A POLICY FOR THE VISUAL FORM OF INDUSTRIAL AREAS

by

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Abstract.

The older industrial areas of the central cities are blighted, noisy, and uninviting; as a reaction to this, the newly created industrial areas in the suburbs are neat and tidy to the point of blandness. This is a loss to the urban landscape, because industrial areas are potentially places of great visual interest, reflecting many aspects of work and production. After examining an existing industrial area for its problems and merits, and looking at the wide range of possibilities for such areas, I propose a policy for handling the visual form of industrial areas under typical city planning circumstances. My objective in the policy is to create surroundings which will provide the onlooker with a clear image or mental picture of the area, and which will convey the meaning of certain aspects of industry to him.

Thesis Supervisor: Kevin A. Lynch
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PART I: INTRODUCTION

The decentralization of industry in the last decades has taken factories into the suburban areas of cities. There the new plants are conspicuous because of their contrast in scale with the nearby houses, and despite attempts to make the buildings look as unlike factories as possible, they remain conspicuous. The result is disappointing. The buildings are blank containers, the sites expressionless expanses of lawn and parking area, the streets dull and motionless. We cannot call these new industrial areas eyesores; they are neat and tidy, free of grime and noise. But their appearance is bland, as if they are too timid to arouse comment by appearing to be what they actually are: places for work and production. The blankness of these areas is a great loss to the urban landscape; the suburbs in particular need the vigor that bold industrial areas could provide. The tracts of pleasant but vapid housing, the undifferentiated flows of traffic are dulling to the minds of adults and children alike, and the present industrial developments add no stimulation.

The blandness of the new industrial areas is the result of an attitude which regards industry with distaste and wishes to efface it as far as possible. But this negative attitude is not the only one that can be taken, or which has been taken in the history of industrialism.

The power and scale of industrial buildings has evoked an admiration of their forms. Artists and architects, accepting the forms of industry as part of their visual world, respond to their boldness and energy. The reproduction below of "City Interior" by Charles Sheeler shows a positive delight in the shapes of sheds, chimneys, pipes and gangways. Diego Rivera's murals for the Detroit Institute of Arts[1*] show men at work in the assembly lines and foundries, surrounded by the dynamic curves of machinery. The same admiration for industrial form is found in the work of photographers. An example is Changing America,[2] a book of photographs by Andreas Feininger; he records the change from natural to man-made landscape without reproach or sentimentality, and there is an obvious relish in the views of the interiors and exteriors of industrial plants. Architects have taken the buildings elements of factories and arranged them in strong, bold compositions. A fine example is the sulphate mills at Sunila, Finland, by Alvar Aalto. The long lines of the warehouses and piers are punctuated by a soaring smokestack, and diagonal conveyors leap from level to level of the horizontal forms.

A fascination with the power and cleverness of machinery is another strain in the American tradition.

1* See page 92 for references.

Tours through industrial plants are popular when the processes are spectacular, as in steelworks, glassworks, and assembly lines. We all like to watch construction sites, especially when the earthmoving equipment is operating: the co-operation of men and machines is an absorbing sight. The hobbies of tinkering with engines and "do-it-yourself" kits are a practical expression of this fascination with machinery.

We can regard industry from the point of view of its creativity in transforming raw materials into finished products, and fabricating units out of component parts. This view goes beyond the appreciation of industrial forms and machines to a feeling for the technical processes and skills that bring about the transformation. We are often conversant with the two ends of the process: the raw material and the product--the tobacco leaf that is made into cigarettes, lumber that is worked into furniture,--and can deduce the steps in the process from our knowledge of craft versions of the industrial process. Sometimes, though, we are familiar only with the product, as with the large range of plastics and synthetic fibers. Many products carry indications of their manufacture in the design: the pressed forms of automobiles and refrigerators, the moulding seams on plastic articles, printed fabric designs, the cast forms of door keys. We probably know far more about the techniques of manufacture than

we would give ourselves credit for.

A broader view of the creativity of industry takes into account not only the technical processes of conversion but also the assembly of labor, materials, and machines in a single location for the purpose of manufacturing. Raw materials arrive from distant places, one plant supplies others with components for further processing, workers travel daily from their homes, and the products of the factory flow to their destinations for further processing or distribution to warehouses and stores. All these movements of goods and persons focus on a location which is determined by its closeness to sources of materials or labor, or its convenience to other plants or markets. The co-ordination of many plants, each with its necessary linkages, forms the basis of a city, and an appreciation of the intricacy of a modern metropolitan region begins with an understanding of the multiplicity of transportation connections for the movement of goods and persons.

Implicit in thoughts about industry must be the idea of its routine and prosaic nature. Among builders of structures to house industry there exists a tradition of forthrightness in building. Many of the early industrial buildings were outside the fashionable urban centers and followed in the line of craft building. The builders used materials at hand, and local craftsmen worked on them. The Functional Tradition,[3] by J.M. Richards, shows examples

of surviving buildings in England. Their keynote is simplicity, durability, and convenience for use, and they connote an attitude of commonsense and honesty, competence, and an acceptance of work in the place of things. The modern equivalent of forthrightness is efficiency, which is expressed in the machined finishes and precise detailing of many contemporary factories.

Industry has other aspects besides the excitement of its forms and machines, the absorbing interest of processes, and its role in the social and economic organization of the city. There are connotations to industry which are more disreputable than the constructive ones already mentioned.

One of these aspects in the pall of blight that industrial land use has spread over many cities that grew during the last century. The conditions that suburbanites avoid in their communities are often very real ones in the older cities of the region. During the Industrial Revolution factories located without consideration for the inhabitants of the city. The plants pre-empted land along rivers and waterfronts, polluting the water and cutting off access for recreation. Smoke and grit poured out of the chimneys to befoul the air, and noise from the machinery pounded through the streets. Housing near the industrial areas fell to the lot of the poor who could not choose where they wanted to live. The grimness of industrial areas and slum housing became the mark of an industrial

city, and is one of the images that the words "Industrial Revolution" evokes. The reaction against the conditions of poverty and hardship has become part of the Western cultural tradition. The fundamentals of modern public health measures, zoning, and social welfare result from this reaction. Though conditions of air and water pollution in cities are not as bad as they used to be, they still persist, despite stricter controls. The inertia of change in cities leaves many industrial slum districts, and areas of manufacturing cities such as Pittsburgh and Baltimore and the towns of the British Midlands portray the consequences of industrialization.

Another shameful aspect of industry is the exploitation of the human labor force that occurred during the Industrial Revolution, when rural workers converged on cities to work in the factories and mills. Conditions of work were unspeakable: low wages, long hours, hazardous work. The organization of labor into trade unions and the efforts of social reformers gradually brought about amelioration of the working conditions. One of the most sensational exposes of workers' lives was Upton Sinclair's novel, The Jungle,[4] a scathing indictment of the miserable condition of the workers in the meat packing plants of Chicago. As a result of these exposures President Roosevelt ordered a commission of investigation, and some of the causes of complaint were cleared up. Most of the changes in

the treatment of labor have been more gradual than this, and have been the subject of great political struggles and negotiation between labor and management. Today the trade unions are powerful enough to bargain with management on an equal footing, and the attentiveness of a factory management to its employees' needs has changed vastly since the beginning of the century. Whether in response to demands by labor unions, to requirements by government industrial codes, or simply out of respect for their employees, managements attend to the working conditions in their plants, guard the safety of workers, and provide welfare and recreation facilities.

Efficiency, which we admire in modern industrial plants, has necessitated the use of human labor in close collaboration with machines. Factory work is sometimes stupifyingly repetitive and unchallenging, and even when it suits the capacity of the worker, it seems a debasement of the human attributes of adaptability and intelligence. Charlie Chaplin's satiric treatment of factory life in Modern Times does not seem a gross exageration of some kinds of repetitive work. The demands of efficiency have resulted in the division of a production process into many repetitive and simple tasks; the worker who performs one of these tasks loses touch with the continuity of the process and loses a sense of the purpose of his work.

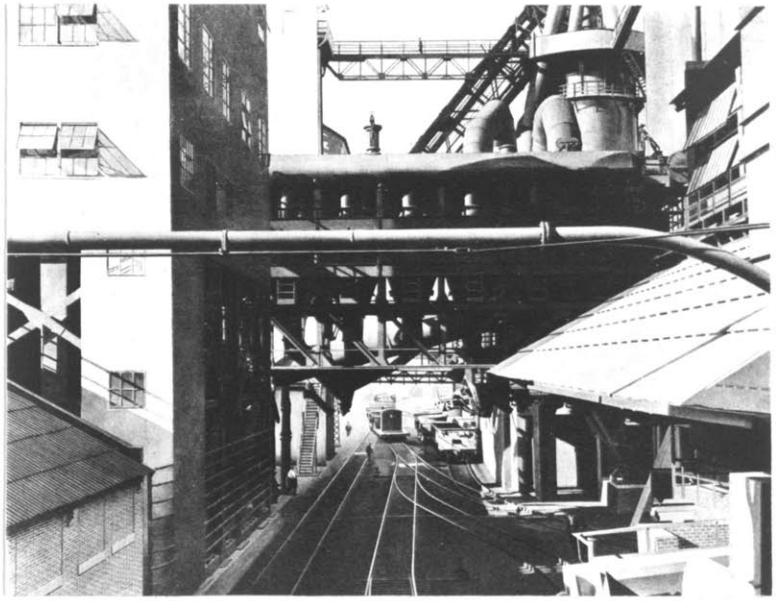
In looking at the different connotations of industry, we cannot ignore the aspect of the goods that industry produces. Industrial products have altered the whole quality of life, making it more comfortable, saving drudgery, reducing illness, increasing our scope of activities. The fact of mass-production enabled the lower income classes to participate in the benefits of industrialization. Yet the standard of product often seems to have been degraded as the volume of production increased. The widespread production of goods in the nineteenth century provoked artists and writers such as John Ruskin and William Morris to protest against the shoddiness of machine goods, and they advocated a return to work by craftsmen. We are very far from that time when a comparison could be made between machine goods and craft products. We have accepted the products of industry as a mainstay of our lives, and have come to appreciate the beauty of articles made by machines, as a result of the teachings of men like Walter Gropius. But a desire for the human touch persists, as evidenced in the fondness for folk art and antiques, and often articles are designed to look as if they were made by human hands even when they are the products of machines. We have accepted the machine, but are not comfortable with it.

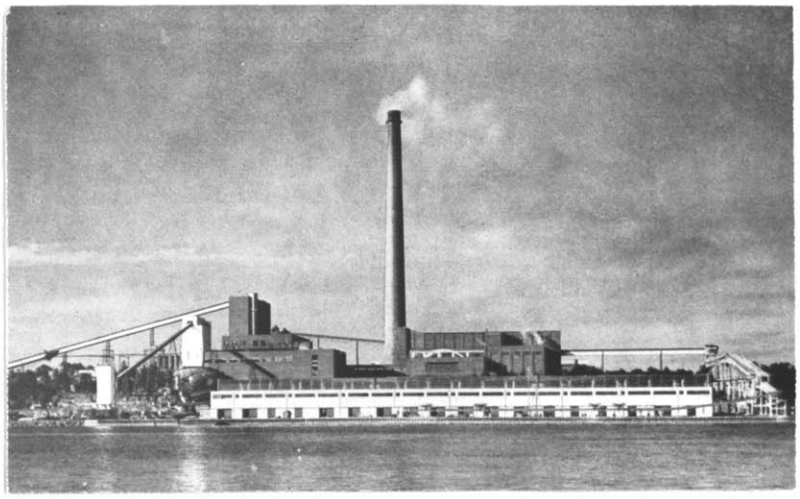
All these aspects of industry--and there are probably more--are the meaning of industry for us. The present new industrial areas reflect only one attitude, a reaction to blight, but there are many other themes which can just as validly be expressed in the urban landscape. By drawing on some of these aspects, we enrich the industrial areas of cities visually, and communicate and circulate ideas about industry. In choosing among the many possible layouts the urban designer reveals himself as an artist. He selects what he feels are the important things to express, and suppresses those that do not fit in with his own attitude. In designing a city he can concentrate on movement systems, emphasize public buildings and spaces, expose the residential nature of cities, express anonymity or reveal individuality. The important thing is to recognize that there is choice in design, even in a field which may seem to be beset by as many constraints as the layout of an industrial area.

A street in Cambridge, Massachusetts --- bleak and untidy, but there is some activity in the streets, some form to hold the eye.

A street in the New England Industrial Center, Needham --- neat, generous, landscaped, but expressionless.

"City Interior" by Charles Sheeler.
The artist delights in the contrast of
bold and intricate forms in these
industrial buildings and equipment.





A sulphate cellulose mill at Sunila, Finland by Alvar Aalto. The architect composes the necessary functional elements of this plant into a powerful image.

Attitudes to industry.

Industrial areas impinge on the interests of groups of persons in very different ways. Before examining how we can change industrial areas, we must look at the interests of these groups and assess the support that they are likely to give to changes.

The local community, whose attitude I have already referred to, has as its primary concern the protection of its residential areas from the unpleasant effects of industry. Suburbanites have some acquaintance with the older industrial areas of the central city, either from the time when they lived in the city themselves, or from their journeys through industrial areas into the city. Because these older areas are often noisy, dirty, and blighted, many suburban communities are reluctant to allow industry to locate within their limits. They believe that the conditions of air and water pollution, heavy noisy traffic, deteriorating buildings, unkempt yards and unsafe deserted streets will reappear to blight their residential areas. Zoning restrictions attempt to weed out the types of industry that these communities regard as detrimental. The most rudimentary zoning ordinances draw a distinction between light and heavy industry, and have different policies for each. Operations which do not produce much noise, smoke, or smell are classed as light industry, and

may locate in areas set aside for business. Processes which do produce these nuisances are prohibited from the town or relegated to areas where the adverse effects will cause the least nuisance.

The Zoning Ordinance of the City of Rye, New York, provides an example of this type of protective zoning. In this suburban community, a few areas are set aside as General Business Districts, which allows the following, among other uses:

> Open storage of contractors' equipment, coal, wood, lumber, new building material or other similar storage yards, excluding storage of junk or salvaged materials, wrecking or dismantling of motor vehicles, or storage of inoperable motor vehicles, and provided that such permitted storage operations are effectively screened from view of adjoining property in a Residence District, are operated with reasonable regard for order and sightliness, and all dust, dirt, and noise incident to such storage or handling are effectively confined to the premises.[5]

This clause allows only the cleaner storage operations, and even these have to be screened from the view of nearby houses. The ordinance also permits further uses in these districts, but the Planning Commission has to consider each application, decide whether it is appropriate on its proposed site, whether it has sufficient off-street parking which is properly screened, and whether the adjacent streets can handle the potential traffic that the use may generate. A limited amount of manufacturing is allowed in General Business Districts:

> Limited manufacturing. Treatment, converting, altering, cooking, processing, finishing, or assembling use, subject to the following requirements:
> (a) A finding that the proposed use in the specific location contemplated will have no material adverse effect on adjoining property, or upon good use of land in nearby areas, or upon desirable living conditions in such Residence Districts as might be affected.
> (b) No power except electric motive power shall be used, and no single motor shall exceed 3 horsepower without specific authorization.[6]

The community has empowered the Planning Commission to select only the most innocuous industries, and it specifically excludes smoke-producing sources of power. By means of these stringent restrictions on the types of industrial processes that it allows, the City of Rye aims to protect itself from what it considers to be the adverse effects of industry.

Developers of industrial property in suburban areas are equally strict in their requirements. The restrictions that a prospective occupant must obey usually prohibit uses which have been known to emit odors, dust, fumes or noise; limit the height of buildings; prescribe open landscaped areas which have to be maintained in a "sightly and well-kept condition"; prohibit the use of coal as fuel; enforce the screening of open storage areas; limit the number of billboards and advertising signs. These restrictions are efforts to eliminate the unpleasant associations with city industrial areas and make the development more acceptable to the community.

A method of eliminating industrial nuisances--one that has been suggested often, but seldom tried--is the use of performance standards in zoning. With this method, the zoning ordinance specifies levels of noise, air pollution, vibration, radiation, and smell that the factory may not exceed. In cases where a measurable level is difficult to state, as in the case of smells, the nuisance may not be perceived further than the boundary of the site, or the boundary of the nearest residence. In setting these levels the community can protect itself against the ill-effects of industry, yet include factories which have interesting production processes. Communities may be made more receptive to industry if shown the educational benefits of having a variety of factories located at close hand: the use of the production processes and factory organization as demonstration material for students in the local schools, and the training programs and employment opportunities that factories offer to young persons.

A recent book, The American Worker in the Twentieth Century,[7] containing autobiographical accounts by workers, sheds some light on the attitudes of workers. The sketches present a vivid picture of the change in working conditions in the last sixty years. Curiously enough, few of the fragments refer to the working environment beyond the factory itself; those that do refer to the industrial district see it as a grim place.

> Take the Second Avenue Elevated Railroad at Chatham Square and ride up half a mile through the sweaters' district. Every open window of the big tenements, that stand like a continuous brick wall on both sides of the way, gives you a glimpse of one of these shops as the train speeds by. Men and women bending over their machines, or ironing clothes at the window, half-naked. Proprieties do not count on the East Side; nothing counts that cannot be converted into hard cash. The road is like a big gangway through an endless workroom where vast multitudes are forever laboring. Morning, noon, or night, it makes no difference; the scene is always the same.[8]

> Lynn is made up of factories--great masses of ugliness, red brick, many-windowed buildings.[9]

But apart from these few references, it is the conditions within the factories that the workers write about. The theme here is the changes that have occurred.

> Back near the turn of the century, a time to which we glibly refer as "The Good Old Days". . . . I worked at a "Model Factory." This "Model Factory" was inadequately lighted in many areas with windows unwashed from one season to the next. It was not comfortably heated in the winter; the floors were dirty and the machine tools were unkept. Even the workmen were frowsy, unshaven, and with overalls so shiny and stiff with grease, oil, and dirt that the "proud" owner thereof could lean them against the bench when the quitting whistle sounded, secure in the knowledge that they would be leaning right there the next morning for him to step into.
>
> Also--the hours were long and the remuneration was "short." . . .
>
> Now I find in this Division of the General Motors Corporation a plant that is light; that is airy; that is clean.[10]

With the improvement in working conditions--and not only the physical surroundings but also the shorter hours,

five day week, insurance provisions, welfare facilities--the worker's preoccupation is with the work itself.

> The worker then discussed the general working conditions in the plant--the lighting, ventilation, safety conditions, housekeeping, cafeteria facilities, and the plant hospital. He thought these conditions were all good, and that in this respect at least the company had done all it could to make work as pleasant as possible for the workers. Then he added:
>
> "But you know, it's a funny thing. These things are all good, but they don't make the job good. It's what you spend most of the time doing that counts."[11]

This and other fragments seem to indicate that working conditions in factories are generally tolerable nowadays. Perhaps it is fair to assume that the factory worker's attention to industrial areas is not very different from the non-factory worker. He has an intimate knowledge of his own plant, and probably has strong feelings about it. He can extend some of his knowledge of industrial plants to what he sees about him, but as industrial processes vary so much, he is practically in the situation of a non-industrial worker when he is away from his own workplace.

In recent years managements have become particularly conscious of the appearance of their premises to the local community and to their consumers in general. The management of a new plant, well aware that the factory is merely tolerated in the community because of the substantial real-estate taxes that the property contributes to the city's coffers, is anxious to please the local citizens and maintain good community relations. One of the forms that this appeasement

takes is a willingness to comply with the desire for an expressionless industrial building. The idea of the corporate image, created by advertising and public-relations advisers, has caused concern about the face that the company shows to the public. A company must appear to have a single personality, expressed through its product, packaging, trademark, advertising, posters, exhibits, offices and plant; each medium reinforces the others, and the audience is supposed to retain a vivid impression of the company's uniqueness and identity. For example: International Business Machines hired Elliot Noyes, industrial designer, to groom its corporate look.[12] This company has developed an image of impersonality, efficiency, sophistication, an air of being in touch with the future, which the company (and probably the public) feels is appropriate to a firm manufacturing computers and automatic control devices. IBM now hires leading architects to design its plants and offices, and the buildings are elegant, spacious, and precise, evoking the same mental picture as the other contributors to the corporate look. A building of this class and finish deserves a prominent location to multiply its effect as an advertisement. But even if the building is not seen by the company's customers, it has its uses as material for photographs which will illustrate the advertisements, prospectuses and stockholders' reports of the company. The address of the company, if it is located in a prestige area, also connotes a suitable aura to customers who have never seen the plant.

These efforts to use every aspect of the company as material for promoting its products have contributed to the changing appearance of industrial areas. Within a single corporation there is a reduction of variety, as each product --- commodity, advertising, building --- has to wear the same expression. And as most corporations are competing for the same few "good" images of efficiency and progressiveness, there is a similarity between the results.

Visitors to the city and inhabitants of other parts of the city may retain prejudices against industrial areas in general but are more ready to appreciate the pictorial aspects of industry than the local inhabitants. Strangers are likely to show interest in the variety of plants, and notice the factories that manufacture products they use.

The large scale organization of modern factories has made them inaccessible to informal visits. Children were once able to watch local craftsmen making familiar household articles; nowadays the only work of this kind that a child can see in his neighborhood is the repairing of shoes, automobiles, and watches. These are service rather than manufacturing industries, and even these activities seem to get done out of sight these days. There are always construction sites to watch, but in a built-up area there may not be much new construction. There is no doubt that children are fascinated by watching people at work --- think of their absorption when they watch automobiles or boats being repaired, and their admiration for construction workers and engine drivers. Our cities today present few opportunities

for sustaining this interest. The school lessons about the economic role of industry are a pallid substitute for contact with the real thing.

As an urban designer I see in industry the mastery of intricate and powerful techniques which have made our era the abundant one that it is, and because these techniques are practised in the city, I see industry as a focus around which many other activities pivot. Both of these faces of industry are important to us, and deserving of greater attention in the visual landscape.

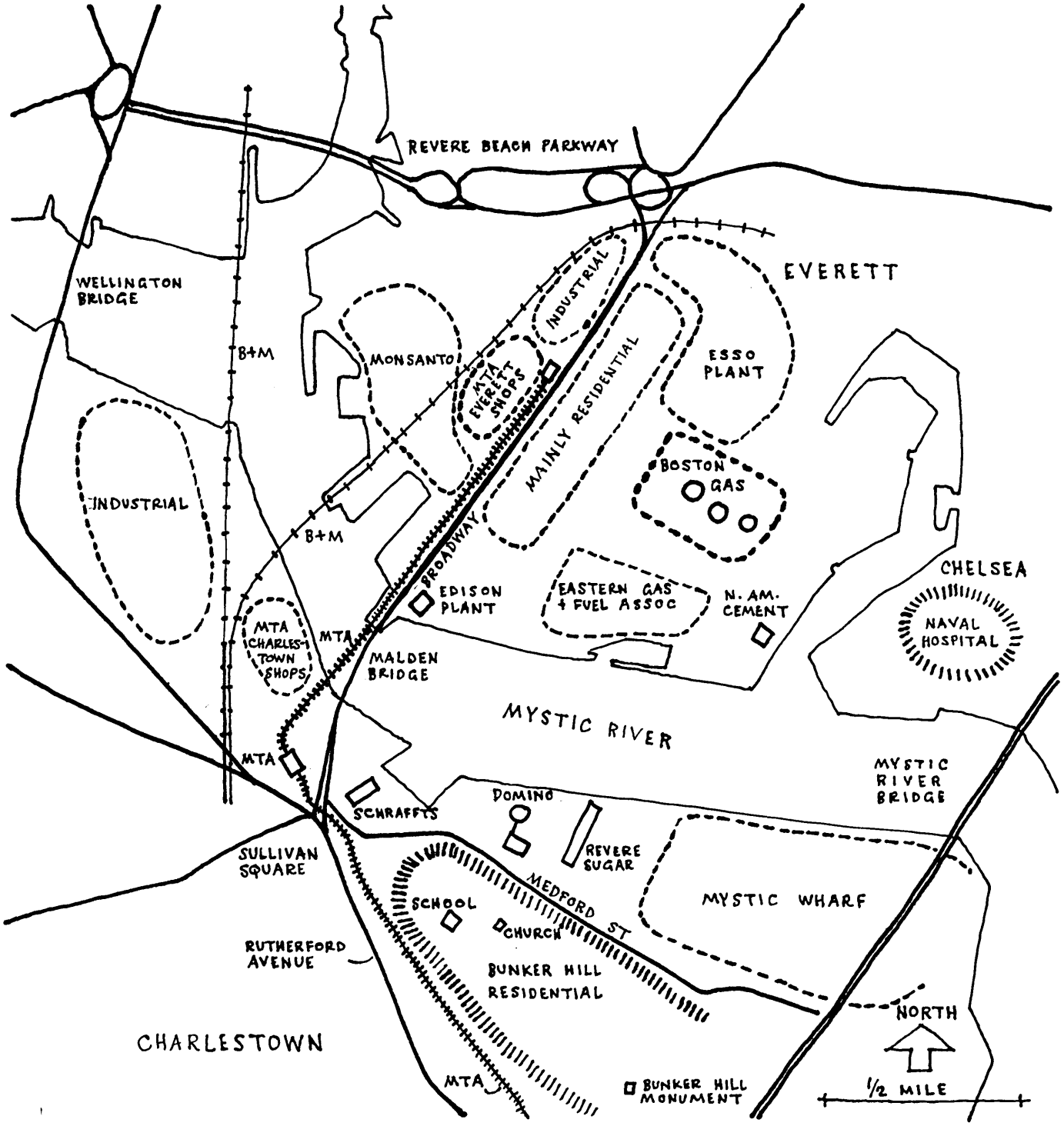
My intention in this study is firstly to look at an existing industrial area, and examine its problems and merits; then I shall see what possibilities there are for the visual treatment of industrial areas; finally a policy follows for the visual form of an industrial area under typical city planning circumstances.

PART II: SURVEY OF AN EXISTING INDUSTRIAL AREA

The purpose of this survey is to examine an existing industrial area to discover the visual potentialities and problems of such an area. Although industrial areas differ from one another, there are many common characteristics, and much can be learnt from a close look at one area which we can apply to others. The analysis examines several aspects of the visual scene: the dominant or main spaces that we experience; the sequence of views that we see along the main paths through the area; the character of distinctive districts; the visibility of landmarks and skylines; activity and movement to be seen in the area; and the meaning that the landscape conveys.

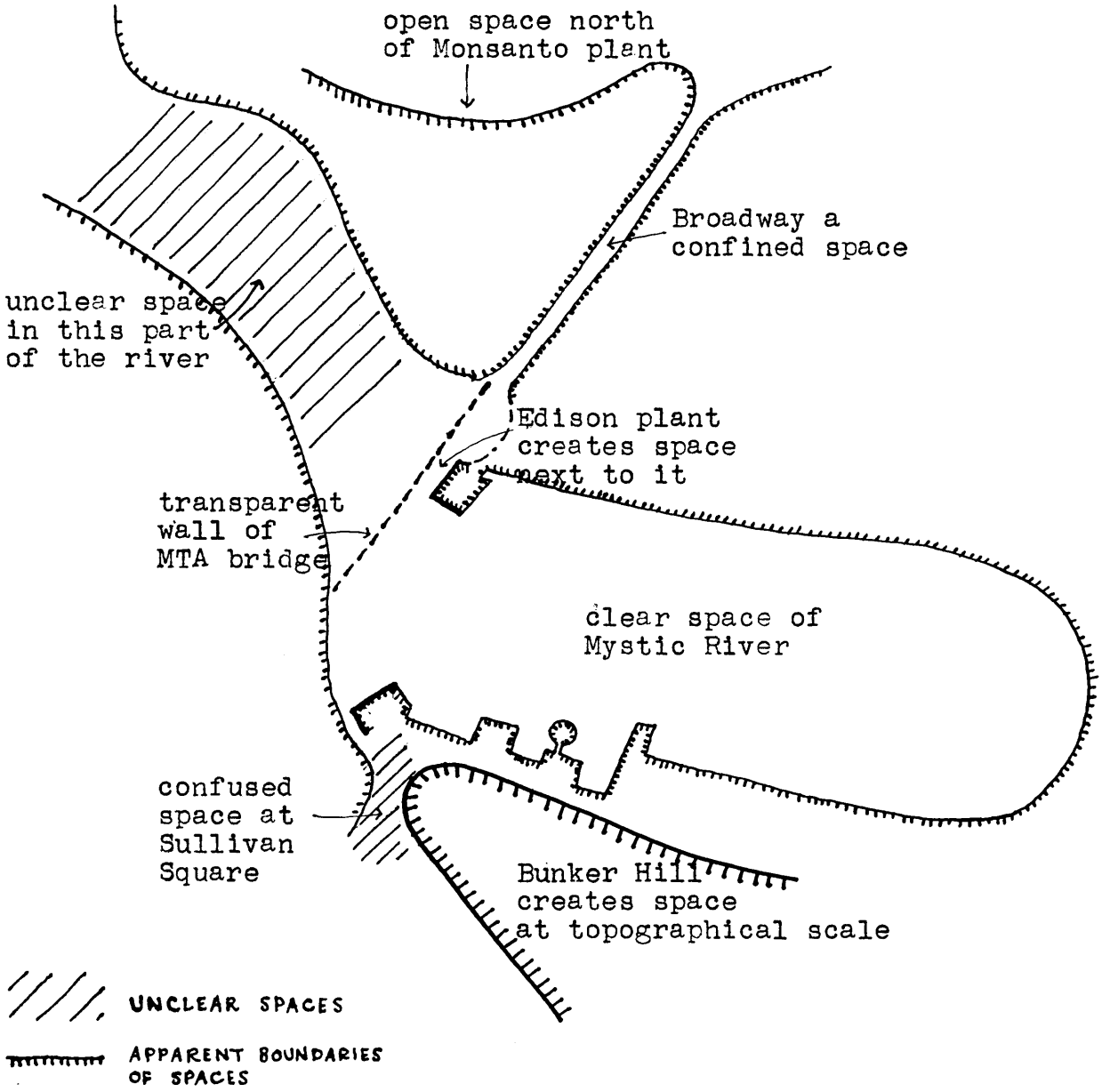
The survey area, which is in the Boston region, is the area of industrial plants near the Mystic River between Charlestown and Everett. The survey takes the point of view of passers-by--persons passing through the district on their way to and from Boston, and who neither work nor live in the area. It therefore records what passers-by can see from the major roads and vantage points.

Description: Map 1 on the following page presents a simplified description of the survey area. It shows major topographical features, the main roads, structures of visual importance, and principal land use districts.



MAP 1: THE SURVEY AREA

Dominant spaces: The most important space is the clear area above the water between the Malden and Mystic River Bridges. The ground to the north of the river is flat, and on the south side it has a gentle slope. Several large compact plants stand on the river banks. On the Charlestown side beyond the strip of plants, Breed's Hill rises to present an intricate skyline of roofs, which continues to the approaches of the Mystic River Bridge. The supports of the MTA bridge parallel to the Malden Bridge create a transparent wall across the river. Some of the large plants near the main roads block out the topographical space and create their own spaces about them. The Schraffts factory and the Edison plant do this strongly, as the foregrounds are uncluttered. West of the Malden Bridge the plants, though large, can only be seen from a distance, and as there are many intervening lower structures, the plants merely become incidents in a skyline. Map 2 diagrams the dominant spaces.



MAP 2: DOMINANT SPACES

Dominant sequences: I have traced out the sequence of objects and views seen from two of the more widely travelled paths through the area. Sequence (A), map 3, shows the approach by road from the north-east along Broadway; sequence (B), map 4 shows the views from the MTA elevated line from Charlestown to Everett.

In these sequences the distinctiveness of the industrial structures, the open spaces of sites and river, and the closeness of the path of travel to the buildings give the sequences their particular interest. A part of a plant --tower, roof or chimney--appears in the distance, is lost behind closer buildings or glimpsed with a changing foreground until the whole complex springs into view. The approach to the Edison plant along Broadway follows this pattern: the final arrival satisfies the distant views. Sometimes the distant prospect is not fulfilled. In (A) we see the gas tanks distinctly from the interchange, but never see them as clearly again, merely catching glimpses down the narrow streets off Broadway. We never have a clear idea of the tanks' location. In the same sequence we do not arrive at the Domino refinery either, but its position is always clear: on the edge of the river that we are crossing at right angles. If we lose sight of a distant object we can recognize it again only if it has a distinctive shape. We see several tall chimneys from the interchange, but none are distinctive enough to remain memorable, and they fail to become

landmarks. On the other hand, the Monsanto watertower with the company's trademark remains distinctive, although we see it across the open site at the interchange, and only have glimpses of it across roofs after that. The use of the same symbol at the entrance to the plant enables us to make the connection between tower and plant.

In sequence (A), once the interchange has been manouvered, the road continues straight and confined until the Edison plant is passed, when the view to the left across the open space of the river bursts open. Once across the river, the road splits into two branches, one of which goes into an underpass; the form of these branches gives no clue as to their direction, nor are they well marked with signs. The view ahead to Sullivan Square warns of this coming confusion.

In sequence (B) the bend in the path shows in the changing views of the Edison plant, and the slow movement of the train in making the curve. Once out of the MTA station there are confining walls on either side till the water is reached, when the space opens out with wide views to both sides. The elevated position and absence of railings gives an unusually spacious feeling. The slope of the line down to ground level informs passengers that the journey is almost over --- a coming to earth.

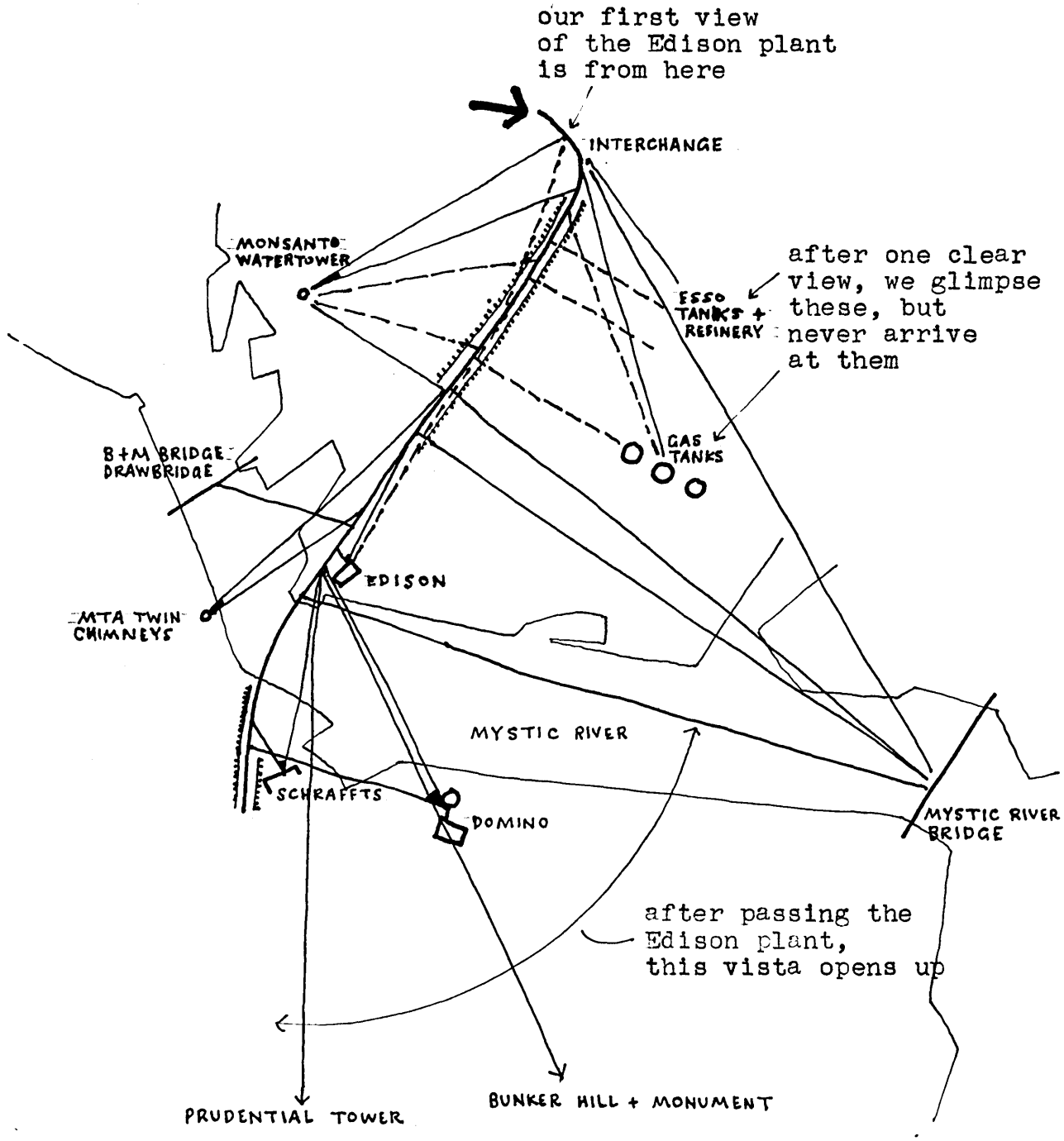
The Edison plant, the dominant structure in the area, strongly marks a position gained from both directions, even though it is not the final object in the sequence. (This area is only a small part of the city, and incomplete in

itself.) In sequence (A) the Edison plant marks the crossing of the Mystic River into Boston, and is the point where the Bunker Hill Monument and the Prudential tower become clearly visible. Once past it the whole river basin appears: the Mystic River bridge on the skyline and the plants along the river, especially the striking Domino plant. In sequence (B) the plant marks the end of the journey, as shortly afterwards the elevated lin slopes down to ground level and into Everett station. The plant has been visible from within Charlestown, presents a vivid picture across the river, and the line passes it close by. The Edison plant acts a symbolic landmark of the entire area. Approaching from either direction its smoking chimneys appear above the roofs of the skyline, warning of a change of character from houses and small industries to an area of large industrial plants. Arrival at the river fulfils this expectation.

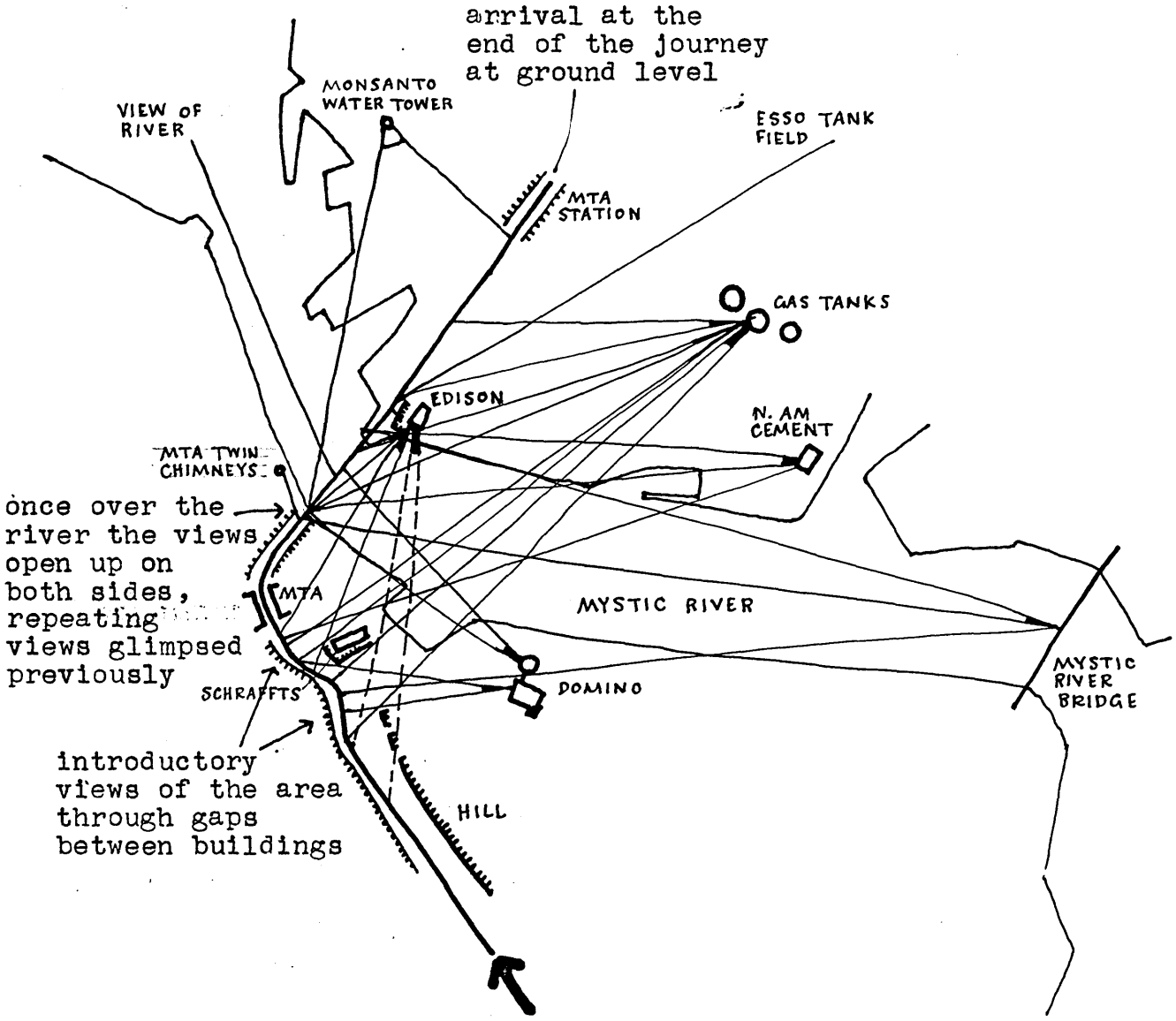
Apart from the fortuitous location of the Edison plant to give point to the approaches from both directions, the interplay of the various goals, glimpsed and hidden, is quite arbitrary. Maps 3 and 4 on the following pages diagram these two dominant sequences.

Three main highways skirt the area: these routes carry more traffic than the paths I have described above but do not penetrate the area. Rutherford Avenue is elevated as it passes through Sullivan Square; from it one can see the larger landmarks --- the Edison plant, the gas tanks,--- but

as the foreground of river is cut off from view, they have no clarity of location. There is no view to the ground level of Sullivan Square itself, and no sense of passing though a nodal point in the city structure. From the Mystic River Bridge there is a clear view up the river, but the position of the bridge balustrade makes it impossible to appreciate it from a car. The Revere Beach Parkway gives a fine view of part of the Monsanto plant across a grassy field; though some commercial structures interrupt the view in places.



MAP 3: SEQUENCE (A), TRAVELLING ALONG BROADWAY FROM THE NORTH-EAST



MAP 4: SEQUENCE (B), TRAVELLING ON THE MTA ELEVATED LINE FROM CHARLESTOWN TO EVERETT

District character:

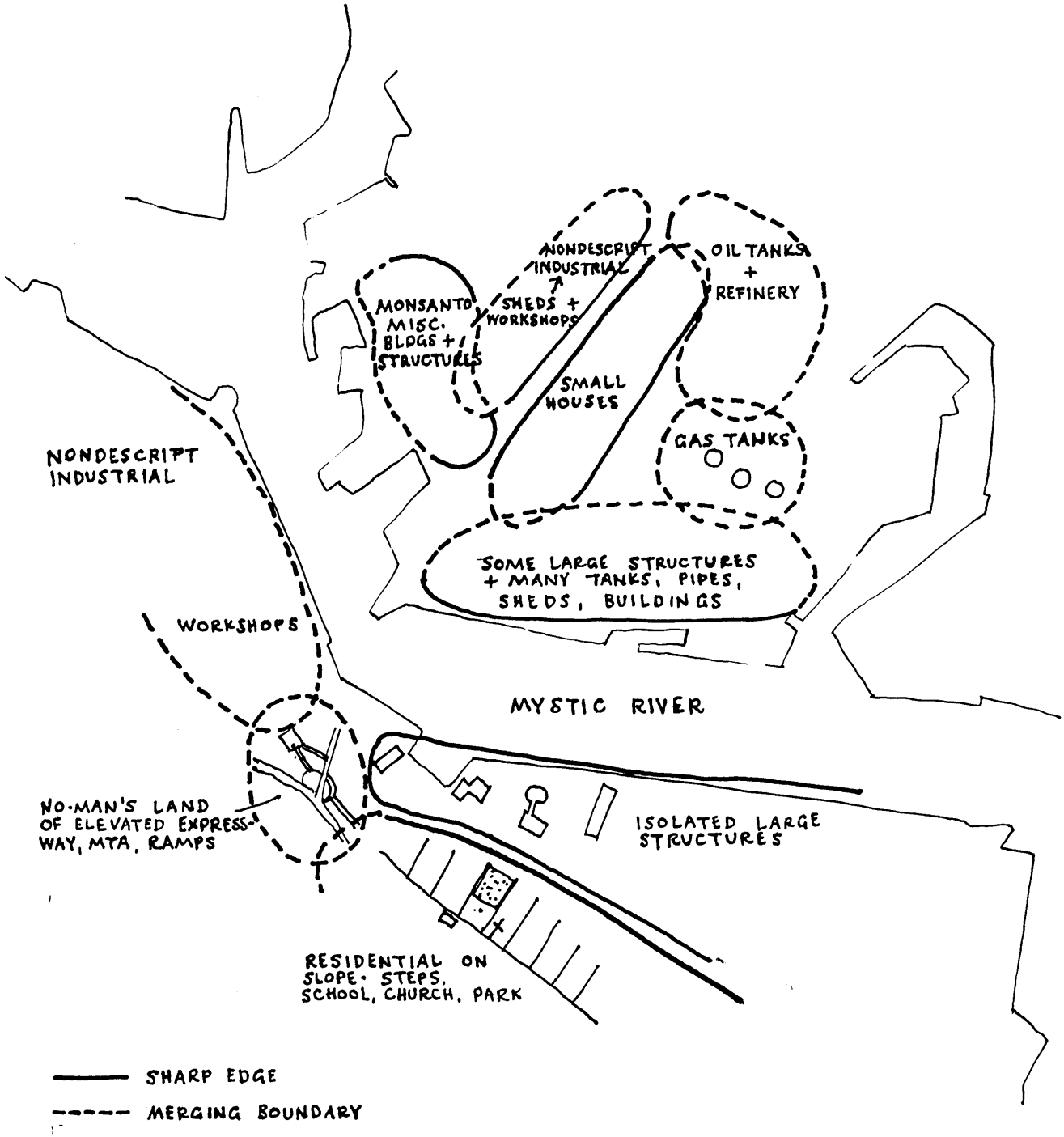
The two most clearly defined districts in the area are in Charlestown and lie on either side of Medford Street: the residential streets sloping steeply up the hill, terminating in steps in some places, and interspersed with a park, school, churchyard, and church; the strip of factories between Medford Street and the river, bounded by water and wharves on the one side, and the open space created by the railroad track and Medford Street on the other. The change of grade and change of character of building combine to make this a sharp edge between the two districts.

Other districts exist but merge into each other: we can clearly picture and describe them, but cannot say where one ends and the next begins. Map 5 shows the recognizable districts in the survey area.

To the east of the Malden Bridge the river gives sharp edges on both its banks. The continuous lines of the wharves, the reflections in the water, and the absence of clutter at the river's edge contribute to this clarity. But to the west of the bridge the junction of water and land is by no means clear. In places the low lying banks become mud-flats; the river has bends and the banks are indented; the two railroad bridges have drawbridge mechanisms which produce structures where we would expect openness; the shapes of the buildings are undistinctive. The result is a difficulty of distinguishing between land and water, and

between the two banks of the river. From the height of the elevated railroad the picture is a little clearer but still confused.

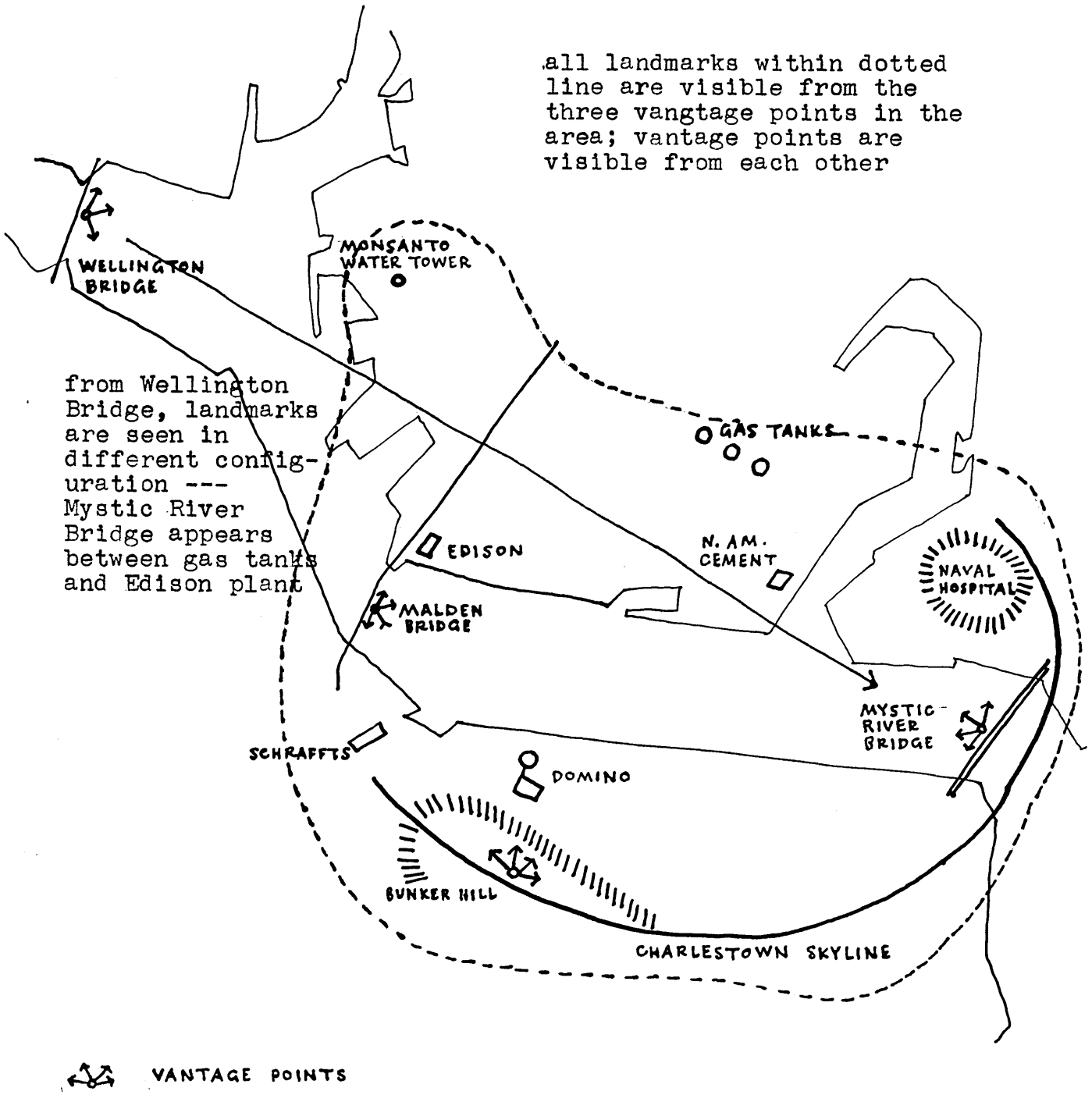
The north edge of the Monsanto plant has a sharp edge where it borders on the open land adjacent to the Revere Beach Parkway. The water tower of this plant with its trademark collects the disparate buildings together into one district by acting as a representative symbol of the district. The two streets carrying heavy traffic, Medford Street and Broadway, act as edges to the districts adjoining them. In both cases there is a change of use from one side to the other, and the constant stream of traffic adds to the effect of a barrier.



MAP 5: DISTRICT CHARACTER

Visibility:

The large open space of the river allows the plants to be seen from a great distance and from many different angles. The major landmarks are shown on Map 6; except for the Monsanto water tower, they are all grouped around the basin. The three vantage points from which it is possible to see these landmarks are also located on three sides of the basin: the Malden Bridge, Bunker Hill, and the Mystic River Bridge. The arrangement of landmarks and vantage points is such that the observer is looking at the same scene from three different angles, and he can also see the other vantage points. The picture is clear and consistent. West of the Malden Bridge there are several landmarks, but they are undistinctive in form, and their location on the ground is hard to pinpoint; nor are there any vantage points until one reaches the Wellington Bridge. From this point almost all the important landmarks are visible, but because of the bend in the river they appear in a different configuration. For instance the Mystic River Bridge appears between the Edison plant and the gas tanks. This view presents a confused picture. Perhaps if there were a road parallel to the river along which to travel, one would see the shift in the configuration of landmarks, and this would assist in indicating the bend in the river. But in the present case the Wellington Bridge is remote from the area, and the view from it is confusing.



MAP 6: VISIBILITY OF LANDMARKS

Visible activity:

Much of the visible activity in the area is that made by the movement of traffic: the heavy traffic of trucks and cars along Broadway, the frequent MTA trains, the trucks along Medford Street. These main flows of movement are not connected with the area. Broadway is the main street through Everett and connects with Route 1; Medford Street is a truck route; the MTA line connects Everett and points beyond to the Boston area. At peak hour these routes provide the adjacent plants with access for employees. During the day most of the traffic is passing through the area except for occasional trucks to the individual plants.

The physical facilities of the road and rail traffic fit well with the flows of activity. The MTA bridge, Malden Bridge and Mystic River Bridge have exposed positions across the open water; the MTA line in its entire length in Charlestown and Everett is elevated and very prominent; Medford Street and Broadway are straight and continuous, and happen to act as boundaries to the adjoining districts. Entrances to the plants allow busy activity at least twice a day for short periods. In some plants, such as the Monsanto and Domino plants, the entrances to the sites are prominent, reflecting this activity or potential activity; in others--the oil refinery, the Edison plant, the entrances are quite obscured.

The river is used for shipping, but only infrequently.

At one time the shipping activity must have been great, and the Malden Bridge and the two B & M railroad bridges have drawbridges to allow the passage of ships. But now the river has become an almost unused body of water instead of a shipping channel. The main space of the area--the open basin of the river--reflects an activity that no longer fills it.

Pedestrians are scarce in the area even at Sullivan Square which is the starting point for several bus routes; there are a few eating places along Broadway which are patronised by workers in the nearby plants. Within sites there is some activity: construction work in the Edison plants, the movement of trucks loading and unloading, workers crossing between buildings or maintaining equipment. Some of the activity I saw was the result of the infrequent occurrences that happen in all parts of the city: survey work on the Malden Bridge by the Public Works Department, demolition of old wharves, and at the entrance to the Domino plant a group of picketers being watched by policement

As well as the visible movement of vehicles and persons, there are other signs of activity: noises, smells and smoke. Along Broadway the predominant noise is that of the heavy traffic and the roar of trains along the elevated line. These noises almost mask the hum of machinery at the Edison plant. At Sullivan Square a frequent noise is the screech of brakes as the trains manouver two curves

in the track. Medford Street is quieter, but there are frequent trucks and occasional trains, for which bells are rung when they approach a level crossing. The two sugar refineries put out a constant hum and hiss of machinery.

Along Broadway the air smells of car exhaust fumes, of gasoline near the refinery, and smoke at the Edison plant. Sometimes there are traces of chemicals in the air from the Monsanto plant. Near the Schraffts factory at Sullivan Square there is often a sickly smell of candy and sugar. Most of the plants produce smoke and steam. The Edison plant often has all five of its smokestacks belching dun colored smoke, and plumes of steam escape on the roof. The Monsanto plant emits steam and smoke from many chimneys and apertures. The two sugar refineries produce only steam.

But apart from the smoke and unusual occurrences, most of the visible activity is the through traffic.

Denotation:

Thus far I have examined the significant visual facts of the area: the spaces, the character of its districts, the sequences of objects seen on a trip along the major paths, the activity that is visible to an observer. But our surroundings are more than an intricate arrangement of shapes and movements: they convey information. I conceive of the environment as a book which the observer reads; instead of words there are buildings, streets, vehicles, people, noises and smells. The observer makes sense of

them to himself in terms of his knowledge, interest and attitudes. The industrial landscape, as do all our surroundings, denotes many things. An engineer, artist, real estate developer or union organizer will see the industrial scene differently. In attempting to describe what the area denotes, I have noticed things in terms of my own attitudes and preferences, which I described above.

Industrial plants vary widely, because each plant is producing different goods. But there are common characteristics. An industrial district as a whole conveys a picture, too. I shall describe each of the major plants, and then comment on the entire area.

The Edison plant, a huge compact mass with towering, smoking chimneys, conveys great power. If we did not know what sort of plant it was, the lettering "Edison" gives us the information that it is a power plant (though we would have to know what the Edison Company produces for this to be a guide), and the familiar transformer equipment on Broadway gives a further clue. From the river side we see large piles of coal on the site. These presumably arrive by ship, though I have never seen a ship unloading there, but the wharf is in good repair. A conveyor from the coal beds leads to a hopper at the top of the building. The hum of generators, the escaping steam from roof condensers, the belching smoke, the lights at night tell us that the plant is in continuous production. The fence around the property and notices threatening trespassers with prosecution suggest

that the equipment is dangerous, and that its vital function to the community needs to be protected from interference. The United States flag adds to this notion of public service. A view of this plant, then, tells us several things: what type of plant it is, how the fuel arrives, some details of the process (the fact that it is continuous, that it is converting energy of great power, that it is important), and what the end product is. These are rudimentary facts, and a closer inspection of the plant or greater knowledge of the process will reveal much more.

A view of the Monsanto plant does not convey as much of the facts of production as this. We never get a clear view of the site as it has to be seen from a distance or beyond closer structures. The many different shapes and sizes of buildings and equipment suggest that several different products are being made; the piles of sand or chemicals must play some part in the process; the smoking chimneys and steaming vents convey the use of heat in conversion processes; but the whole picture has to remain a vague one. The entrance and public area off Broadway has lawns, flowers and neat brick buildings, indicating an attempt to present a public face to the street. The guard checkpoint into the production area suggests again security against intruders who may injure themselves or the plant, or attempt to steal trade secrets. The use of the trademark "M" at the entrance and on the water tower allows us

to make the connection with the products of the company if we recognize the symbol from its use in advertisements.

The Esso plant is hardly visible from the main vantage points. The closest view is from the interchange, and here we see the gasoline storage tanks. The company has capitalized on this one close view by painting its name on some of the tanks, and by placing a billboard to identify the plant. We glimpse the jungle of pipes of the refinery down the side streets off Broadway, and their distinctive appearance enables us to identify the complex as an oil refinery.

The North American Cement Company's storage bins are distinctive as a shape, and their whiteness makes them stand out in the landscape. But the company's name (difficult to read from a distance) is the only thing that tells their function.

Across the river the Schraffts plant identifies itself by the company's familiar trademark, "Schraffts Chocolates" lettered in art nouveau script in gold, and by the pervasive smell of candy in the area. Apart from this we do not know more of what happens in the multi-story building. The separate public and employees' entrances seem to indicate a large number of workers, but during working hours they are not to be seen.

The Domino sugar refinery is a striking building: its dramatic shapes, bright colors and newness make a vivid contrast with other plants in the area. We know that it is

a sugar refinery from the sign "Domino sugars" and "American Sugar Refining Company" at the entrance. The architect probably intended the building to be highly expressive of its function. Several forms make up the composition: a central cylindrical tower with smaller appended orange colored cyliners; the coneshaped warehouse; the lower cubic shapes of the factory; the intricate complex of exposed machinery. These forms probably do reflect their contents, yet without a knowledge of the processes they house, they remain only interesting shapes and we have to regard them as sculpture. The cone-shaped roof must be a storage area, as it connects with a conveyor leading to the wharf, but we do not know if it stores the raw material or finished products. We have a view into the plant through a picture window and glimpse machinery inside without knowing what it is doing. Likewise the exposed tangle of pipes, tanks and gangways give no clue to the process. The site layout shows the customary guard's check-point and a large parking area which indicates the size of the work force. The freight cars, stationary and moving on the site, suggest a heavy reliance on rail transportation.

Apart from the few large plants in the area, there are many smaller ones, which have much of the character that we associate with intown industrial areas: the plants are indistinguishable from one another, we do not know how large the premises of a company are, or which buildings

belong to which company. Often the activities of the factory are completely mysterious, as we see no signs of materials, process, workers or products. We label these areas in our minds as "industrial", and discard them, because the confusion of premises, and private and public spaces offers little hope of a clear or interesting explanation.

Even the larger plants are not free of confusion. With adjacent plants it is often difficult to separate the structures belonging to the different companies. For instance the three large gas tanks right next to the Esso refinery seem to be part of the same complex. But is this a real or accidental connection? A knowledge of the processes helps to sort out this visual confusion; but conversely a clear visual separation or connection would be helpful in explaining the processes.

In the daytime the impression of activity in the area is mainly the passing traffic, as activity within the buildings is hidden from view. But at night the plants on continuous shift are illuminated, and we see how busy they really are. A factory like Schraffts, presenting a blank face during the day, seems to vibrate with energy with the whole building illuminated.

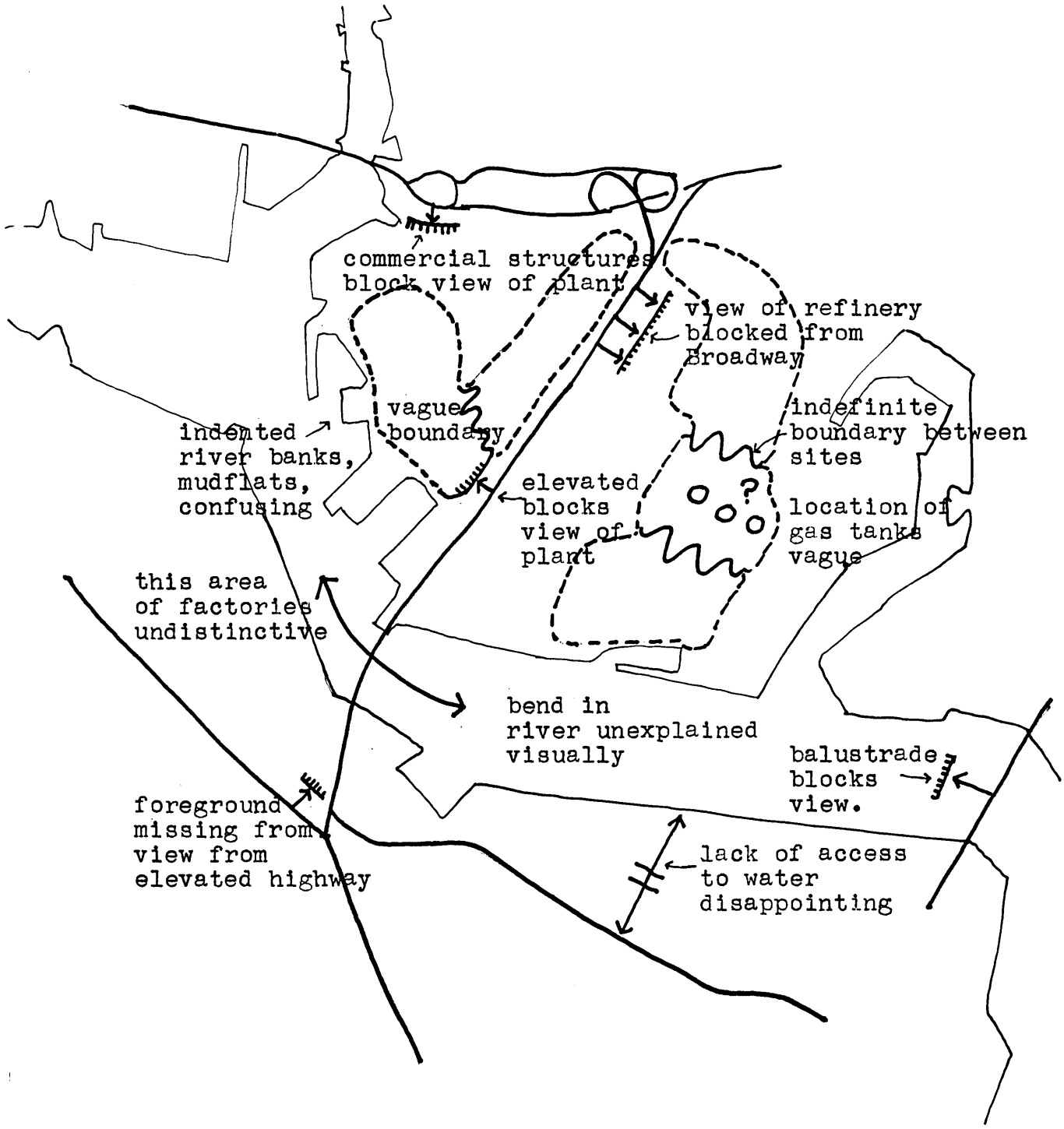
Comment:

The visual merits of this area arise out of the grouping of distinctive structures around the clear open space of the Mystic River; the relationship of the Malden

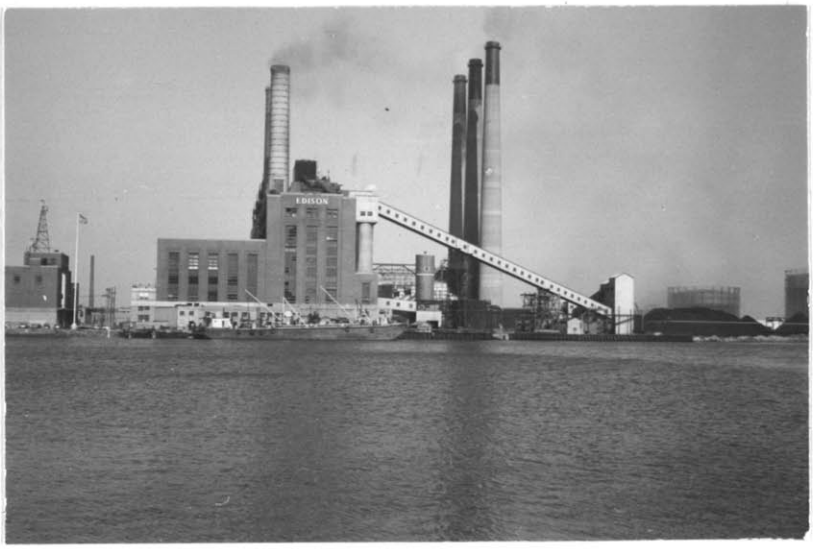
Bridge, Broadway, Medford Street, and the Mystic River Bridge to the river; the unique skyline of Breed's Hill in Charlestown; the dominance of the Edison plant, its close siting to the roadway, and its position in the approach along Broadway, forming an impressive entrance into Boston. Note that the industrial structures are not the only important visual elements in the area: the river itself, the Mystic River Bridge, the Charlestown skyline, the view of the Prudential Building, the elevated MTA line act together with the industrial buildings to form the scene.

The chief visual problems of the area derive from the shapelessness of the river and skyline west of the Malden Bridge, and the difficulty of approaching or seeing some of the plants (Monsanto, Esso). Map 7 diagrams these problems.

On the following pages there are photographs of views in the survey area.

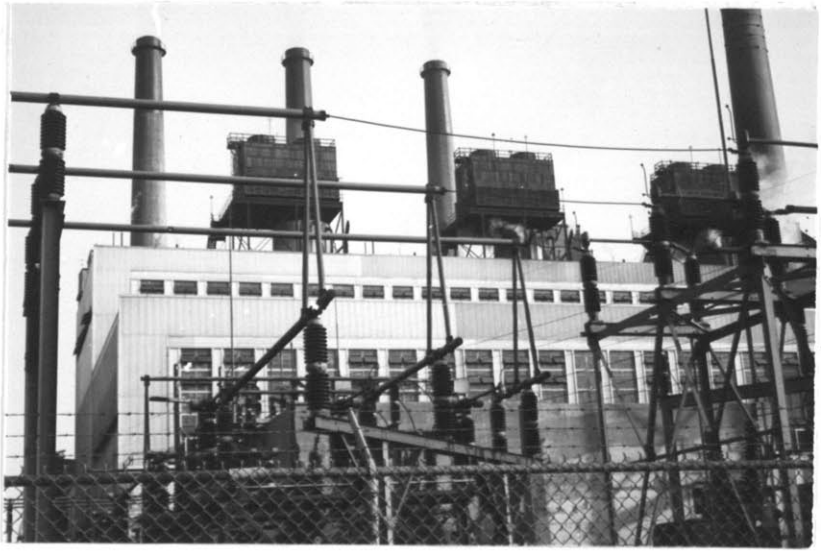


MAP 7: SOME VISUAL PROBLEMS OF THE AREA



The Edison plant is a vision of great energy and power. We see the connection between water, wharf, piles of coal, conveyor and smoke.

The plant is the most prominent landmark in the area. Here we see it from the Revere Beach interchange above the roofs of factories.....



..... and after travelling along Broadway we arrive at it. From this angle we see the purpose of the plant --- electric power.

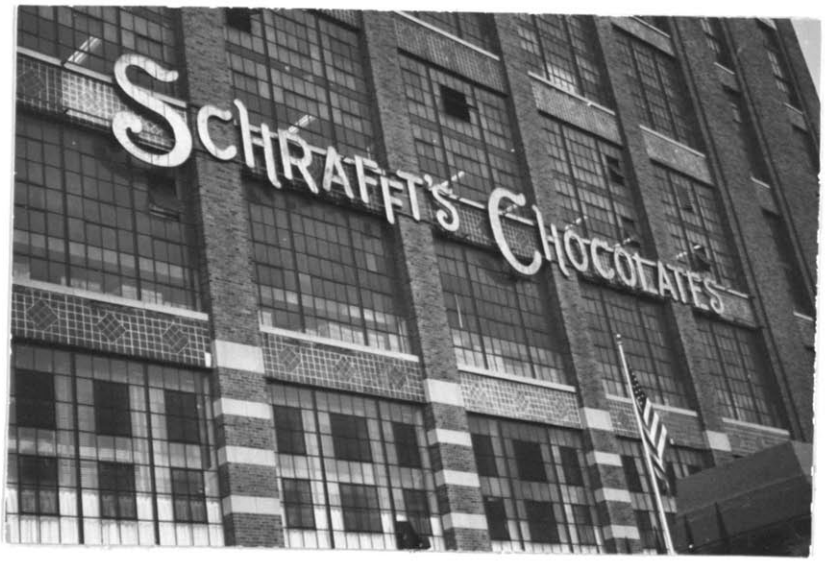
The Esso oil refinery has its equipment exposed to view, but few persons see it because it is hidden from the main road.

From the interchange we see the tanks, the company name, and a billboard illustrating the purpose of the product --- a succinct use of this brief view.

Travelling along Broadway we catch some glimpses of the refinery, but never arrive at it.

The Monsanto plant, always seen beyond closer structures is an assortment of buildings and equipment, identified only by the water tower with the company's trademark.

The entrance to the Monsanto plant is emphasised by the increased height under the elevated structure, the sign at the left with the company's trademark, and the lawn and hedges.



The name of this factory in the familiar script establishes a connection between factory and product.

The visible flow of traffic and MTA trains along the Malden bridge and Broadway fits with the prominence of the structures.

The Domino sugar refinery is a functional-looking building, but we need some knowledge of the processes of refining to make sense of the building.

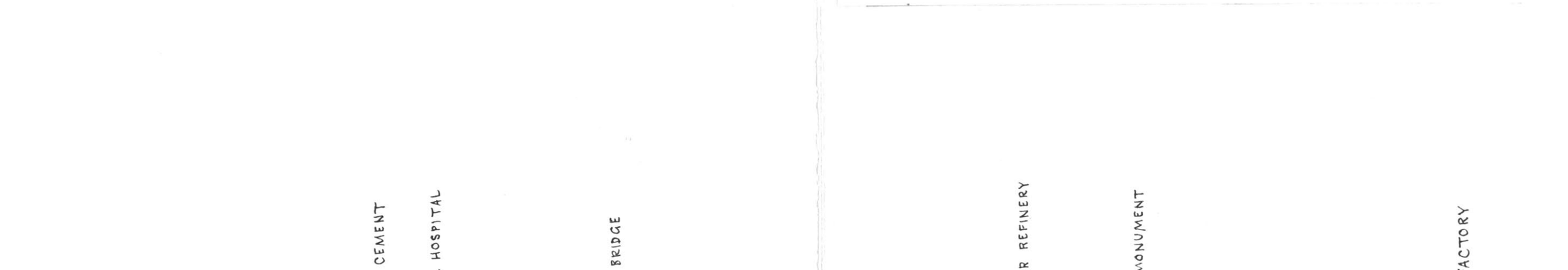
The structure at the left is evidently a storage apace, but is the raw material or finished product stored there? A view inside would make this clear, and help us know how the goods move through the site.

These gas tanks are visible from long distances, but none of the main roads pass near them, and we are never able to pinpoint their location.

West of the Malden Bridge the skyline is undistinguished. The two low railroad bridges prevent us from seeing what p happens to the river.

This is a street that we label "a typical industrial area". It looks as if the companies occupy separate floors in the building, but we are not sure. What do these companies produce?

From the Malden Bridge we see this highly articulated skyline, anchored at each end by a strong form. Industrial structures and other landmarks make up the skyline.



PART III: POSSIBILITIES IN THE VISUAL FORM OF INDUSTRIAL AREAS

The visual form of industrial areas though sharing many characteristics with other parts of the city has possibilities and problems of its own. Industrial areas, if we can generalize about a class of land use so varied, have large bulky buildings, often with distinctive structures and plant equipment. The main buildings cover only a part of the site, the remainder being left open or occupied by low structures. We do not find the articulated definition of space that occurs in more built-up areas of the city where the street is a basic element of space. Here the street retains its identity as a path of travel, but only the floor surface and moving vehicles define it spatially. At the side of the street there is a transparent fence, or nothing at all to contain the space. The left-over spaces on sites are irregular, sometimes continuous from site to site and from site to street. Occasionally the bulk of the factory is close enough to the street to create a wall, but the control of noise and fumes works against this closeness to the public right of way.

Spatially, then, an industrial area is likely to consist of large structures, each surrounded by open space. As a result, any single plant can be a dominating structure in the area, depending on design. The isolation of structures creates the visual problem of differentiating between

the spaces that belong to particular plants.

The size of buildings, and particularly the height of towers and chimneys, makes them visible from great distances. The area has many potential landmarks, though the structures have to be distinctive in shape for them to act as landmarks. The public does not often penetrate into industrial areas except along one or two main streets, and structures visible from afar but lost behind closer buildings become unanchored landmarks, marking a location that is hard to fix in position. The experience of driving through an industrial area is potentially an exciting one, and we can visualize an interplay of structures, appearing as goals in the journey, tantalisingly disappearing, to be reached later and passed, marking stages in the progress of the journey. Here the visual form of such a sequence is no different from other areas in the city, but the prominence and distinctiveness of industrial structures offers a great potential for sequence design.

Whether seen from fixed or moving viewpoints, the disposition of landmarks tells us much about the industrial area. Industrial landmarks act as beacons and show the location of the factory areas from other parts of the city, and some idea of the extent of the area. The choice of landmarks to dominate the area should relate to the significance of the structure. In the survey area by a happy chance a power plant is the predominant landmark; its important

function as a power source and its public service character have found appropriate expression. Other plants which merit a strong visual emphasis might be factories which are large employers or which represent a particularly important industry to the city.

A main problem in the visual form is the difficulty of identifying the premises of an industrial company, the spatial territory to which it lays claim. With this piece of information we can begin to discover things about the activities that occur there; without it the scene becomes confused and senseless. The ultimate interest in an industrial area must come out of a sense of the different activities that are taking place. In a residential area the basic activity in the buildings is similar, and individual differences in households find their own expression. In industrial areas the activities within the structures are similar only at a rudimentary level--workers and machines produce some kind of goods or service--but beyond this the activities are really very different. A first step in promoting these differences is the clarification of the premises of a company. Once we know this we can begin to connect the various buildings and structures and use of site to make some sense of the process. We can also judge the size of the company. The clarification of premises is possible in several ways: by surrounding the plant with open space or a clear boundary fence; by a consistent

architectural treatment of the buildings with similar forms and materials; by the use of signs to identify a group of assorted buildings as one complex; by clearly joining buildings and structures together; or by a combination of these arrangements.

The mosaic of properties, all different, is held together by the transportation system which penetrates the area and the edges which bound it. We can design these elements--the paths along which we travel and the edges which we use as linear references--so that they assist us in forming a clear mental picture of the area. But beyond the formal pattern that paths and edges create, they carry particular meanings of industrial areas.

More than in other parts of the city, in industrial areas the individual properties have little to do with one another. In residential areas, social ties develop between the occupants of different houses; in commercial areas the proximity of stores allows convenient shopping, and stores depend on workers in other premises for at least part of their sales. But except in the rare cases where products of one plant are shipped to an adjacent plant, the only binding tie between the plants in an industrial area is a reliance on the same transportation facilities. Roads, railroad tracks and shipping channels, the flows of vehicles, freight trains and ships, and the connections between the public facilities and private plants are the elements around

which to design an industrial area as an expression of the use of common transportation facilities. This expression may take the form of clear paths of travel: a distinct hierarchy of major highways and minor collector roads within the area; clear differentiation between public and private roads; well-marked entrances into sites; the separation of truck traffic and passenger traffic; a network of railroad spurs that fits into the road layout; the use of railroad embankments and overpasses to emphasize the rail facilities; the clear layout of docks and wharves.

Visual edges may be the boundaries between parts of an industrial area having different types of factories, or they may define the line between industrial and non-industrial sectors of the city. A familiar type of edge is a transportation facility: highway, railroad, shipping channel. A busy main road has the effect of a double-sided edge, or a seam; it divides and joins at the same time. The edge separating factory areas from the city is an expression of a community need to put some distance between heavy large-scale industry and houses. These edges may be transportation facilities as above, or they may be tracts of open ground, massed trees or water.

I have presented some thoughts about the visual form of the area: the arrangement of landmarks, sites, paths and edges. If these are not to be merely formal devices, they must fit with the way that the area will be used, and they must be a visual expression of the activities and people in the area, and of ideas about them.

A key interest in industrial areas is the human resource of labor, and a basic fact to convey is the presence of workers in the plant and the work they engage in. The most vivid way of showing the use of human labor in industrial production is to show workers at work. For persons who do not engage in manual labor themselves there is an endless fascination in the deftness with which workers co-ordinate with machines, an interest not a little tempered by the comparison of the humanness of the machines and the machine-like movements of the humans. But whether we like what we see, we find it interesting. The sight of workers at work in a factory also serves the moral purpose of reminding us how the industrial system uses human beings. In many cases, of course, it will not be possible to see work in progress from a distance and at a travelling speed, but occasionally this exposure may be appropriate.

In some plants it is not possible to show factory processes in operation, and other aspects of the employees' day at the plant can be exposed. The employees' entrance, whether a separate entrance or the main entrance of the plant, is a telling sign of the use of labor, and though its use occurs only twice a day for brief though busy periods, it stands as a sign of potential activity. Many plants today provide cafeterias for their workers and these are well suited to an exposed architectural treatment, allowing the workers to gain contact with the world outside the plant at the same time as giving a view to the public on the outside.

The links and crosswalks between buildings on the site are potential places to show activity. A view of the car-parks enables an observer to gain an idea of the size of the labor force; the division of this into executive and employees parking areas reveals something of the relative size of supervisory and productive personnel. We have given little attention to the appearance of parking areas. Seen from above a large car park is a fascinating sight, but from ground level it lacks any semblance of order. Just as the open-air storage of materials can be decorative, so can a large parking area; the individual units need to be subordinated to a larger design of blocks. Perhaps the area can be arranged so that a passer-by gets long views down the open lanes, like the view through a forested area; perhaps cars of similar size should be parked together; terrace parking, parking on a tilted plane, or parking lanes radiating from a central point, are other possibilities. Trees in parking areas should be bold masses to match the formidable scale of the area; a scattering of garden trees is out of place.

The differences of occupation and status of workers traditionally expresses itself in the dress of the workers. This tradition, I believe, is dwindling, and it is becoming more difficult to gauge the relative rank of workers. The clues are subtler ones nowadays. The number of unskilled and semi-skilled jobs is declining, and so the range of ranks is reduced; middle-classness has become a desirable status, and with it the possession of a white-collar job, or the appearance of having one. We can no longer expect

to differentiate the occupations and status of workers off the job. But at work, some trades require overalls and suits to protect the worker and his clothes, and this special dress differentiates these workers from others. On some construction sites the colors of hard-top hats indicate the ranks of the workers, and with the key to the color code, sidewalk watchers can see the numbers and functions of the levels of supervision. Differentiation of workers by means of an additional item of clothing in this way, though not in the basic dress, is a possible way of making the activity of a group of workers more intelligible. Although differentiation of occupation by dress is a meaningful way of explaining the functioning of a group, it is not within the urban designer's province to dictate it. Appropriate dress is deeply rooted in the customs of a society, and suggestions of change by outsiders would be resented--and rightly so.

Instead of showing the presence of employees at the plant, we will have to show their absence in some plants. This can appear from the use of open air machinery contrasted with a small building for control workers.

The heart of industrial activity is the process itself. In some plants we can reveal the process of production, whether in the open air or through transparent walls of glass. We can imagine a plant laid out so that the process, from intake of raw materials to finished product, takes place before our eyes; perhaps it could parallel the path of travel and we

would move from beginning to end of the line when passing it. The equipment and machinery themselves can be laid out to explain the process: position, form and color can emphasize significant parts of the process, and make others inconspicuous, boldly simplifying the process to afford a quick and direct understanding. The use of color on machinery is a particularly cheap and effective way of achieving directness: perhaps the main flow of the process can be traced in a single color. The stumbling block in exposing a production process is the necessity for the plant to be able to adapt itself to new techniques. Even if the process is visible at first, changes in methods may require a rearrangement of the layout. Plants with several units of production may be able to keep one always visible; buildings may have a modular structure which allows transparent panels to be moved about; it may be possible to move points of visibility for the public when processes change. These things are possible--but it depends on how much importance the company places on the use of its process as an advertisement and enlivenment of the urban scene.

Most of us have some sense of how industrial products are fabricated. Even if we cannot follow the intricacies of a technique, the main lines are often simple. But when we see a process taking place in front of us, we have to be helped along in our understanding. Parts of some processes are invisible; what seem to be irrelevant pieces of machinery are more prominent than the basic ones; we lose

the connection between one operation and the next. The first step in explaining a process is an identification of the process. Signs are very useful here. For instance, the sign "Domino Sugars" tells us that the structure is a sugar refinery, which we might not have known otherwise. Even if we do not glean much more from a view of the plant, at least we now know what a modern sugar refinery looks like, and shall recognize another when we see it. Then we need to have an articulation of the steps in the process. The separation of steps into distinct parts of the site, or different buildings, achieves this clearly, though it may prove inflexible for the plant-owner in some cases. The use of signs can indicate the steps, though this is less convincing than a physical articulation. Then we should know the direction of flow of the process. This may be perfectly clear from the articulation of parts of the process; otherwise the position of the two ends of the process--the storage of raw materials and product--may indicate the direction. Arrows, the numbering of steps, and color gradation codes may serve as a substitute for physical arrangement, if this is not possible. Finally, the details of the process, if not obvious from a view of the machinery and workers, may be supplied by simple broadcasts or lectures in a tour, or by diagrams of the operation. Some industrial processes may be too complex and too invisible to be capable of a simple visual explanation, but we are able to comprehend most of them.

If it is not appropriate or possible to expose the process in its entirety or even in a fragmentary way, the buildings housing the process can convey some idea of the activity: large, uninterrupted floor spaces suggest continuous processes or a need for flexibility of arrangement of machines; windowless buildings indicate artificially controlled conditions for special processes, or storage space; multi-story buildings indicate the use of many machines of different type, rather than a co-ordination of processes into a single continuous operation. Structures for specific functions denote their purposes more directly; some of these structures found in industrial areas are boilers, tanks, ventilators, chimneys, conveyors, and hoists. The separation of the process into several buildings indicates semi-independent units of the process, or the production of different products on the site.

As a step beyond the mere denotation of the industrial process or activity, buildings and sites can be expressive of it, indicating some of the quality of the process as well as the fact. Massive forms can express the idea of great heat, pressure or quantities involved in the process; precise detailing and the use of machine finished surfaces might suggest efficiency and precision in the proeess; the use of a human scale shows that human labor engages in the work, while an inhuman scale expresses the predominance of machine fabrication.

A supplement to the sight of the activity itself is a sign denoting activity. Noises, smells, and smoke can act as signs of processes in operation. The whirr of machinery is often the only clue to activity in some of the new industrial districts. These by-products of production--noises, smells, and smoke--reveal fluctuations in the processes, announcing when the machines are starting up and closing down, or when the process reaches specific stages. If not a nuisance on other counts, we can conceive of these signs giving a daily rhythm to the activity in an industrial area, differentiating the parts of the day into recognizable periods, just as the flows of activity at peak hours and lunch-break structure the day. The interior lighting of factories at night shows that the process is a continuous one, and enables us to see into the buildings, which is often difficult during the day because of reflections on the glass.

The sight of raw materials used in the process or finished products that emerge from it make the manufacturing process more tangible to the observer. The plant can store these articles in open storage areas visible to the passer-by. The new industrial districts contain clauses in the agreements with occupants that all open storage areas should be screened, presumably to preserve a tidy appearance. However, open storage areas need not be disorderly, and the appearance of quantities of repeated units can be richly

decorative. From these we gauge the volume of the plant's production, as well as a reminder of the creative role of industry in transforming raw materials into products. A view of the goods entering or leaving the plants makes the connection between the point of production and the distant points from which the goods are drawn or for which they are destined. The sight of the goods being unloaded from trucks, railroad cars or ships presents the most vivid impression of the linkages in the industrial network, but in the absence of the activity of loading goods itself, the trucking bays, railroad lines, wharves and cranes, indicate the potential activity that takes place there. The movement of materials, parts or goods between intermediate steps of the process can itself be exposed, or indicated by pipes, hoists and conveyors.

In the same way that the materials and products are exposed to view, the sources of power can be similarly treated. In industrial buildings of an earlier age, windmills and watermills, the source of energy supply for the plant was a dominant visual element of the structure. With electric power, the source became an invisible one, with cables and transformer rooms placed underground or hidden. But if this invisibility is not a technical necessity, pylons, cables and sub-stations indicate the source of power. We are used to the tangle and confusion of existing cables and poles in our cities, but this is not a necessary consequence of exposing them. Structures for fuel storage--

oil and gas tanks--can be made visible, together with the fuel connection to the plant.

Industrial vehicles, though seen in all parts of the city, are an especially strong visual and noise element in industrial areas. The sight of materials and goods in transit reinforces the fact of an industrial plant as a focus on which materials and parts converge, and from which they are distributed for further processing or consumption. The shipments could add much variety to the traffic in the city. Unfortunately many trucks give no hint of the goods they are carrying; there is a need to protect goods from theft and weather, and an advantage in having a container that will do for many purposes. But these trucks add blankness to an industrial scene that already suffers from sterility. Some industrial vehicles do reveal their contents, when the goods are impervious to weather; others reveal them in the shape of the vehicle, such as oil tankers and concrete mixers. Perhaps trucks could have an open grille at the back instead of solid doors; this would allow a view from the rear. Another source of information that adds to the idea of industrial linkages is the origin and destination of the vehicle. Often we read this information on trucks that run a regular route, while some companies give their plant address, the origin part of the journey. The display of a sign giving the contents of the vehicle, as well as where they come from and where they are going

to, could take the place of a view into the truck and act as an advertisement for the company. This could be a removable sign changed for different deliveries.

I have already discussed the main tie that binds together the individual properties of an industrial area: the transportation network. But there are other shared facilities which may deserve visual emphasis. Mass transit stations, bus terminals, shared parking garages and car parks, trucking terminals, docks--nodal points in the transportation system--serve the entire district; others are a common power or water supply (a water tower would indicate this), stores, business services, and cafeterias. The entrance to the area from a highway is an element which relates to the area as a whole; its visual emphasis is essential for identifying the area from the highway and for aiding orientation.

The distribution of industrial areas over the city follows a pattern today that is set by the accessibility of intown areas to labor dependent on public transportation, and the accessibility of suburban areas to labor using private transportation. This is a gross simplication; there are many other factors which enter into the location of industry, such as the inertia of plants to move from locations which were originally determined by this accessibility to labor, the need for special facilities such as water transportation or large sites, or the necessity to locate away from residential areas. Other patterns are

possible, especially now that the use of road transportation for both labor and goods is becoming feasible. For instance plants manufacturing similar products might group themselves together. This pattern appears in the linear plan for Stalingrad, (illustrated in Communitas),[13] which designates areas for the wood industry, metallurgy and machine building. A similar grouping is likely to appear in the new Ciudad Guayana, Venezuela, where existing conditions and accessibility to raw materials determine one grouping of the steel plant and machine shops, another of the aluminum plant and its allied industries, a third of the forest products and chemical industries. These groupings emphasize the linkages between plants within the group: the fact that the primary plant processes the raw material into a usable material which the other plants fabricate. Groupings of similar products also reduce the large diversity of industries into a few recognizable types, making it easier to see the industrial base on which the economy of the city rests.

A major objective of this study is to find ways of bringing persons not engaged in industry into contact with it. A primary way of establishing contact is to insure that persons see the industrial areas of the city. The layout of the city itself determines whether this will occur, a main consideration being the position of the industrial areas in relation to the commuting routes. Main roads and mass transit routes can be laid out to pass through or nearby industrial areas. These routes could pass through large factory sites,

perhaps even entering into buildings along the way. Vantage points, easily accessible, could overlook industrial areas. Most of the newer industrial areas nowadays are arranged for automobile access only, and are therefore closed to children. In local shopping districts accessible to pedestrians, plants requiring small sites can locate, contributing interest for passers-by and diversity to the scene.

The suggestions up to now have aimed at revealing existing information in industrial areas in a vivid and interesting way. We can also consider this information as material for more formalized education on industry in the city. With this objective in mind the range of possibilities extends: plant tours could become more common than they are today; the interiors of plants more accessible to interested passers-by, especially children; the greater use of signs to explain the processes; maps displayed to show sources of materials and power, and destination of products; the display of production figures and costs; information about labor-management conflicts.

In all the above suggestions I have adopted the view of the activity or material itself as the most vivid way of conveying the information--vivid in its realness and alive with the fluctuations of movement. Where the activity itself cannot be revealed (perhaps for technical or security reasons), or when the activity is intermittent, a building form can stand for it: a conveyor indicates movement along

a belt, an employees' entrance indicates that movement takes place through it at changes of shift. A further remove from the tangibility of the real object is the use of pictorial and verbal signs to illustrate and denote materials, processes and products, and to present the company's trademark, which allows us to make the connection between familiar products and the plant we are viewing.

This list of possibilities is a diverse one, the ideas varying greatly in detail and in relevance to the urban designer's sphere of work. They all deal with the way that the urban scene reveals itself. But there are several claims of interest involved here, and they inhibit the range of possibilities.

The main concern of corporation managements is producing the product efficiently, and though they place importance on the aura that the plant creates, it is of subsidiary order. They will not favor a building or site treatment that interferes with the plant's operation or ability to adapt to new techniques. It may be difficult to press suggestions such as the exposure of the process, a visible location of trucking bays and employee entrances, and extreme ideas such as public paths through the site. On the other hand, a prominent location for the building, the use of signs, and the display of product and employee facilities, are perfectly acceptable.

Workers are probably concerned that they do their work in a dignified way, and would resent feeling that they

were on exhibition by having to wear special dress or being the subject of lectures or broadcasts. Skilled workers would not object to being watched at work. As for the design of the area, I think in general that employees would enjoy seeing what was happening in the factories about them, and would favor the idea of facilities within the area that they could use at lunch-hour.

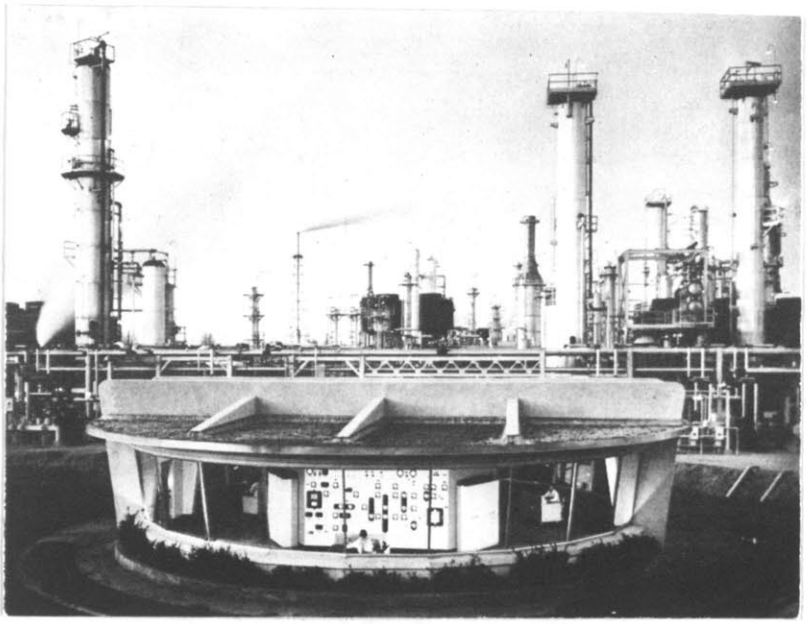
City travellers would find interest and enlivenment in the exposure of activities and increased visual information about industry. They would also appreciate (even if they did not realise what made it so) an increased clarity of orientation and a tautened visual structure; these are important enough to warrant the use of public controls and the careful design of public works. Tourists are in the mood for novel sights and new facts (if the facts are presented in a non-academic way), and would enjoy many of the ideas suggested here. Nearby residents do not want disturbances and nuisance, and do not want their properties to drop in value; they will cast a jaundiced eye on changes that they believe to do these things.

Of the many possibilities, there are some that cannot be achieved now, because the existing customs are deeply entrenched: the dress of the worker is an example. The urban designer can effect little change here (even if he wanted to), but he must observe the result of such customs on the total visual scene. Other possibilities are strictly

within his province, and he is able to manipulate the layout of an area to achieve his design. The following policy is an illustration of one possible direction.

Some of the ideas I have mentioned are carried out in a fragmentary way today; the following photographs illustrate a few examples.

A transparent wall enables us to see the process of production, though reflections on the glass often interfere with the view. This particular interior is more visible in reality than in the photograph.



In this oil refinery the equipment is open to view, and the fact of a few workers controlling the entire plant is expressed in the small control building, into which we can see.

A loading platform with products visible emphasises the fact of distribution. A common symbol on the sky sign, packaging, and trucks would enhance the connection of product and plant.

The employees' entrance seen at the change of shift tells us about the workers employed there. Waiting space, visible from the street, would be a useful addition to this entrance.

The employees' cafeteria is the only sign of life in this plant on Route 128, and even it is subdued.

This walkway connects parts of the premises together; if it were transparent we could see what was moving.

The products of an iron foundry lying on the site tell what is produced there.

The open air storage of products can be decorative.

The upper sign is a rooted sign, because this building is the place where the product is manufactured. The lower signs are non-rooted, having no connection with this location.

This is a common type of freight carrier, giving no clue as to its contents or destination.

We know the contents of this vehicle from its shape.

This open truck reveals its contents.

This vehicle shows the difficulties of transporting the product.

If we know something about the different railroad companies, the signs on freight cars tell us their routes.

This vehicle gives us the purpose of the company and enables us to connect the vehicle on its journeys with its home base.

PART IV: A POLICY FOR THE VISUAL FORM OF INDUSTRIAL AREAS

I have limited the following policy to the visual form of industrial areas, while recognizing that the visual form is not a matter to be treated separately from functional, economic and social considerations, and that an industrial area does not exist independently of the rest of a city. But as urban planners have paid scant attention to this topic up to now, I feel that an emphasis of this subject is warranted. The policy is not for an area in a particular place; the recommendations are general and will have to adjust to local conditions.

The policy takes the form of a set of objectives for the visual form, proposed methods for achieving the objectives, and the actions (direct public measures, regulation of private action, encouragement of private action) that need to be taken.

The policy is written for the typical city planning situation, in which the city planning board and its technical staff plans or makes recommendations about the construction of elements built with public funds, such as roads, bridges, utility lines, public signs, landscaping in public rights of way; has influence in the location of railroads, power easements, shipping channels and traffic flow; the city planning board, through the local legislative arm, regulates the actions of property owners with

the city's subdivision regulations, zoning regulations, and building code; it can influence private actions through negotiation with owners, collaboration with organizations such as the local chamber of commerce, and education of the public.

Objectives:

1 To design the industrial area in such a way as to allow observers to form a clear image or mental picture of the area, and to use the industrial areas to help in clarifying the general image of the city.

The clarity of the image expresses itself in the ability of observers to differentiate between parts of the area --- to be able to identify different directions, streets, districts, etc. --- and at the same time compose these parts to form a total structure. A close fit between the activity pattern --- the flows of traffic, the concentrations of localized activity -- and the physical form of the area contributes to this clarity. The area should be rich in detail so that observers can continually add to their image of it; they may grasp its outlines at a first visit and yet find enough interest and variety so that their image continues to grow. An additional property of the area is the choice it offers to observers for their personal way of forming an image. For instance, some persons think of an area as a map, while others think of the succession of objects that they pass on a trip through the area. The design of the area should facilitate both of these views, and others.

2 To create industrial surroundings that will allow observers to see and understand facets of industry which can have meaning for them.

The particular meanings which I choose to emphasize in industrial areas are the following: a sense of the power of industry; the creativity of industry in transforming raw materials and parts into goods, and the sense of abundance in this production; an understanding of the techniques of production; a sense of the different groups of people working in factories, the relations between them, and the relations between humans and machines; the interdependence of modern society expressed through the linkages that factories have with sources of materials, consumers, and labor markets; the change that has taken place in industry in working conditions and techniques of production.

The spirit that underlies this list of aspects of industry is the desire to put ourselves into a sharpened perception of the realities of life about us. We live in an industrialized age, yet we are ready to ignore this fact. I put forward the point of view that the fact of industry is real, and that it is necessary for us to accept it so that we can be in touch with the age and place we live in. In a way this proposal is an attempt to overcome the gap that exists between the middle classes and the means of production. Marx attributed social disorganization to the alienation of the worker from the means of production, his lack of a sense of continuity and purpose in the work that

he did. In our society the middle classes, are even more alienated than the worker, having nothing at all to do with the production of goods; they merely consume them. Various utopian schemes have attempted to integrate production into the lives of all the population: the Goodmans' second and third Community Paradigms in Communitas[14] do this. My intention is less radical: simply to make that part of the population not connected with industry aware of it and interested in it. As a secondary effect I aim at broadening the view of industrial workers too, and making them more conscious of what takes place in their own plants and the neighboring ones.

Although this policy sets out to emphasize the above meanings of industry, it does not restrict persons to seeing only these aspects, nor prevent them from imputing any connotations to industrial areas that they wish, or even ignoring the entire topic altogether.

This objective also aims at an educational use of the area. The arrangement of the industrial area and sites will serve as material to teach the public, adults and children, about industry in the city.

3 To provide a powerful visual interplay of forms.

One of the particular excitements of an industrial area is the strength and boldness of the structures. Many industrial processes, especially those with stringent technical requirements, demand a specific form; a sensitive engineer or

architect recognizes the beauty of these functional shapes and does not try to mask them. Apart from the many connotations that an industrial area has, it can be a place refreshing in its straightforward presentation of form, free of the stylistic cliches of fashionable architecture.

Priorities:

I give the objective of clarity of image first priority because it affords us control over our environment. A clear image is the fundamental step in attaining surroundings that we can make meaningful to ourselves: it gives us the ability to think about our surroundings, presenting as it does a mental picture of a coherent form to which we can refer and relate our thoughts about the area; it also gives us the ability to move within our surroundings with security, aiding orientation and wayfinding.

With a clear image of our environment we can comprehend our surroundings in terms that go beyond a sense of its formal structure; we can see meanings and values in the arrangement of the form and the activity within it. The connection of the meanings we want to express to the physical form we are creating depends on the clarity of the image, and so the objective of clarity takes priority over the objective of meaningfulness.

Method of achieving objectives:

1 The creation of a clear image in the industrial area.

As the image of the industrial area grows out of the

arrangement of its parts, this policy aims at creating a clear image in the following way:

a) The design of a clear layout of the path system. As the roadway is the only part of the area that the outside public enters, it is a particularly important element of the image. A clear layout derives from the differentiation of major and minor streets, a geometrical street pattern, the continuity of width and views of approaching landmarks, the matching of traffic flow to the street system, and other means.

b) The emphasis of the entrances from streets to plants. These mark the connection between public and private property, and measure off distance along a street.

c) The definition of the territory that a plant occupies. Each plant is a small district, unified by its function and appearance, and distinct from its neighbors.

d) Well-marked edges to districts. These may arise from the change in scale or type of development, the change from built-up area to open ground or water, physical boundaries such as railroad lines, power easements or highways. Edges work together with the differentiation of districts in building a memorable pattern.

e) The differentiation of landmarks. Landmarks are important elements for showing the identity of the area to other parts of the city, defining the extent of the industrial area, emphasizing movement through the area and the direction of paths by their relative shift, and identifying direction and districts.

f) The creation of nodes. Many industrial areas lack points of activity, and this lack of a focus contributes to the sense of amorphousness that we often feel. Nodal points can offer many useful services: the collecting points of mass transit and trucking systems, stores, luncheon places, business services, recreation facilities.

g) The structure of the image. The various visual elements, given identity and differentiation by the above means, have to form a coherent visual structure. A common way is to subordinate all elements to one main element, such as an open space, large structure or major highway. A development of this is an arrangement of several foci, all keyed to a main focus. Or we can think of several foci, each one leading to the next in a linear arrangement. There are many ways of creating a visual structure; the designer makes his choice depending on the existing visual structure (topography and buildings), functional requirements, the new visual elements that he is going to introduce, and the design he wishes to create.

2 <u>The contribution of the industrial area to the image of the city</u>.

At the scale of the larger city, the policy aims at using the industrial areas to contribute clarity to the general city image in the following ways:

a) Strongly marked edges. The change of scale at the edge of industrial districts provides edges which help form the structure of the image.

b) Differentiation of paths. Paths passing through the industrial areas have a different character from other paths. The sequence of views along these paths can be especially dramatic because of the many landmarks along the way, and the open spaces that occur in these areas can serve to prepare travellers for transitions from one district to another.
c) Differentiation of districts. The scale and use of industrial areas differ greatly from the residential sections of the city and add contrast and variety to the city pattern.
d) Landmarks as orientation. Where the general city image requires it, particular structures in the industrial areas can locate to assist in orientation and clarification of the image.
e) Minor nodes. The placing of commercial facilities acts as minor nodes in the total structure.

The image at the scale of the industrial area or the entire city results from the working together of the above elements. The decision of which elements to emphasize or suppress, where to differentiate or merge, and how to compose all the elements is a decision that the designer makes. The pattern that the elements form must be sustained by the activity pattern --- the flows of traffic, the clusters and groupings of localized activity. The physical pattern is sharpened when the activity bears out the indications of the physical pattern, blurred when the activity does not fit into it. The designer has to design for the way the city is likely to be used.

The elements thus far have been treated as pure form

and activity, and the image has been considered for its clarity in terms of the physical units that constitute it. In reality the things we see are weighted by their associations for us, and the visual elements must work together with the meanings they have.

3 The design of the area to express meaning.

I intend to emphasize the particular meanings that I have selected by making the area more accessible, by presenting the material in a vivid and developing way, and by stressing the meanings in an educational program.

a) Accessibility. An important step in exposing the meanings of the area is the removal of the anticipated confusion by a strong image (as above), the design of fixed and moving view-points from which to see the area, and if possible, access into the sites themselves.

b) Vividness and development. An observer perceives an activity at its most vivid if he has direct contact with it himself by seeing or hearing it, or through his other senses. This is first-hand knowledge, whereas representation of the activity by sign or symbol (unless the representation is a work of art) is some-one else's interpretation of the fact, and it has lost its immediacy. In order to preserve the freshness and vividness of the surroundings I favor the exposure of the activity itself in preference to a representation. This exposure of the activity is not always possible; the activity may be intermittent or invisible. In this case a sign may represent potential activity.

The physical appearance of an area should be a true reflection of the activity that occurs there. Efforts to disguise an activity behind a facade are false and misleading, and disconnect the observer from the real world. An extension of this preference for form arising out of the activity at that place is a preference for rooted signs to non-rooted signs. Rooted signs refer to activity which takes place where the signs are located, non-rooted signs have no connection with their point of location. The use of rooted forms and signs sharpens the surroundings by presenting the observer with the facts of what happens there, and he can form his own judgement of what is taking place.

Some meanings are more important than others, and the visual scene should emphasize the important ones above the more remote ones. The area should appear to unfold in interest through subsequent visits. The first level of priority is meaning that allows direct action: a sense of where one is going in the area, and how to enter and leave it. After that there is the class of meaning to do with the area as a whole: this focuses on common facilities. Thirdly, we reach the meanings of the individual plants and processes.

c) Educational program. This aims at using the material of the area itself to teach things about industry. Methods of doing this include formal tours of the area, permanent and temporary exhibitions the compilation of school curricula which draw on the area for examples, and signs in the plants giving factual information.

4 The creation of a powerful visual landscape.

A bold landscape will result from the use of simple forms in the buildings themselves, and a treatment of highways, embankments, landscaping, and illumination that is in scale with the buildings. A clutter of small structures should not interfere with the view from public areas.

Actions:

1 Measures that the public agency will implement directly:

transportation facilities — In laying out the transportation system, the public agency:

designs a clear and legible street pattern;

differentiates between highways, major and minor roads according to the expected traffic flows by the design of width, median strips, type of paving and curb, illumination at night, landscaping;

takes note of present landmarks and view, and integrates proposed and likely landmarks into the existing ones to form coherent sequences;

fits the street system to take advantage of existing and likely views of plants and prominent structures, and arranges that they can be seen (transparent fences, railings on bridges);

fits the industrial areas into large sequences by designing the transition points between industrial and other areas to maintain continuity yet express the change, and by arranging the roads to have views of goals outside the area where necessary;

fits the street system to the topography;

takes note of the street and highway intersections for their contribution to the visual structure, and designs them with the desired amount of emphasis;

marks the entrances into the area, especially those off fast highways, identifying the area and giving notice ahead of time;

uses transportation facilities (railroad stations, rapid transit stations, bus terminals, parking garages) in planning nodal points in the area;

designs transit vehicles and routes to facilitate views and form coherent sequences;

plans the layout so that railroad and water freight movement is visible;

uses highways, railroad and rapid transit tracks, water channels and docks for their contribution as edges in the visual structure;

allows stopping places along roads at strategic points as vantage places for views;

designs sidewalks where pedestrians are expected, places benches and plants shade trees here.

public industrial structures — In locating industrial structures of a public or semi-public type over which the agency has more control than the plants of private companies (power plants, power transfer points and substations, gas plants and meters, telephone exchanges, water purification plants, arsenals, public works engineering shops), the agency:
sites them in prominent positions;

uses them as landmarks;

defines the property limits of the plant;

clearly marks the entrance from the public roadway;

exposes the process of production;

allows raw materials and fuel to be seen;

makes employee entrances and facilities visible;

designs structures expressive of the function.

exhibition space — The agency sets up exhibition space in the area in conjunction with the companies; this space may be at the nodal points in the area; tours of the area could start and finish here;

arranges permanent and temporary exhibitions of goods produced in the area; how they are made, how processes have changed, what working conditions are statutory, and how these have changed;

illustrates by maps the linkages between plants and their sources of materials and parts, and their consumer and labor markets;

arranges for model machines which the public can work, as well as demonstrations of work in progress.

signs — The agency sets aside strips of land alongside highways for the display of billboards and models advertising products made in the area;

displays signs on highways and bridges, railroads and bridges, pipelines, waterways indicating where they run from and their destinations;

displays at salient points directories of the companies in the area;

displays signs outside public industrial plants explaining diagramatically the processes that are taking place.

recreation — The agency designs space for lunch-hour recreation.

2 The regulation of private action by controls:

A fence of the same design must be constructed around the property; where two properties abut there must be two fences or a single fence containing elements of both designs.

The tallest structure on the site must bear the company's name or trademark; this may be illuminated at night.

Subsequent prominent building landmarks must differ from existing ones. Although the amount that they differ cannot be defined, it has to be easy to tell them apart.

There has to be a company sign-board at the entrance to the plant from the street.

> Every company must display its products in a place visible from the public areas, or if this is not possible, must display a representation of the product or its purpose.
>
> Open air storage areas of materials, parts, or products may not be screened, but must be kept in tidy condition.
>
> Factories that operate at night must be illuminated from within, so that it is possible to see inside the building; factories that do not operate at night may not be lit from inside or outside. Tall structures without an illuminated sign at the top must carry a red light.
>
> If there is a current labor-management dispute in a plant, there has to be a sign displayed which gives information about the dispute.

3 Encouragement of private action by negotiation and persuasion:

The public agency will negotiate with the industrial firms and the local chamber of commerce to further its objectives through persuasion and encouragement. The main instrument of negotiation will be a liason office which will make known the objectives of the public agency through publications, exhibitions and references to the work of the agency itself, and which will give advice to owners and management. The agency will establish a review board which will inspect the proposals of new owners and make suggestions for improved designs. The power of the review board to enforce its suggestions will be limited, restricted more to delaying tactics than rigid enforcement. But as many plant owners are conscious of the advertising value of the site and plant, there is a good change for successful control by sympathetic negotiation.

The public agency will attempt to attain the following through encouragement and persuasion:

a unified architectural treatment of the buildings on the site, and their connection to each other by walks and links;

an architectural expression keyed to the processes and type of the industrial plant;

the differentiation of landmarks in new buildings located among existing ones;

emphasis of entrance in the design of fence and driveway;

the design and operation of the plant to be handled in such a way that the process of production is exposed to view;

the placing of employee entrances and facilities to that they are visible from public areas;

the location of truck bays and railroad sidings so that they are visible from public areas;

siting of buildings to take advantage of views from public areas;

the discouragement of a clutter of small structures which interfere with the view of the main structure from public areas;

the design of trucks which expose their contents to view, or carry representations of the contents; also the display of the starting points and destination of trips on the exteriors of trucks;

the availability of plants for tours and informal visits.

Comment:

In fairness to plant owners who are not interested in the publicity value of their properties the division of the industrial area into public and private zones may be a workable solution. The public zone would include those plants eager to exploit the advertising potentialities of their premises. They would locate on the prominent sites, participate in the tours through the area, and agree to be receptive to ideas of the planning agency. The private zone would consist of plants which did not wish to be seen or visited by the public. These plants would be freer to arrange their properties than if they were in the public zone, but as they are less visible, the result is less important.

The policy is intended for the development of new industrial areas, but some of the ideas can be applied to existing ones. Here the basic arrangement of sites and streets cannot easily be changes, but applied elements of form can alter the appearance. The use of signs, color, screens, fences, landscaping and lighting is relatively inexpensive and can do much to introduce clarity and interest to the scene.

References.

1 Bertram D. Wolfe, Portrait of America by Diego Rivera (New York: Covici, Friede, Inc., 1934).

2 Andreas Feininger, Changing America (New York: Crown Publishers, 1955).

3 J.M. Richards, The Functional Tradition in Early Industrial Buildings (London: Architectural Press, 1958).

4 Upton Sinclair, The Jungle (New York: New American Publishers, 1963).

5 Rye, New York, Revised Building Zone Ordinance of the City of Rye (1961), Article 6, Table of Regulations, Business Districts, Col. 1, B-6.

6 ibid., Col. 2, B-6.

7 Eli Ginzberg and Hyman Berman, The American Worker in the Twentieth Century (New York: The Free Press of Glencoe, 1963).

8 ibid., p. 111.

9 ibid., p. 93.

10 ibid., p. 173.

11 ibid., p. 284.

12 Walter McQuade, "An Industrial Designer with a Conspicuous Conscience," Fortune, Vol. 68, No. 2, (August, 1963).

13 Paul and Percival Goodman, Communitas (New York: Vintage Books, 1960), p. 72.

14 ibid., pp. 153, 188.

Sources of illustrations.

All photographs taken by the author, except for the following:

p. 10, upper plate: Charles Sheeler (New York: Museum of Modern Art, 1939), Plate 37.

p. 10, lower plate: Finlands Arkitektforbund, Industrial Architecture in Finland (Helsinki: Finlands Arkitektforbund, 1952), p. 76.

p. 71, center plate: "Automation and architecture," Architectural Forum, Vol. 107, No. 1, (July, 1957).

Bibliography.

Sylvia Crowe, The Landscape of Power (London: The Architectural Press, 1958).

Frederick Gibberd, Town Design (London: The Architectural Press, 1955), Part Three.

Kevin Lynch, Site Planning (Cambridge, Mass.: M.I.T. Press, 1962), pp. 163-67.

Theodore K. Pasma, Organized Industrial Districts (Washington: U.S. Dept. of Commerce, Office of Technical Services, Area Development Division, 1954).

Christopher Tunnard and Boris Pushkarev, Man-made America: Chaos or Control? (New Haven: Yale University Press, 1963).

S.B. Zisman, "Notes on Industrial Site Planning," Journal of the American Institute of Planners, Vol. 25, No. 3, (August, 1959).

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