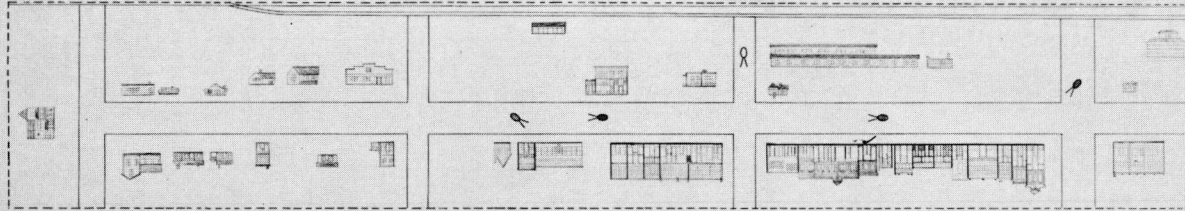
PERCEPTUAL ANALYSIS

BEMENT ILLINOIS

L. A. 134 SOPHOMORE CLASS

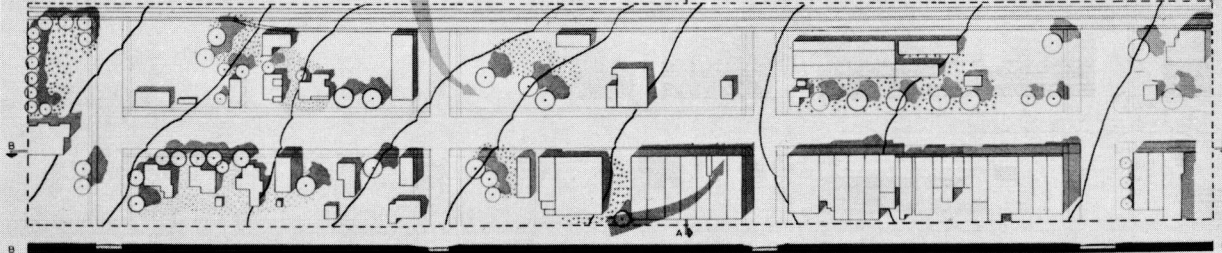
UNIVERSITY OF ILLINOIS

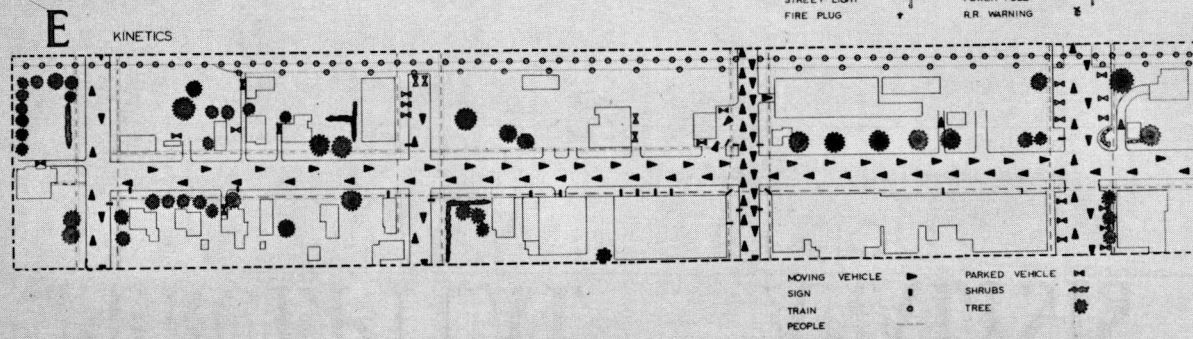
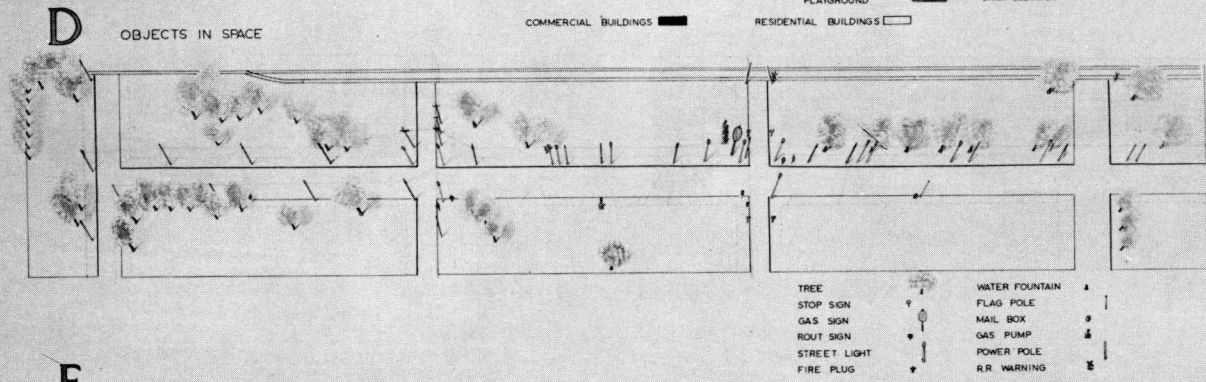
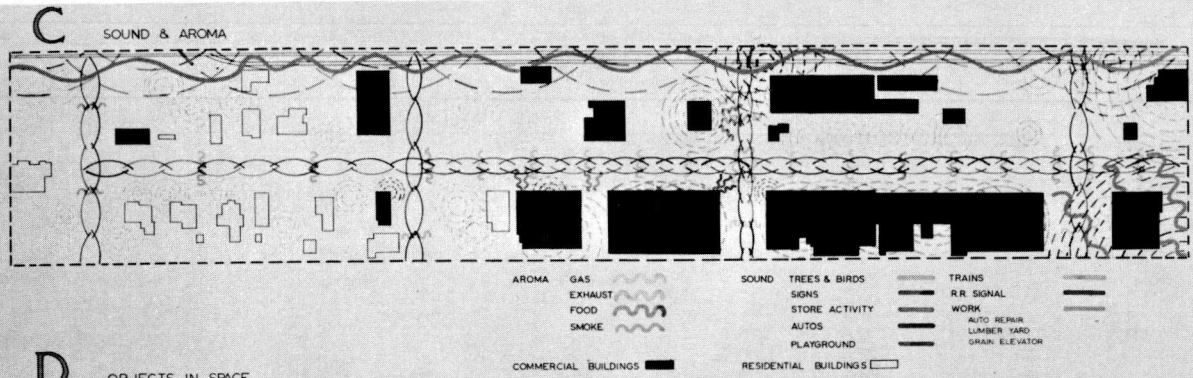
A WALLSCAPE



B WEATHER & TOPO

SUMMER PROTECTION  N W WINTER WIND 
WINTER "  S W SUMMER " 
ALL SEASON " 





DAVE GEHRIG

Figure 2.

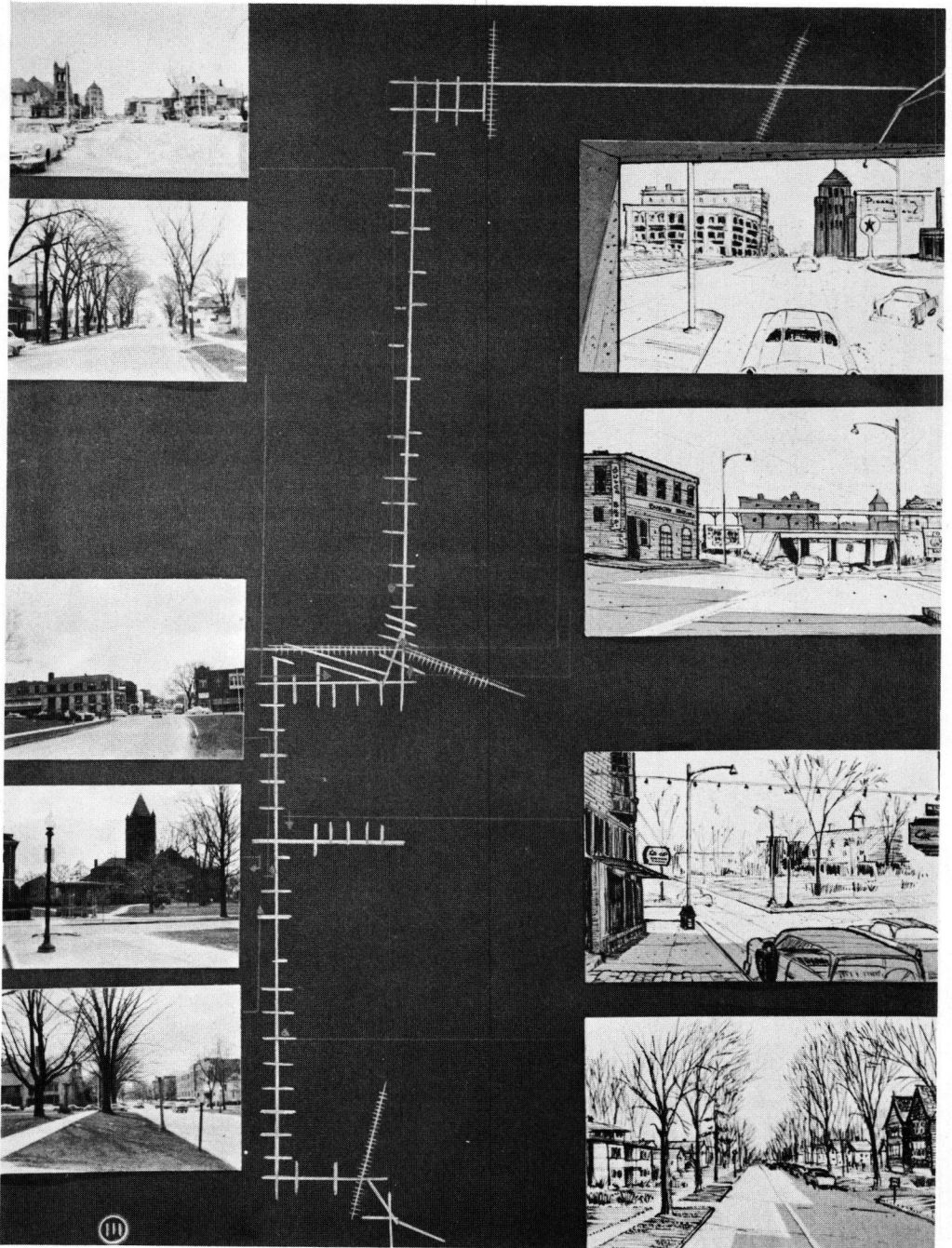


Figure 3.

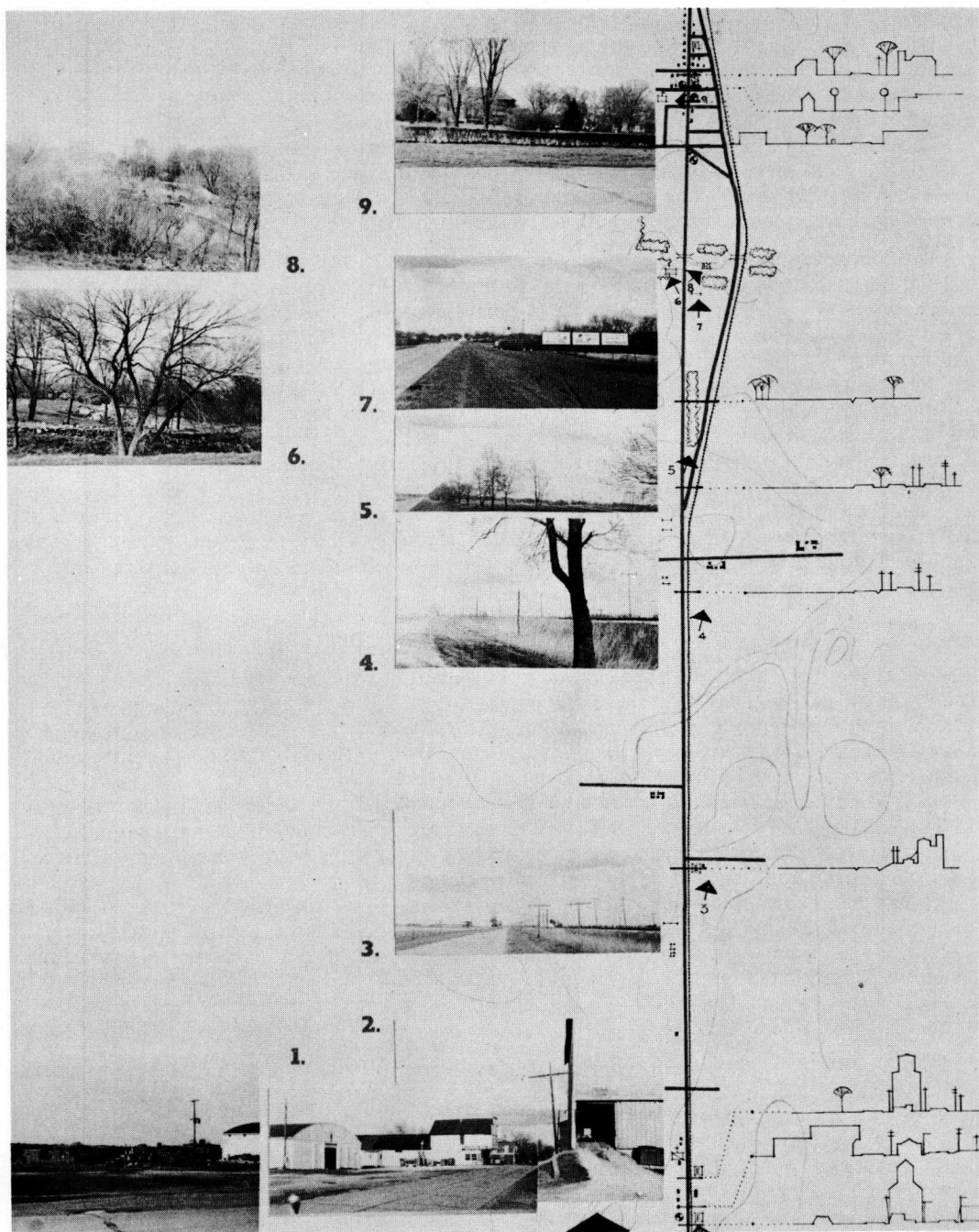


Figure 3. (continued)

such cities as Champaign-Urbana with a combined population of 70,000, St. Joseph with a population of 941, and Mahomet, 1,017.

The visual elements were recorded in both directions, thus providing two distinct visual sequences of the same route. These recordings dealt with the open country, apparently isolated objects, objects in succession, repetitive objects, the effects of perspective, and also the highway as it becomes enclosed by and winds through a substantial city. Significant elements were illustrated by both photographs and sketches in a series of cross-county studies along a mapped route line at constant scale (see Fig. 3).

The aim of this exercise was not primarily to gather evidence upon which to re-design the route, but to develop powers of observation and selection of such objects as are relevant at speed. Another important feature of the analysis dealt with the problem of describing accurately in both words and symbols these same recorded objects.

The foregoing exercises re-emphasized the fact that any conscientious study of visual values, which are becoming so vital to successful environmental design, including highway design, will reveal the limitation of terminology and that the problem of description and vocabulary must be tackled simultaneously with that of elemental analysis. The many problems involved in the preparation of a much needed international planning dictionary have been examined with groups in the United States and abroad in the hope of finding sympathetic understanding, talent, and support for the research to be undertaken. Action on such a dictionary is essential as the whole range of planning and design activities becomes more complex; otherwise, the professions will be permanently hampered for lack of a clearly established language.

Research at Illinois is being continued with additional case studies directed at testing and refining recording techniques. Special attention is being given to the methods applied to linear survey, recording, and analysis by other disciplines, such as the geographer's "traverse."

IMPROVING THE LANDSCAPE

Visual control cannot be recommended in vacuum. It is implicit that before any such control can be fully effective, the whole subject of highway environment must be continuously reviewed by a permanent research organization where the changing demands and conflicting circumstances can be analyzed in the interest of an improved landscape.

Such an organization could, of course, serve a wider need than just that of highway design. The whole inhabited scene is in need of a more harmonious environment. "Omnitecture," the study and art of artificial as opposed to natural landscape, has a very particular application to the problem at hand.

Things seen, and their significance in movement, have been the subject of scattered and spasmodic research; but the time has come when the need for collective and consistent assessment upon which recommendations and action can be taken is now a matter of pressing urgency.

Verticals, and Urban Confusion

In referring to the urban confusion, it may be useful to turn again to the contrasting visual imagery which develops, and point out some of the conditioning factors which, when better understood, can become both conscious and subconscious elements at the service of the "omnitect."

The overriding impression gained in most cities is that of vertical lines combined with limited lateral visibility. This impression prevails even though the structures may not be very tall; but the combination of corners, posts, poles, towers, monuments, and trees whose trunks are bare of foliage, all in close proximity, tend to lift the attention upwards, notwithstanding the confusion of trivial detail which robs the scene of comprehensible unity and repose.

Diagonals, and Suburban Anonymity

On leaving the urban area lateral visibility broadens and the vertical impression gives way to diagonals. Roof slopes, eaves lines, and the converging of wires in perspective become significant, and the effect of these diagonals is to deflect the attention from side to side instead of up and down.

Horizontals, and Rural Monotony

With the approach of open country, speed becomes the chief preoccupation rather than a general awareness which is so necessary and so hard amid the distractions of the city. The long horizontals of the pavement become transfixing, and only the most strident advertisements succeed in registering upon the attention. These "dazzlers" and other items, emerge in isolation as a series of targets or advancing blobs poised around, but clearly related to the weaving ribbon of the pavement ahead.

Here, then, are three visually distinct but consequential developments in vehicular progress, impressions which need analysis so that better use can be made of contrast, diversity, and the impact of the scene in general, so that particular messages can be conveyed en route with greater certainty.

HIGHWAY DESIGN POTENTIALLY A NEW FORM OF ART

Such abstract descriptions as are now necessary in highway design are difficult to convey in words; a simplified kinetic language is obviously needed. The film and animated diagrammatic representation is the logical medium for this purpose of relating static objects momentarily visible and in apparent movement; that is, objects floating along the beam of sight, pierced by the line of consciousness and leaving an intelligible impression upon the mind.

Subtlety Required

Apart from the feats of engineering, the outstanding characteristic of a successful and invigorating highway is its subtlety. The duller the country through which the highway passes, the more essential does artifice become. But the distinction between artifice and artificial must be immediately comprehended. Any over-emphasis and self-consciousness of design will turn subtlety into affectation. Engineering along—sheer calculated logic—is not enough. The forces at play in the design of a spare and elegant bridge are not the same as those affecting highway design. A bridge is a dramatic climax, a daring incident which compels attention. It is in the sharpest contrast with its surroundings, often appearing to be in conflict with the elements. The highway, however, should be in conformity with its land-form if it is to give any visual satisfaction.

The visual aspects of highway design must therefore be regarded as a justifiable, independent and respected facet of any Highway Design Department. It is an art form of the very highest order, especially since it plays a vital role in sustaining interest in safety, in soil stabilization, and in conservation. Lastly, and only because of the fulfillment of the earlier conditions, conscious design of the highway environment ensures a double beauty, both for the traveler and for the local inhabitant, two clearly defined visual conditions forming one environment.

There is, of course, nothing new in these proposals. Historic references show that what is now proposed is a continuation of past traditions of triumphant environmental design.

Because of what has already been achieved, the highway systems of the United States are the envy and admiration of everyone. What has been done, however, is not enough. Greater highways are now under way, and there will be more to come. It is inconceivable, therefore, that is the face of such greatly extended programs the vital role of visual design and environmental control will still be ignored. It is imperative that the problem be fully recognized and that visual research be established as an indispensable part of highway design teams.

There can be no real comprehension of "enviria" without the deepest appreciation

of landform and the significance behind each folding of the ground, each rise and fall, and of the actual substance itself, earth, rock, water, the accompanying ecological coverage, and the prevailing climatic conditions. If this basic material is not understood, none of the dependent details can be properly understood.

The composition of elements in repose is, like any other art form, a matter of technical mastery as well as of inspiration. Landscape design is in need of fresh impetus. Highway designing provides the opportunity for exploration of new directions of thought and invention to those practicing in this profession.

As previously pointed out, landscape designed to be seen while progress is maintained from incident to incident is nothing new. While speed of movement has changed, subtleties in design have been lost; while scale of composition has changed, kinetic artistry has also been lost. The great parks have given place to suburban gardens, and the creative capacity of the professional designers has been employed accordingly.

Now, however, the financial resources, the scale of operations, and public demand, make possible, once more, the development of the high art of kinetic landscape design.

ACKNOWLEDGMENTS

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