



POST-WAR INDUSTRIAL EXPANSION
NEAR THE CENTER OF BOSTON

By

E. JACK SCHOOP

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Department of City and Regional Planning
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Certified by

Thesis Supervisor

Accepted by

Head, Department of City and Regional Planning

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E. Jack Schoop

ABSTRACT

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SUBMITTED TO THE DEPARTMENT OF CITY AND REGIONAL PLANNING ON FEBRUARY 19, 1960 IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF CITY PLANNING.

Recent studies have documented the trend towards suburban industrial expansion and even suggested that industrial (and all other) areas close to the heart of central cities are doomed to extinction with no feasible reuse evident.

This study of 26 industrial firms which have expanded the capacity of old buildings or built new ones within three miles of Boston's Central Business District finds that portions of existing close-in industrial areas are thriving, thus giving great promise for continued revitalization of such areas.

Close-in locations are found to have substantial industrial advantages and offer good facilities for all but the largest production firms requiring large amounts of ground space. Plant managers are generally quite satisfied with their decisions to move into or retain a plant close to the heart of the metropolitan area.

Significantly, the plants which were studied showed they could meet modern industrial floor space requirements as well as new suburban plants by modernizing the interior, constructing additions or using other buildings elsewhere in the area for separable operations.

The great economies possible in using old industrial buildings, the continuing effective demand for close-in industrial space and the probable solution of central city access problems via an urban expressway system suggest that existing close-in industrial areas will continue to be intensively used for many decades and at least until existing buildings become structurally unsound.

New industrial construction in close-in areas, however, has been restricted to generally vacant and relatively inexpensive sites. Replacement of other deteriorated close-in areas by new industrial developments is entirely a function of land cost. Public land assembly and disposition policies are the key to industrial expansion near the heart of central cities; economical and efficient land assembly procedures and intensive use of the land by very large multi-story industrial buildings appear to be main avenues to reuse of deteriorated areas by industry in the absence of heavy public subsidies.

Thesis Supervisor

JOHN T. HOWARD
Head, Department of City and Regional Planning

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INTRODUCTION

It is generally believed that big industry is moving to the suburbs. The recent Route 128 Study¹ documented this trend in Greater Boston. Raymond Vernon in New York also has demonstrated the freedom of larger firms to move out; he ended his report² by virtually sounding the death knell for the inner ring of central cities, for which he saw no possible reuse.

It is inconceivable that no solution exists for so large a problem. If the large gray areas surrounding the Central Business District are indeed doomed, we must be seeking ways to resurrect them. One way - certainly not the only one - is the reestablishment of larger industry in such areas. The author has observed that, contrary to the published trends, some larger firms do remain intown. This is a significant fact which is too readily overlooked amid the attention being given the suburbs today.

Consequently, this study is directed at firms which have remained near the heart of Greater Boston area to determine why industry is remaining and can continue to remain intown. It will not dispute the outward trend but merely demonstrate that it is not universal.

1. The Route 128 Study

The Route 128 Study investigated 96 firms which settled along a circumferential limited access highway winding through suburban Boston at a radius of approximately 10 miles from the CBD. It was concerned with the economic impact of the highway. By inference, not necessarily intentional, it

¹ Massachusetts Institute of Technology, Route 128 Study, Cambridge, 1958.

² Raymond Vernon, The Changing Economic Function of the Central City, New York, 1959, pp. 61-62.

suggested that a suburban location along that highway offered many industrial advantages not available intown. Because it was not concerned with industry which had not located on Route 128, intown industrial advantages were overlooked.

Highlights of the report included the facts that: (1) Most of the relocated firms came from intown Boston - 68 per cent from within a radius of 2-1/4 miles and 96 per cent from within 4-1/2 miles of the CBD; (2) The average employment increase of relocated firms was 25 per cent; (3) 1957 plant construction on Route 128 represented 38 per cent of all business construction in Greater Boston; (4) Before choosing their Route 128 site, most firms considered only alternate Route 128 sites or other suburban areas. These findings, standing unchallenged by related metropolitan industrial development figures, suggest to the unwary the existence of quite a strong trend.

2. Vernon on the Future of the Central City

Vernon totals up a bleak outlook for the heart of large metropolitan areas. He sees a growing obsolescence in the rest of the central city beyond the CBD with "nothing in view to interrupt the cycle so far evident in the old cities." The cycle: old slums being abandoned in favor of newer ones farther out; retail stores following the population, manufacturing and wholesaling responding to obsolescence by looking for new quarters and by renting structures in suburban industrial areas where obsolescence is less advanced.

Concerning the use of the inner area of the metropolitan area, Vernon concludes that "modern factory space is ruled out by the high costs of recapturing the site; new multi-story lofts face a poor market, since they will be competing with obsolescent factories vacated by their prior owners." He could

see only two other possibilities for reuse, the return of middle-income population or subsidized government interference; the first he rules out in the face of current trends, the second is similarly dispatched because it would require a scale of public expenditure which is presently inconceivable.

3. Scope of this Study

This study is limited to larger manufacturing and distributive firms which have invested in new or refurbished plants in the inner ring of metropolitan Boston. It excludes (1) smaller industries which have requirements different from those of larger ones and upon which considerable research has already been accomplished³, and (2) research and development firms which also have different requirements.

The study is further limited to the locational advantages seen by the management of the subject firms in choosing or keeping an "intown" location. Supporting information on floor space, ground space and employment is also included to provide additional comparison between these "intown" firms and their suburban brethren documented in the Route 128 Study.

The study is not concerned with industrial location theory or with the special requirements of each industry.

4. General Method of Attack

Information on the selected firms and their location decisions was obtained by interview of the top management of each. Sufficient firms were included to

³ Cf. Culp, John L., A Study of the Graphic Arts in Boston, unpublished thesis, MIT, 1959; Saalberg, James H., A Study of Business Dislocation Caused by the Boston Central Artery, unpublished thesis, MIT, 1959; and Tappe, Albert A., The Ladies' Garment Industry in Boston, A Study of Characteristics Affecting Choice of Location, unpublished thesis, MIT, 1958; Greater Boston Economic Study Committee, A Report on Downtown Boston, 1959.

permit use of confidential data without disclosing the identity of specific firms.

The body of the study documents the locational advantages reported by the "intown" firms. Where significant, comparison is made with similar data on a portion of the industries cited in the Route 128 Study, using original data collected during the course of that study. The Route 128 industries included herein are only those of comparable industrial classification with the "intown" sample; this group consists of 52 firms, with 11,268 employees and a total investment of \$36,047,000, out of a grand total of 96 firms with 17,076 employees and a gross investment of \$50,251,000 in buildings. Similar methodology was used for both studies to permit valid comparisons. More explicit details on methodology are presented in Appendix A.

CHAPTER ONE

CHARACTERISTICS OF THE SELECTED FIRMS

1. Location Criteria - "Intown" and "Route 128" Defined

The "intown" group of firms is located within three miles of the heart of Boston's Central Business District. "Intown," by this definition, includes the oldest part of the metropolitan area as opposed to both the suburban fringes and the relatively less densely developed "middle" area where traffic circulation is less critical and undeveloped land is more available.

This area was selected because it is the problem "gray" area, the part of the city undergoing most rapid deterioration; and the part of the city posing the most perplexing problems of redevelopment because of its size and because of the "trend to the suburbs."

For the purposes of this study, the "intown" area includes only Boston and Cambridge. There was little significant industrial expansion in Somerville, Everett and Chelsea, making the effort needed to identify subject firms unworth-while.

The "intown" area is subdivided into four areas: Areas 2A and 3A, located two and three miles, respectively from Boston's CBD but separated from it by the Charles River (see Figure 1); and Areas 2 and 3, also located two and three miles, respectively, from the CBD but with no intervening physical barrier. The strategically-bridged Charles perhaps now imposes no more barrier than the dense urban areas between the CBD and Areas 2 and 3 but it no doubt influenced land-use patterns and remains a significant dividing line.

The "Route 128" group of firms is located along that route.

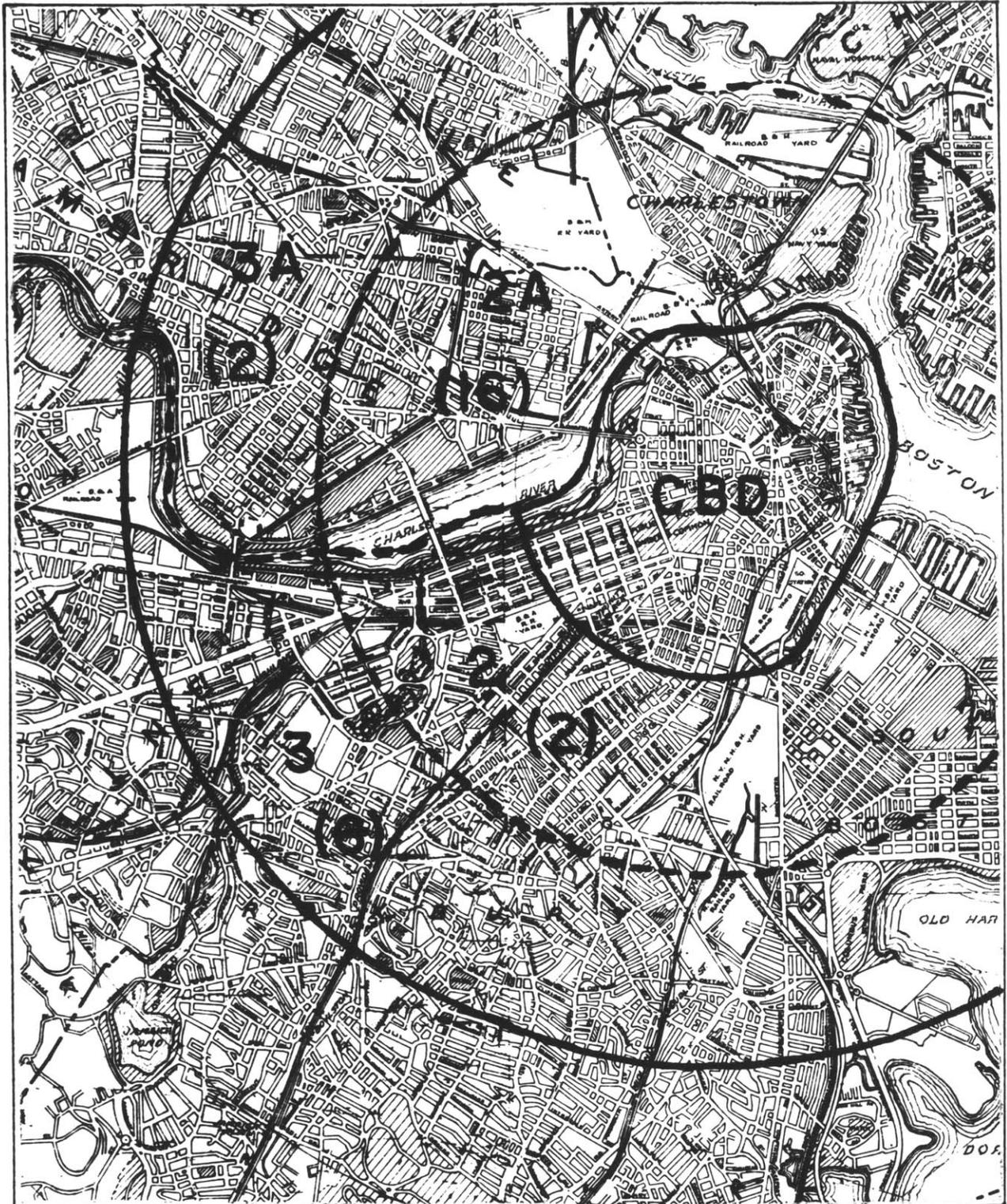
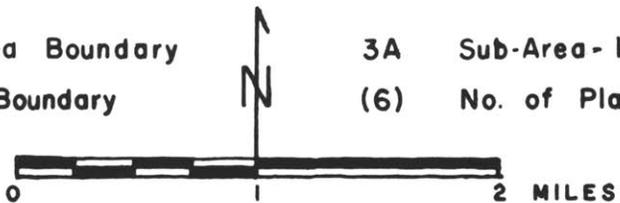


Figure 1

THE 'INTOWN' AREA OF BOSTON AND CAMBRIDGE

- 'Intown' Area Boundary
- Sub-Area Boundary

- 3A Sub-Area-Key
- (6) No. of Plants Studied



2. Basis of the Study - New Investment in Plant

Subject "intown" firms were selected on the basis of new or additional investment in physical plant, totaling at least \$100,000 since World War II. Such expenditure is considered evidence that in most cases the investors weighed choices as to where to place their investment and chose an "intown" location. Use of employment data, investment in equipment, and value of product was discarded as usually requiring less firm commitment to a location.

The study was limited to the number of firms which could be fairly readily identified. The total size of the universe and total new or additional investment in "intown" plant is not known. Information on such investment is incomplete - to obtain it would require an exhaustive search and verification of building permit records. The limited number of sample firms is considered adequate, however, to achieve the purposes of the study, especially since (as Chapter Five will demonstrate) this limited "intown" group compares very favorably with the entire Route 128 group in terms of total floor space and employment.

New investment in existing plant is not related to the previous value of the existing plant because of the difficulty of obtaining such information. Many owners are unwilling to disclose such information; even if they were, it would be exceedingly difficult to place comparable valuation on plants of varying ages and stages of obsolescence. In this respect, the "intown" sample is not comparable to the "Route 128" group which includes mostly new plants with readily ascertainable values, indeed, it is not a purpose of this study to make such comparisons.

3. Represented Trade Groups

The selected firms are grouped in four categories:

- Trade Group 1 - Food Manufacturing and Processing
- Trade Group 2 - Iron and Steel Product Manufacturing
- Trade Group 3 - Miscellaneous Manufacturing
- Trade Group 4 - Wholesale Distribution, with Stocks

These groupings are made in partial recognition of the fact that different industries have different locational criteria. Size of the sample and the nature of the study preclude more detailed groupings. (See Appendix A for information on the types of firm included and the reasons for the particular groupings.)

4. "To Move or Not to Move"

Of the 26 firms included in the "intown" sample, all but five actually considered moving to another location before making their investment.

Ten of the firms invested in a completely new "intown" plant. Of these, four moved from locations in the CBD; four relocated from another "intown" site; one was a newly-formed establishment; and one moved in from a location three miles farther out in the "middle" ring.

5. Timing of the "Call to the Suburbs"

The post-war period was originally selected as the basic period when the impact of urban decentralization was generally felt. In the course of the interviews, however, it became evident that the lure of the suburbs was not very strong among the subject firms until the possibilities of such a move were dramatized by the completion of the now-industrialized portions of Route 128 in 1951. Some firms did consider a suburban location before that year but it was not yet "the fashion" in Boston.

TABLE 1

APPROXIMATE TIMING OF POST-WAR INDUSTRIAL
EXPANSION OF "INTOWN" LOCATIONS

| | <u>No. of Firms</u> | <u>Investment Represented</u> |
|--------------------------|-------------------------|-----------------------------------|
| Invested before 1951 | 9 | \$2,814,000 |
| Invested 1951-59 | 12 | 8,050,000 |
| Invested in both periods | 5 | 5,700,000 |
| | <hr/> 26 | <hr/> \$16,564,000 |

6. Distribution of the "Intown" Firms

The largest number of firms was found in the industrialized portions of Cambridge and Charlestown, between one and two miles from the CBD. The second largest group was found in Boston between two and three miles from the CBD. The reasons for this distribution of firms are not pertinent to this study; however, it should be noted that the Cambridge group may be over-represented because of both the author's greater familiarity with that area and the greater adequacy of available building records in that city.

TABLE 2

THE DISTRIBUTION OF "INTOWN" FIRMS

| <u>Zone</u> | Trade Groups | | | | <u>Totals</u> |
|---------------|---------------------|----------------------|----------------------|----------------------|---------------|
| | <u>1 (Food)</u> | <u>2 (Steel)</u> | <u>3 (Misc.)</u> | <u>4 (Dist.)</u> | |
| 2 A | 6 | 1 | 4 | 5 | 16 |
| 3 A | | | | 2 | 2 |
| 2 | | 1 | | 1 | 2 |
| 3 | | 2 | 4 | | 6 |
| <u>Totals</u> | <hr/> 6 | <hr/> 4 | <hr/> 8 | <hr/> 8 | <hr/> 26 |

CHAPTER TWO

THE LOCATIONAL ADVANTAGES OF 'INTOWN' INDUSTRIAL SITES

The managers of "intown" industrial plants listed many factors as influencing their choice of the location in which to place additional investments. Most were synonymous with factors cited by Route 128 plant managers.

1. "Intown" Location Factors

Factors deemed important by "intown" plant managers are:

- (1) Market accessibility: the major market is either nearby or readily accessible by the desired or required methods of transportation.
- (2) Excessive replacement cost: replacement of the existing plant would either exceed the means of the firm or constitute an unnecessary expense.
- (3) Accessibility for personal contacts: the firm requires fairly ready personal contacts with customers or advisors either at the plant or "in the field."
- (4) Employee accessibility: the labor market is located in the same general area and/or the plant is readily accessible to employees by auto or transit.
- (5) Traffic congestion: congested streets interrupted shipping and receiving at the former site and/or discouraged customers from coming to the firm.
- (6) Room for expansion: a new location was used in order to construct a more efficient, horizontally-expanded plant; usually, little or no attention was given to reserving additional ground-space for future horizontal expansion.
- (7) Fire protection: public fire fighting resources are available because of the size of the city.
- (8) Nearest available land: the new site was the nearest open or relatively cheap one in the vicinity of the former plant.
- (9) Attractive plant: the firm desired an attractive building on an attractive site.
- (10) Advertising value: the building and site have considerable advertising appeal upon passing motorists.
- (11) Accessibility to supplies: the supply sources are either nearby or readily accessible by the desired or required means of transportation.
- (12) Other factors: include the desire for a plant built and located for ready disposition (1 old, 2 new plants); additional land was available at the existing site, either already owned or fairly easily purchased (3 old plants); land costs at the site were "reasonable" (2 new plants);

special utility needs were available (1 old plant); production schedules did not permit time for relocation (1 old plant); and trucking rates dictated a location in the most favorable rate zone (1 new plant).

2. Relative Importance of the "Intown" Factors

TABLE 3

FACTORS AFFECTING CHOICE OF "INTOWN" LOCATIONS,¹
BY INVESTMENT AND NUMBER OF PLANTS

| <u>Factor</u> | <u>Investment Represented</u> (Thousands) | <u>% of Total Investment</u> | <u>No. of Plants</u> | | |
|-------------------------------------|--|------------------------------|----------------------|------------|------------|
| | | | <u>Total</u> | <u>Old</u> | <u>New</u> |
| Market accessibility | \$ 8,450 | 57.5 | 15 | 7 | 8 |
| Excessive replacement cost | 7,297 | 49.7 | 9 | 9 | |
| Accessibility for personal contacts | 5,685 | 38.8 | 3 | 2 | 1 |
| Employee accessibility | 5,655 | 38.6 | 7 | 2 | 5 |
| Traffic congestion | 2,065 | 14.1 | 2 | | 2 |
| Room for expansion | 2,065 | 14.1 | 2 | | 2 |
| Fire protection | 2,000 | 13.6 | 1 | 1 | |
| Nearest available land | 1,925 | 13.1 | 2 | | 2 |
| Attractive plant | 1,500 | 10.2 | 1 | | 1 |
| Advertising value | 1,500 | 10.2 | 1 | | 1 |
| Accessibility to supplies | 1,322 | 9.0 | 4 | 2 | 2 |
| Other factors | 4,115 | 28.1 | 11 | 6 | 5 |
| Totals * | \$14,677 | 100.0 | 21 | 11 | 10 |

¹ Excludes 5 firms which did not consider relocation.

Accessibility to market emerges as the most influential "intown" location factor (see Table 3). Significantly enough, however, reference to Table B-1 in Appendix B suggests that the market is not necessarily an "intown" one or even centered on Greater Boston; the majority of the subject firms identified New England or the entire United States as their major market, although they may also distribute locally.

Accessibility to local markets was felt to be better from the center of the area rather than from the "edge;" new expressways have especially added to the

* See explanatory note, page 18.

feasibility of an "intown" distribution point. Accessibility to more distant markets was attributed to one or more of the following factors: (a) new expressways to the north and south, (b) proximity to marine terminals, and (c) proximity to rail terminals. Most firms had their own trucks with supplementary service provided by leased vehicles or commercial trucking firms. Only three firms shipped by rail from their own siding and none use rail exclusively.

The excessive cost of replacing existing facilities is the most important factor favoring continued use of the current plant site. This, more than any other factor, argues against wholesale abandonment of existing "intown" industrial areas. Expansion of existing plant was done in all but one case on a permanent basis.

Of almost equal importance is employee accessibility. Table C-1 in Appendix C indicates that the great majority of "intown" plants draw their labor force from "close-in" locations, a factor which should remain important for a long time to come.

The only other major factor in terms of investment represented - accessibility for personal contacts - is important to only a few firms; it does not appear to be a widely-applicable locational influence. The same appears true for most of the other factors cited by "intown" management. Many, however, are quite influential in a given case and one or more of these less-general factors probably affect a large number of firms.

3. Route 128 Location Factors

Many of the factors deemed important by Route 128 plant managers are included in the preceding summary of "intown" factors. Others which apparently are more peculiar to suburban plants are:

- (1) Room for Expansion: a new location was used in order to construct a more efficient plant; usually, attention was also given to reserving considerable additional ground-space for future horizontal expansion, landscaping and buffer-strip purposes.
- (2) "Reasonable" price: either the building rent or the land cost was cheaper at the chosen location than elsewhere.
- (3) "Package deal": a promoter was available to provide a plant as a "package" including land, preparation of site, erection of building to specifications and financing arrangements.
- (4) Need for clean air: air in suburban locations has less foreign matter to interfere with delicate production processes.
- (5) Other factors: include the desire to escape the higher taxes prevailing in central locations (5 firms); the desire to locate near other plants owned by the same firm (2); the desire for a plant built and located for ready disposition, with even a possible value increment over time (2); building or land was readily available (2); the firm was forced to move (1); and a special water supply was available (1).

4. Relative Importance of the Route 128 Factors

TABLE 4

FACTORS AFFECTING CHOICE OF ROUTE 128 LOCATIONS,
BY INVESTMENT AND NUMBER OF PLANTS

| <u>Factor</u> | <u>Investment Represented</u> (Thousands) | <u>% of Total Investment</u> | <u>No. of Plants</u> |
|-------------------------------------|--|------------------------------|----------------------|
| Room for expansion | \$27,582 | 76.9 | 30 |
| Employee accessibility | 14,932 | 41.5 | 13 |
| Advertising value | 9,830 | 27.3 | 12 |
| Market accessibility | 8,836 | 24.6 | 27 |
| "Reasonable" price | 8,191 | 22.8 | 13 |
| Traffic congestion | 6,508 | 18.1 | 13 |
| "Package deal" | 4,344 | 12.1 | 7 |
| Need for clean air | 3,900 | 10.8 | 2 |
| Accessibility to supplies | 3,775 | 10.5 | 9 |
| Accessibility for personal contacts | 3,640 | 10.1 | 13 |
| Attractive plant | 3,405 | 9.5 | 5 |
| Other factors | 11,012 | 30.6 | 13 |
| Totals * | \$36,047 | 100.0 | 52 |

* See explanatory note, page 18.

The need for room to expand stands out as the dominant reason why many firms chose locations in the vicinity of Route 128 for industrial expansion. For many firms this included adequate land for future as well as present expansion requirements.

Employee accessibility is also highly important. Inspection of the original interview material suggests that Route 128 firms required many fairly well trained employees who tend to live in suburban areas and fairly small numbers of relatively unskilled workers. Many, however, reported keeping almost their entire original labor force, much of which came from "close-in" locations and commuted to the plant by car.

Of lesser, but still considerable, importance as locational factors are advertising value, market accessibility, low land or building cost and escape from traffic congestion.

5. "Intown" v. Route 128 Location Factors

Availability of room for expansion stands out as the most dominant location factor in terms of total investment influenced thereby. On the surface, it appears to be a prime factor inducing choice of a suburban location. Actually, however, "intown" plants in general expanded as much and often even more than did the suburban plants (Cf. Chapter Five). The importance of expansion space as a location factor, therefore, appears grossly understated for "intown" firms.

The understatement is even more apparent when one considers the method of inquiry. The majority of "intown" firms expanded their existing space instead of moving to a new location (as did almost all the Route 128 firms). "Expansion" is so obvious a reason for investing in an existing plant that it would not be

mentioned; it only comes to mind when one must seek a new site in order to accomplish that objective.

Room for expansion is thus an important locational factor either "intown" or in the suburbs. An apparent difference would be that large future space requirements, as well as present ones, would require generous amounts of land. However, 13 of the 26 firms surveyed were either contemplating imminent future expansion or averred that future expansion requirements could be met at the present site or adjacent to it; in the author's observations, at least several more firms could expand their present plant should the need arise. Thus, anticipation of future expansion requirements should not necessarily dictate a suburban location unless it was anticipated that such requirements would very evidently exceed the potential of the existing site or unless other suburban features and amenities were thought desirable.

TABLE 5

FACTORS AFFECTING CHOICE OF LOCATIONS IN
"INTOWN" AND ROUTE 128 AREAS, BY TRADE GROUPS

| | "Intown" ¹ | | | | | Route 128 | | | | |
|--|-----------------------|----------|----------|----------|--------------|--------------|----------|----------|----------|--------------|
| | Trade Groups | | | | | Trade Groups | | | | |
| | <u>1</u> | <u>2</u> | <u>3</u> | <u>4</u> | <u>Total</u> | <u>1</u> | <u>2</u> | <u>3</u> | <u>4</u> | <u>Total</u> |
| Market accessibility | 3 | 2 | 4 | 6 | 15 | 3 | 1 | 2 | 20 | 26 |
| Room for expansion | | | | | | 3 | 3 | 15 | 12 | 33 |
| Excessive replacement | 4 | 2 | 3 | | 9 | | | | | |
| Employee accessibility | | 1 | 3 | 3 | 7 | | 3 | 8 | 2 | 13 |
| Advertising value | | | | 1 | 1 | | | 5 | 7 | 12 |
| Accessibility for personal contacts | | | 2 | 1 | 3 | | | 1 | 12 | 13 |
| "Reasonable" price | | | 1 | 1 | 2 | | 4 | 4 | 5 | 13 |
| Traffic congestion | | | | 2 | 2 | 1 | 1 | 4 | 8 | 14 |
| Total No. of Firms * | 4 | 2 | 8 | 7 | 21 | 4 | 5 | 20 | 23 | 52 |

¹ Excludes 5 firms which did not consider relocation.

* See explanatory note, page 18.

Accessibility to markets and to employees rate fairly high in importance as locational factors to both "intown" and Route 128 firms.

As noted in Section 2 above, "intown" plant managers claim a wide market, not just a local one, and find good market access features at their "intown" locations. Table 5 indicates that it is mainly the suburban manufacturers, especially those in Trade Groups 2 and 3, who are not as concerned about market access as the comparable "intown" manufacturers. This may largely be due to differences in type of products, required modes of transportation, and markets (e. g. light easily transported products v. heavy bulky ones, or component parts shipped entirely to one or two assembly plants v. finished goods shipped to distributors in many areas). Market accessibility for "intown" manufacturing sites may, therefore, be somewhat overrated, but the suggestion remains that this is a significant and generally unpublicized "intown" location feature.

For distributive firms, on the other hand, with primarily local and New England markets, locations "intown" or out on Route 128 seem equally favored. Chapter Three further documents the lack of certainty and general conviction concerning the best distributive location. But the evidence again suggests that "intown" locations are at least as valuable for distributive purposes as are suburban ones.

Employee accessibility as a locational factor is rated only a little more highly among Route 128 plant managers than among "intown" managers. -- in terms of investment represented (Tables 3 and 4) employee access is considerably more important to suburban firms but this is offset by the proportionately greater number of "intown" firms claiming this advantage (Table 5).

Comparison of "intown" labor distribution¹ and Route 128 employee distribution² indicates that both draw quite heavily from the same labor supply areas. The "intown" survey, however, disclosed that a substantial proportion of "intown" employees were low-paid unskilled or semi-skilled workers, many of whom came to work by public transit (see Table C-2 in Appendix C). Generally, it appears that Route 128 plants employ more highly skilled workers who command a higher pay and can afford automotive transportation. Also, more of the most highly skilled workers, i. e. engineers and research specialists, live in the more suburban areas.

Employee accessibility, therefore, appears to refer mostly to the type of worker and the kind of transportation he can afford rather than the location of the labor market. As such, labor accessibility can be either an "intown" or suburban locational influence depending upon the predominant type of labor involved.

Excessive cost of replacing an existing plant is almost exclusively an "intown" or possibly an inner suburban locational factor. Table 5 further suggests that this factor applies mainly to manufacturing plants which, compared with distributive firms, have special space requirements and often considerable heavy equipment. The latter is expensive to move, may be tailored to the building or may be built into the building (e. g. cranes, power distributors, raw material chutes and tubes). Generally, too, this factor applies to older stable industrial firms with a fairly large plant and relatively small expansion requirements.

¹ See crude data in Table C-1, Appendix C.

² See Route 128 Study, op. cit. pp 48-49.

On the other hand, Table 5 indicates the advertising value of a heavily-travelled highway in pleasant surroundings, larger tracts of land at "reasonable" cost, and the desire to escape "intown" traffic congestion are all factors which would generally influence choice of an outlying location. None of these factors, however, are exclusive with suburban locations as Table 5 indicates.

In sum, it appears that in the opinion of "intown" managers their industrial sites offer many locational advantages. These include most of the advantages claimed for suburban sites except (1) large acreages at "reasonable" cost, (2) the easiest and speediest auto access for employees, and (3) special requirements such as clean air. At the same time "intown" sites often offer advantages not available in the suburbs such as (1) the opportunity to capitalize upon an existing investment and (2) the easiest access for workers dependent upon public transportation.

Note: In Tables 3, 4, 5 and 6 totals given reflect actual investment and numbers of plants involved. The sum of the columns exceeds the totals because many plants reported more than one factor.

CHAPTER THREE

OTHER AREAS CONSIDERED PRIOR TO THE INVESTMENT DECISION

In both the "intown" and Route 128 surveys, management was asked to identify other areas which were considered before the final investment choice was made.

TABLE 6

OTHER AREAS CONSIDERED FOR RELOCATION OF 'INTOWN' PLANTS, BY INVESTMENT, NUMBER OF PLANTS, AND TRADE GROUP

| <u>Area</u> | <u>Investment Represented</u> (Thousands) | <u>% of Total Investment</u> | <u>No. of Plants</u> | <u>Trade Groups</u> | | | |
|----------------------|--|------------------------------|----------------------|---------------------|----------|----------|----------|
| | | | | <u>1</u> | <u>2</u> | <u>3</u> | <u>4</u> |
| Central Bus. Dist. | \$ 565 | 3.9 | 1 | | | | 1 |
| "Intown" Area | 9,450 | 64.4 | 9 | 1 | | 3 | 5 |
| "Middle" Ring | 375 | 2.6 | 2 | | 1 | | 1 |
| Route 128 | 9,100 | 62.2 | 5 | 2 | 1 | 2 | |
| Other Mass. Cities | 2,000 | 13.6 | 1 | | | 1 | |
| Outside Mass. | - | | - | | | | |
| No Specific Area | 697 | 4.8 | 5 | 2 | 1 | 2 | |
| Unknown ¹ | 455 | 3.1 | 2 | | | 1 | 1 |
| Totals* | \$14,677 | 100.0 | 21 | 4 | 2 | 8 | 7 |

¹ Specific areas considered are not known to present management.

The management of "intown" plants apparently gave almost as much consideration to suburban areas as to "intown" ones before making its final decision. Thus the advantages of one area compared to the other were fairly well weighed. Significantly, it was the larger firms, in terms of investment represented, which gave the most consideration to an outlying location. Table 6 indicates these were exclusively manufacturing firms.

Route 128 firms, which were asked about specific sites considered rather than just general areas, apparently restricted their investigations to more

* See explanatory note, page 18.

outlying locations. Again, however, it was the larger firms which considered the most outlying locations; the largest number of (but smaller-sized) firms weighed more central locations.

Wholesale firms exhibit the most uncertainty about the best location. Significantly, "intown" wholesalers gave no consideration to outlying locations while those now located on Route 128 gave much more consideration to more centrally-located alternate sites than to other outlying ones.

It may be concluded that in the opinion of the surveyed plant managers "intown" or other fairly close-in locations seem to offer special advantages to market-oriented industries, (whether the market be local, regional or national) and to "smaller" manufacturing industries. Larger firms may be dissuaded from using more centrally-located sites largely because of the desire for more space than might be available.

TABLE 7

OTHER SITES CONSIDERED FOR RELOCATION OF ROUTE 128 PLANTS,
BY INVESTMENT, NUMBER OF PLANTS, AND TRADE GROUP

| <u>Area</u> | <u>Investment Represented</u> (Thousands) | <u>% of Total Investment</u> | <u>No. of Plants</u> | <u>Trade Groups</u> | | | |
|----------------------|--|----------------------------------|--------------------------|---------------------|----------|----------|----------|
| | | | | <u>1</u> | <u>2</u> | <u>3</u> | <u>4</u> |
| CBD and "Intown" | \$ 3,470 | 9.7 | 9 | | 1 | 2 | 6 |
| "Middle" Ring | 14,540 | 40.4 | 24 | 1 | 3 | 8 | 12 |
| Route 128 | 20,997 | 58.3 | 24 | 1 | 2 | 15 | 6 |
| Other Mass. Cities | 870 | 2.4 | 3 | 1 | | 2 | |
| Outside Mass. | 1,500 | 4.2 | 1 | | | 1 | |
| Unknown ¹ | 200 | 0.6 | 1 | | | | 1 |
| Totals ² | \$31,304 | 100.0 | 45 | 3 | 5 | 19 | 18 |

¹ Specific sites considered are not known to present management.

² Totals reflect actual investment and number of plants involved, excluding seven plants which did not consider other sites in addition to the one actually chosen. The sum of the columns exceeds the totals because many firms considered more than one area.

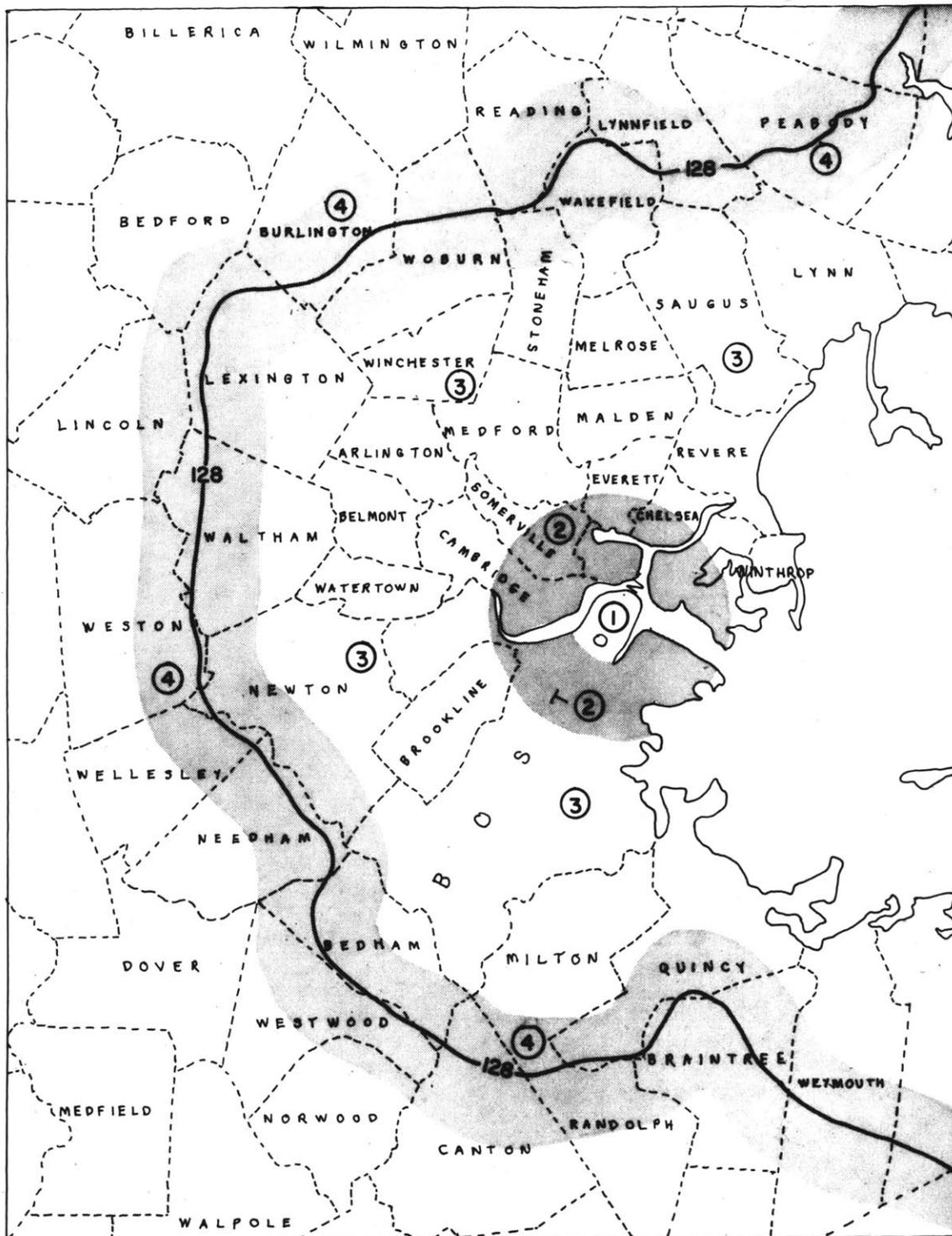
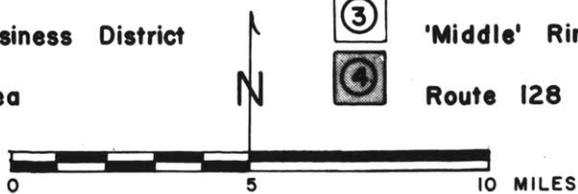


Figure 2

THE GREATER BOSTON AREA,
ROUTE 128 vis-a-vis THE 'INTOWN' AREA

- | | | | |
|---|---------------------------|---|----------------|
| ① | Central Business District | ③ | 'Middle' Ring |
| ② | 'Intown' Area | ④ | Route 128 Area |



CHAPTER FOUR

POST-MORTEM: SATISFACTION WITH THE CHOSEN LOCATION

Further light on the suitability of "intown" locations for industrial purposes is shed by the degree of management's satisfaction with the location actually chosen and used for some time.

1. "Intown" Management's Evaluation

TABLE 8

POST-MORTEM EVALUATION OF "INTOWN" SITES,
BY INVESTMENT AND NUMBER OF PLANTS

| <u>Finding</u> | <u>Investment Represented</u> (Thousands) | <u>% of Total Investment</u> | <u>No. of Plants</u> |
|-------------------------------|--|----------------------------------|--------------------------|
| Generally meets expectations | \$ 5,945 | 40.5 | 11 |
| Local taxes too high | 3,400 | 23.1 | 4 |
| Exceeds all expectations | 2,485 | 16.9 | 4 |
| Expressway an unexpected boon | 1,565 | 10.6 | 4 |
| Totals * | <u>\$14,677</u> | <u>100.0</u> | <u>21</u> |

Other findings mentioned include:

- (1) Advantages: Customers are conveniently close by (2 firms); traffic congestion not as bad as anticipated (2); City of Cambridge government and services provide favorable industrial environment (1); freight accessibility is better than expected (1); proximity to M.I. T. and Harvard is rewarding (1); and employee accessibility is better than was anticipated (1).
- (2) Disadvantages: Shortage of parking space is increasing (3 firms); traffic congestion is worse than expected (1); office help is hard to get (1); the quality of available labor in the area is poor (1); unpleasant industrial atmosphere (1); and new expressway appropriated ground-space needed for parking and horizontal expansion of plant.

* See explanatory note, page 24.

2. Route 128 Management's Evaluation

TABLE 9

POST-MORTEM EVALUATION OF ROUTE 128 SITES,
BY INVESTMENT AND NUMBER OF PLANTS

| <u>Findings</u> | <u>Investment Represented</u> (Thousands) | <u>% of Total Investment</u> | <u>No. of Plants</u> |
|---|--|----------------------------------|--------------------------|
| Generally meets expectations | \$ 9,926 | 27.5 | 17 |
| Poor service facilities (motels, banks, restaurants, etc.) | 3,924 | 10.9 | 4 |
| Unexpected advertising value | 3,176 | 8.8 | 5 |
| Labor market better than expected | 3,108 | 8.6 | 3 |
| Totals* | \$36,047 | 100.0 | 52 |

Other findings mentioned include:

- (1) Advantages: Many customers have moved outward also (4 firms); accessibility is better for personal contacts (2); employee accessibility is better than expected (2); service facilities are better than expected (1); Route 128 was built after the firm was located in the area (1); trucking access is better than expected (1); and employee morale is improved (1).
- (2) Disadvantages: More trouble found getting or keeping help (3 firms); distance is too great for employees (3); mail delivery is slower (1); and trucks from distant cities go to CBD, then back to the 128 plant, instead of coming direct to the plant (1).

3. Relative Satisfaction with the Site

"Intown" management apparently was queried more specifically concerning satisfaction with the site than was Route 128 management. Many Route 128 questionnaires recorded no reply to this question.

The reaction of "intown" managers was generally one of satisfaction. The majority were satisfied or even more than satisfied with their location; and some benefited from inauguration of expressway service fairly close-by. The major criticism was addressed at high real estate taxes with significant concern also expressed about limited parking space.

* See explanatory note, page 24.

"Intown" management was more divided on traffic congestion problems, depending upon the specific location. Significant advantages was found in having good proximity to customers, counsellors, and employees.

Those Route 128 managers who replied to this query also were generally satisfied with their location except for some criticism about the lack of various service facilities. Reaction on employee availability and accessibility was divided, depending upon location and the type of employee involved.

It might be inferred that "intown" managers were more enthusiastic and satisfied with their location than were their Route 128 counterparts. However, the difference in reaction may be largely due to the interviewer and his methods of questioning and recording. In any event, it may be concluded that "intown" management was generally quite satisfied with the chosen location with relatively few managers expressing significant "regrets."

Note: In Tables 8 and 9 totals given reflect actual investment and number of plants involved, excluding five intown plants which did not consider relocation. The sum of the columns is less than the totals because many plant managers failed to respond to this query.

CHAPTER FIVE

FLOOR SPACE AND EMPLOYMENT: "INTOWN". v. ROUTE 128 SITES

Crude but significant data is available on employment and floor space for the subject firms, roughly indicating trends in expansion of "intown" industrial plants.

TABLE 10

FLOOR SPACE AND EMPLOYMENT FOR "INTOWN" AND
ROUTE 128 PLANTS, BY TRADE GROUP

| <u>Item</u> | <u>Trade Groups</u> | | | | <u>Totals</u> |
|--|---------------------|---------------------|---------------------|---------------------|---------------|
| | <u>1</u> (Food) | <u>2</u> (Steel) | <u>3</u> (Misc.) | <u>4</u> (Dist.) | |
| <u>Total Floor Space (Thsd. Sq. Ft.)</u> | | | | | |
| Before expansion, "Intown" | 1, 160 | 646 | 582 | 277 | 2, 665 |
| After expansion, "Intown" | 1, 289 | 909 | 1, 141 | 337 | 3, 676 |
| Net Change, "Intown" | + 129 | +263 | + 559 | +60 | +1, 011 |
| Route 128 Plants | 131 | 396 | 1, 819 | 800 | 3, 146 |
| <u>Total Employment in Plant</u> | | | | | |
| Before expansion, "Intown" | 2, 790 | 3, 030 | 2, 740 | 390 | 8, 950 |
| After expansion, "Intown" | 2, 265 | 2, 431 | 4, 090 | 277 | 9, 063 |
| Net Change, "Intown" | - 525 | - 599 | +1, 350 | -113 | + 113 |
| Route 128 Plants | 298 | 876 | 9, 079 | 1, 015 | 11, 268 |
| <u>Floor Space per "Gross Employee"(Sq. ft.)</u> | | | | | |
| Before expansion, "Intown" | 417 | 214 | 212 | 709 | |
| After expansion, "Intown" | 570 | 375 | 280 | 1, 220 | |
| Net Change, "Intown" | + 153 | + 161 | + 68 | +511 | |
| Route 128 Plants | 438 | 453 | 201 | 790 | |

Data in Table 10 is crude and must be used with caution because:

- (1) Employment data includes total employment in the plant, not maximum employment per shift. About 20% of the firms have more than one major shift. However, the data is restricted to employees actually working in the plant and excludes truck drivers, salesmen and others not utilizing space in the plant proper.

- (2) There is no isolation of specific types of firms requiring more or less floor space per employee.
- (3) Storage space is not isolated from productive space. Vehicular storage, however, is usually excluded.
- (4) The sample, particularly of "intown" firms, is incomplete.

Table 10 demonstrates some significant facts about "intown" industrial expansion:

- (1) The net increase in floor space achieved by the "intown" group of plants (a partial sample) was one-third that achieved by comparable Route 128 plants (a full survey). If one considers the fact that nine of the "intown" plants are completely new substitutes for previously-used space (subsequently freed for use by other enterprises), the gross increase in floor space would be an even more substantial portion of the Route 128 total.
- (2) In terms of aggregate floor space only, the partial sample of "intown" plants had considerably more space after expansion than the entire comparable group of Route 128 plants.
- (3) The partial group of "intown" plants has a total employment which compares very favorably with that for the entire comparable Route 128 group.
- (4) The resultant floor space ratio to employment is generally much more favorable for the "intown" group than the Route 128 group.
- (5) The "intown" group's high floor space/employment ratio was achieved partially by holding aggregate employment almost constant, with sharp employment decreases in three trade groups offset by significant employment increase in the fourth. The employment reductions were made in those plants which were best able to substitute more sophisticated mechanical equipment for manpower.

The data thus demonstrates that in terms of total employment and floor space, the "intown" group of plants is as significant to the economy of the Boston area as is the Route 128 group.

Most important of all, the data demonstrates that in terms of employment per square foot of floor space "intown" plants can be expanded to match and even exceed the standards achieved by new modern construction on suburban sites which offer none of the space limitations generally ascribed to old "intown" sites.

This is most important since one of the major expressed reasons for relocation is the need for room to expand. Chapter Seven describes how this expansion is accomplished at "intown" sites.

CHAPTER SIX

THE UTILIZATION OF LAND: "INTOWN" v. ROUTE 128 SITES

It is readily apparent that "intown" industrial plants do not have the ground space available to suburban plants. "Intown" sites are characterized by maximum site utilization for building, loading, storage and parking. Route 128 plants usually have land for expansion and for attractive landscaping.

Table 11 amply demonstrates the difference in site sizes between "intown" and Route 128 plants. Surprisingly, however, suburban wholesale distributors apparently do not use much larger sites, on the average, than do their "intown" counterparts. This group of industries apparently uses its sites intensively; little consideration seems to be given to future horizontal expansion needs. A possible conclusion is that wholesalers (who as a group are freer to move than are production firms) are less committed to a given location and will move elsewhere to obtain needed space requirements.

Production firms, on the other hand, clearly favor larger sites in the suburbs. Of particular significance is that of the 24 firms included in Route 128 Trade Groups 2 and 3, 13 have more than 23 acres each. This fact probably exaggerates the average for this group somewhat because the large firms were less likely to be overlooked in the survey than smaller ones; but the fact remains that these are much larger sites than would be available "intown".

Only current acreage data is readily available. However, six of the 16 "intown" plants which expanded on the existing site acquired additional land for horizontal expansion. Of these, one added only a small amount of land and three increased their previous holdings by about 50 per cent. The remaining two increased their original holdings roughly three or four times, one by

outright acquisition and the other by renting and refurbishing existing buildings on a long-term basis.

TABLE 11

SIZE OF "INTOWN" AND ROUTE 128 PLANT SITES, BY TRADE GROUP

| <u>Item</u> | Trade Groups | | | | <u>Totals</u> |
|-------------------------|--------------------|---------------------|---------------------|---------------------|---------------|
| | 1 <u>(Food)</u> | 2 <u>(Steel)</u> | 3 <u>(Misc.)</u> | 4 <u>(Dist.)</u> | |
| <u>"Intown" Plants</u> | | | | | |
| Gross Acreage | 11.4 | 8.7 | 24.4 | 11.6 | 56.1 |
| Average per plant | 1.9 | 2.1 | 3.0 | 1.5 | 2.2 |
| <u>Route 128 Plants</u> | | | | | |
| Gross Acreage | 19.2 | 194.5 | 519.0 | 44.7 | 777.4 |
| Average per plant | 4.8 | 39.1 | 25.9 | 1.9 | 15.0 |

CHAPTER SEVEN

DEVICES FOR CAPITALIZING UPON AN 'INTOWN' LOCATION

A variety of methods of expanding "intown" industrial space comes to light even in this small sample. Such variety bodes well for future "intown" industrial expansion.

1. Refurbishing Old Buildings

Several firms solved the space problem by modernizing the interiors of existing buildings. One plant had such high ceilings that an additional deck could be erected between existing floors in various parts of the building. Several refitted the interiors of buildings formerly used for other purposes.

One expanding firm has a very well thought-out policy for using old buildings at great savings over the cost of new ones. This firm found it could rent and handsomely refurbish existing buildings at a capital cost of about \$6 per square foot (plus nominal rent) compared to its estimate of \$15 a square foot to provide a new facility. The policy enables the firm to use "five-year quality" improvements in rented quarters instead of more costly "permanent" ones and to build new facilities only when the need is clear and existing buildings cannot meet special requirements. So successful did the policy appear that the company was considering even the purchase of old buildings (if they could not be rented) instead of the construction of new ones wherever possible (the estimated cost of buying an old building was \$1/sq. ft.).

Another plant owner, who had met his initial expansion requirement by horizontal addition, also expressed the opinion that he could modernize his existing floor space to achieve all the efficiencies of a new one-story plant at

far less cost than by completely new construction. This possibility is well documented by the experience of a New Jersey firm described in Appendix D.

2. Expanding the Old Horizontally

Many firms constructed additions to existing plants. Generally it was pointed out that the firm had an existing facility which it would be too costly to replace. Sometimes vacant land was available; but six firms acquired neighboring properties at considerable cost, with much of the cost going for buildings which had to be demolished.

Several firms expanded horizontally by "filling in the gaps" between existing buildings, a method which avoided the necessity of acquiring additional land.

It is significant that two large firms found such great economies in horizontal expansion that they eliminated construction of several other plants. One was consolidating three proposed plants into one "intown" one; the other had purposely expanded its original plant to four times the standard maximum capacity prevailing in its industry.

3. New on Top of Old

Construction of an additional floor on top of an existing building was found feasible in three cases where the buildings were structurally adaptable.

One firm added an entire new third floor. Later it consolidated its operation to the two upper floors and was able to rent the first floor at a considerable return on its expansion investment. Another firm, cramped for horizontal expansinn space, found it could successfully relocate all of its office functions to a permanent addition on the roof of the existing one-story structure.

4. Space Unlimited Via Satellites

At least three firms overcame space deficiencies in their existing plant by renting or acquiring other buildings in the general area. Use of such "satellite" space may not be a new idea but it offers virtually unlimited additional space possibilities in cases where unified operations are not mandatory.

One firm acquired several buildings in the immediate vicinity of its main plant, but covering a number of city blocks. Another "farmed out" a separable manufacturing process to a rented building several miles farther away. The third rented storage space a mile away and a warehouse and distribution office three miles away but convenient to rail, sea and highway transportation; it also bought a satellite manufacturing plant two miles away for a separable process. The latter two firms took satellite space because it was "available" with almost no concern for its location.

5. New Buildings on New Sites

Most of the completely new plants included in the "intown" survey were built upon undeveloped land. However, at least two sites had some minor improvements thereon which were costly to acquire.

Sites used included vacant land sold by a railroad to potential customers, some publicly-owned vacant land, and private land. The latter was completely unused in most cases, but three properties had been used as parking lots or for residences.

It appears at the present time that new industrial construction generally cannot afford sites which must be cleared of costly existing improvements.

Significantly, at least three of the new industrial buildings were built with an eye towards speculative investment as well as immediate utility. The

management wanted a plant which could be either readily disposed of if the firm had to move, or sold at a profit while the firm moved to less "valuable" quarters.

6. The Turning Point: Bringing Suburban Advantages "Intown"

The owner of one of the sites included in this study is about to launch a large-scale "intown" industrial project which might be the forerunner for "intown" industrial revitalization of considerable proportions.

Urban expressways, in the opinion of the firm's management, are successfully assaulting the traffic congestion which has made "intown" areas undesirable for many types of industry. The proposed project would further increase the attractiveness of an "intown" location by providing adequate and close-by parking, all the efficiencies of one-story plants, and a considerable amount of room for expansion.

Using a tract of about 15 acres, the firm expects to erect eventually a series of linked buildings which together will offer such extensive floor space that any tenant would be able to house its entire operation on a single floor. Two levels of underground parking are to provide space for all employees and customers even more conveniently than is possible in a one-story suburban operation. The cost of the site and multi-story construction is expected to be offset by the economies of literally "stacking" one-story operations on top of another.¹

By erecting a 10 to 12-story structure, with only 60% of land coverage, the firm tentatively expects to obtain 20 times the building space at only six

¹ This development should not be confused with conventional loft buildings which lack the features of underground parking and continuous linkage, enabling a tenant to spread its operations at one level through several buildings.

times the land cost of a suburban site, while offering the many efficiencies of an "intown" location.

The extensive floor space is expected to be managed in such way that individual firms requiring more floor space over time can obtain it on the same floor and adjacent to their then-current operations.

Such a project will house many firms. As such, it usually could only be carried out by a management or investment firm capable of commanding great financial resources on behalf of a number of tenants. Single industries, except possibly for the very largest, could not afford such a venture.

7. Land Assembly for Modern "Intown" Developments

The above-described project uses an extensive tract of previously-developed land acquired at great cost and under unique circumstances. The promoting firm feels that other such developments are unlikely at the present time because of the virtual impossibility of privately assembling the large acreage needed and the great difficulties now inherent in obtaining acreage cleared under federal urban renewal program. If additional projects of this type are felt desirable, the firm feels that more efficient public land assembly methods must be developed.

CHAPTER EIGHT

'INTOWN' MANAGEMENT'S REFLECTIONS ON THE
'TREND TO THE SUBURBS'

A final bit of insight into "intown" management's conception of its locational advantages comes from unsolicited observations concerning the suburbs. These were not a part of the interview format and resulted from the managers' interest in the purpose of the study.

Historically, it is interesting that one large firm felt as late as 1949 that one mile from the heart of the CBD was as far "out" as customers and clients would go; but by 1951 the firm had invested in an additional plant near Route 128.

Two managers characterized the "trend to the suburbs" as a "fashion" which claimed considerable prestige value which may now be diminishing.

Two others countered the land cost differential between city and suburb - one pointing out that high real estate taxes made some "intown" land as cheap as suburban (taxes on the most recently acquired land were 15% of the purchase price, he claimed), the other arguing that amortization of land costs over a long period made the price differential negligible.

The most frequent comments concerned accessibility to central city facilities. One owner, prominent in civic affairs, said Route 128 executives were tiring of their frequent trips to the center of the city and characterized "that hole in the ground" (a subway entrance) as one of his assets. Another commented that quick access to the State House and other government offices was a factor often overlooked by executives who move their plants to the suburbs. A third told of stories that research personnel in the suburbs were unhappy about their distance from the "research row" at M. I. T. and Harvard.

Three others commented on the distance from Route 128 to central city markets.

Finally, a firm which had invested in suburban plant, but is currently investing in an "intown" facility, found "Route 128 is getting reasonably close to the saturation point" because of less and less attractive land combined with strained service facilities which cannot compare with central banks, legal offices, etc. The firm reported that announcement of the "intown" project brought a flurry of inquiries from other firms whose previously expressed interests were all in suburban locations. The inquiries were interpreted as evidence of substantial latent preference for "intown" locations.

CHAPTER NINE

SUMMARY AND CONCLUSIONS

1. Summary

- (1) "Intown" plant managers feel their industrial sites offer many of the locational advantages of suburban ones except: (a) large acreages at "reasonable" cost, (b) easiest and speediest auto access for employees, and (c) special requirements such as "clean" air for certain industrial processes. At the same time, "intown" locations command special advantages including (a) ability to capitalize on existing investments, (b) the easiest access for employees who are dependent upon public transportation, and (c) convenience to centrally-located service facilities.
- (2) Market-oriented industries, especially wholesale distributors, appear to favor more centrally-located areas. "Larger" production firms, on the other hand, generally appear most interested in suburban locations.
- (3) "Intown" plants, whether new or simply expanded, demonstrate they can provide as much floor space per worker as do new suburban plants although suburban locations permit much larger sites. Existing "intown" plants can be expanded to meet modern space requirements by modernizing the interior, constructing additions or using other buildings elsewhere in the area for separable operations.
- (4) New industrial buildings in "intown" locations now appear feasible only when the required land is either vacant or encumbered by only minor improvements. One new possibility, however, is the construction of

very large, multi-story industrial buildings housing many individual firms, with high-volume site utilization carrying the cost of site acquisition and clearance.¹ A system of urban expressways and extensive off-street parking beneath the buildings could permit such developments to compete favorably with larger suburban industrial sites.

2. The Future of Existing "Intown" Industrial Areas

- (1) First and foremost, the demonstrated economies inherent in continuing to use and even expand existing industrial plants argues strongly against complete abandonment of current "intown" industrial areas at least until the buildings become structurally unsound. This is likely to encompass a period of at least several decades.
- (2) The above yields the conclusion that the "trend to the suburbs" has been overplayed in the general thinking and literature, for active interest remains in "intown" industrial activity. This in no sense argues the validity of the suburban trend; it merely asserts concurrent if less publicized interest in "intown" locations.
- (3) Furthermore, the continuing effective demand for "intown" space by market-oriented industries and the probable solution of "intown" access problems by expanded urban expressway and public transportation systems should reinforce the appeal of economical existing structures to economy-wise industrial firms, especially if the advantages become more widely publicized and accepted.

¹ This type of building should not be confused with conventional loft buildings which are comparatively very small.

- (4) When existing structures can no longer be feasibly reclaimed, it is possible that current additions will "survive" and become in turn so costly to reproduce as to justify replacement of the "original" building. The interspersion of these additions and completely new buildings may tend to promote the longevity of existing industrial areas indefinitely. Complete obsolescence thus appears so far off in time that totally new concepts of construction, financing, location criteria, manufacturing, distribution, transportation and public policy are likely to evolve and completely by-pass current problems.

3. Industrial Reuse of Deteriorated "Intown" Areas

- (1) The cost of land is clearly the major factor determining the feasibility of industrial reuse of deteriorated "intown" areas. Completely new industrial construction is now likely to be limited to remaining vacant sites or to sites cleared with a public subsidy. Under present circumstances, therefore, little new construction can be anticipated.
- (2) The land cost problem might be overcome by the present proposal for large multi-story industrial buildings permitting high-volume use of expensive sites while providing all the physical features need by modern industry. A major advantage is that efficient land assembly by a public agency or private redevelopment corporation might make large sites economically useable for such intensive purposes without the need for public subsidies. The proposal needs further study, however, because of the large investment required, the accent upon tenant-status, and the possible impact of a number of such structures on the form, economy and circulation patterns of the city.

- (3) Streamlined public land acquisition policies, including such items as efficient management of tax-foreclosed properties, might also make feasible the reuse of some smaller sites by individual industrial firms with little or no subsidy. If desire for central locations persists, industry may be willing and able to pay somewhat higher costs for "intown" land than for suburban sites. This possibility, however, is probably restricted to the cheapest possible land, e. g. land largely acquired by tax foreclosure with relatively easily-removed improvements.
- (4) Industrial reuse of deteriorated "intown" areas is thus clearly dependent upon efficient public land assembly policies. The scarcity of public funds for subsidies suggests much more consideration should be given to streamlining land acquisition agencies for maximum efficiency and economy.

APPENDICES

APPENDIX A

METHODOLOGY AND RELIABILITY

1. The Sample Industries

The industrial group selected for study excludes the following types of industries:

- (1) Those located "intown" only because of their direct relationship to marine and air terminals;
- (2) Chain store warehouses and other storage operations which are direct adjuncts to retail operations;
- (3) Small, specialized industry groups with definite location requirements making an "intown" location mandatory, e. g. newspaper publishing.
- (4) Smaller industries and research firms as reported in Chapter One.

Firms which met the requirement of having expended more than \$100,000 on additions or expansions since World War II were identified from the following sources:

- (1) The State Department of Labor and Industries' annual summaries of building permits exceeding \$100,000 in value. These listings, available only since 1951 and including only crude project identifications, primarily provided clues for further search of building permit records.
- (2) Greater Boston Chamber of Commerce current construction summaries, available for only the last three years, contained the same type of data as above and generally served the same purpose.
- (3) The Cambridge Building Department's register of all permits issued. Firms receiving permits for over \$100,000 in new construction or additions were readily identified; several which had obtained successive smaller permits totaling over \$100,000 were also identified with the aid of the Building Commissioner's personal recollections.
- (4) The Boston Building Department's records of various types, principally annual and monthly reports of differing content and completeness. The large volume of permits prohibited a review of all permits issued.

The various listings were generally incomplete and surprisingly incomparable. Unless building permit records were exhaustively searched and verified, the total number of firms expending over \$100,000 cannot be determined. The author would conservatively guess, however, that the sample of 26 firms represents about two-thirds of the actual total.

The list of firms thus obtained was further reduced by the elimination of firms located outside the selected three mile radius from the Central Business District. The final listing included 31 firms, 26 of which consented to the study and another of which was found to have not carried out the authorized construction.

The Interview Procedure

Letters describing the thesis project and the needed information were sent to the top officials of each of the selected firms with a request for an interview. Follow-up calls for appointments met with great success.

The prepared interview format followed the procedure used in the Route 128 Study to afford some degree of comparability. Interviewees were asked for their subjective observations on location factors the firm may have considered, other locations considered and "post-mortem" findings. A series of more specific questions was included to provide supplemental data; these are included in Appendices B and C.

Persons interviewed were the top managers, their immediate deputies, or administrators specifically charged with building location and expansion programs. The interviewer asked all the same questions but he varied their phraseology according to the requirements of each interview.

Reliability of the Interview Data

Interviewees were asked what the principal locational factors were without being prompted concerning any factor. Thus each reason was "volunteered." Each was ascribed equal weight as a factor because of the difficulty of attributing any kind of uniform priority rating to each.

The "factors" were recited quite readily by most interviewees, indicating they had done some preparation for the interview. Chapter Two describes the general location factors described to the author. The more detailed questions concerning location criteria are summarized in Appendices B and C. In the interests of uniform presentation of data, important locational factors disclosed in the supplementary questioning, rather than in the "original" questioning, have not been included in Chapter Two.

Information desired on floor space and employment was specified in the advance letter so it must be presumed that many of the interviewees had sought out this information before the interview. However, it often seemed to the author that these were "rough figures" and the great majority of floor space data was given to the nearest thousand square feet. These should be fairly accurate, however, since this is apparently a fairly important bit of information to plant managers and owners.

Employment information was "average" employment data; effort was made to avoid seasonal or other extremes in data. The value of postwar improvements appeared generally reliable but sometimes included fairly evident "guesses." (Interviewees were asked the total value because building permit data were often incomplete.)

Reliability of the Route 128 Data

The original interview forms from the Route 128 Study were made available to the author. Route 128 data included herein differs considerably from that to be found in the Route 128 Study for several reasons:

- (1) Different industrial classification methods were used in the two studies. The current study is based on Standard Industrial Classification methods whereas the earlier study utilized more subjective groupings, e.g. retail sales were included in the earlier study's "distributive" group.
- (2) Some of the Route 128 industries did not meet the minimum \$100,000 investment standard.
- (3) Interpretation of such subjective data by different persons for different purposes is bound to differ. The original data was not codified so as to permit the author to use the original interpretations even if he wished to. Also, the author lacked the background knowledge of each firm necessary to interpret the information at any more than its "face value."

As a result, only 52 of the 96 plants included in the Route 128 Study are included in this study. These include all plants in the manufacturing and distributive standard industrial classifications and represent a complete survey of these two groups. The remaining 44 plants were principally retail or research plants, with a few small manufacturing and distributive firms which did not meet the \$100,000 investment standard.

Classification of the Selected Industries

The finally selected group of "intown" firms was first classified according to Standard Industrial Classification codes. All manufacturing firms were identified by such codes in the Massachusetts Department of Commerce publication, The Buyer's Guide. Code numbers were assigned to other industries according to the SIC manual.

It was mandatory that the firms be so grouped as to hide the identity of every industry included in the study because much of the information was given

in confidence on the promise this would be done. It was found that the industries were too widely diversified to permit anything but the broadest classifications. Enough firms were included to permit identification of food processors and iron and steel produce manufacturers, but all other manufacturers had to be grouped together. Similarly, the distributive group permitted no logical separation by type but this is less crucial since distributive industries have more nearly uniform requirements than do manufacturers.

Adequacy of the Study

The lack of depth in the sample data is not a liability to this study because it is addressed primarily at qualitative rather than quantitative factors. Its main emphasis is upon subjective evaluations of the reasons behind "intown" industrial expansion and the broad methods by which it is accomplished. Quantitative data is introduced without pretence of completeness and only for the purpose of supporting the qualitative material.

APPENDIX B

IMPORTANCE OF COMMERCIAL ACCESS TO 'INTOWN' FIRMS

Table B-1

MAJOR MARKETS AND MODES OF TRANSPORT FROM
'INTOWN' PLANTS, BY TRADE GROUP

| <u>Item</u> | Trade Groups | | | |
|--|--------------------|--------------|----------------|--------------|
| | 1 (Food) | 2 (Steel) | 3 (Misc.) | 4 (Dist.) |
| | (Number of Plants) | | | |
| <u>Major Market</u> | | | | |
| "Intown" | 1 | | 2 | 1 |
| Greater Boston | 2 | 1 | 2 | 7 |
| New England | 2 | 2 | 4 | 6 |
| U. S. & Abroad | 3 | 2 | 5 | 1 |
| <u>Routing from Plant</u> | | | | |
| Truck Only ¹ | 5 | 2 | 7 | 8 |
| Truck and Rail ² | 1 | 2 | | |
| Rail Only | | | | |
| <u>Importance as Location Factor</u> | | | | |
| Only Truck Imp. to Loc. | 4 | 1 | 6 | 7 |
| Only Rail Imp. to Loc. | | | | |
| Truck and Rail Imp. to Loc. | | 2 | | |
| Mkt. Access Not Important ³ | 2 | 1 | 1 | 1 |
| Total No. of Plants | 6 | 4 | 7 ⁴ | 8 |

¹ Includes five plants which haul to rail or sea terminal by truck.

² Only heavy goods or large volumes shipped by rail.

³ Not as important as other factors, e. g. raw material access, employee accessibility, etc.

⁴ All tables in Appendices B and C exclude one firm in Trade Group 3 which did not provide supplementary data.

Table B-2

SOURCES OF RAW MATERIALS AND MODES OF TRANSPORT
TO 'INTOWN' PLANTS, BY TRADE GROUP

| <u>Item</u> | Trade Groups | | | |
|--|--------------------|---------------------|---------------------|---------------------|
| | 1 <u>(Food)</u> | 2 <u>(Steel)</u> | 3 <u>(Misc.)</u> | 4 <u>(Dist.)</u> |
| (Number of Plants) | | | | |
| <u>Major Sources</u> | | | | |
| "Intown" Suppliers, Warehouses | 3 | | 2 | |
| Greater Boston Suppliers, Whses. | | 1 | 1 | |
| U. S. & Abroad | 5 | 3 | 4 | 8 |
| <u>Routing to Plant</u> | | | | |
| Truck Only ¹ | 3 | 2 | 6 | 1 |
| Truck and Rail | 3 | 2 | | 5 |
| Rail Only ² | | | 1 | 2 |
| <u>Importance as Location Factor</u> | | | | |
| Only Truck Imp. to Loc. | 1 | 1 | 4 | 2 |
| Only Rail Imp. to Loc. | | | 1 | 3 |
| Truck and Rail Imp. to Loc. | 3 | 2 | | 3 |
| Raw Mtl. Access Not Important ³ | 2 | 1 | 2 | |
| Total No. of Plants | 6 | 4 | 7 | 8 |

¹ Includes two firms which haul from rail terminal by truck.

² Rail access needed by users of heavy, bulky raw materials such as steel. Some thus find rail very important but some have stopped using their siding because truck is quicker and more flexible, thus advantageous where speed of receipt and delivery is important. One executive also commented that lack of a siding was advantageous in making all rail lines available instead of being restricted to one carrier.

³ Not as important as other factors such as access to market or employee access.

Table B-3

IMPORTANCE OF PERSONAL CONTACTS AT OR NEAR
PLANT, FOR 'INTOWN' PLANTS, BY TRADE GROUP

| <u>Item</u> | Trade Groups | | | |
|---|--------------------|---------------------|---------------------|---------------------|
| | 1 <u>(Food)</u> | 2 <u>(Steel)</u> | 3 <u>(Misc.)</u> | 4 <u>(Dist.)</u> |
| | (Number of Plants) | | | |
| Personal Contact Not Important ¹ | 6 | 4 | 5 | 4 |
| Personal Contact Important | | | 2 | 4 |
| With Customer at Plant | | | | 2 |
| With Customer Nearby | | | 1 | 1 |
| With Nearby Universities | | | 1 | 1 |
| Total No. of Plants | 6 | 4 | 7 | 8 |

¹ Several even found value in getting away from "nuisance" small orders at previous CBD locations.

Table B-4

IMPORTANCE OF ACCESS TO EXPRESSWAYS FOR
'INTOWN' PLANTS, BY TRADE GROUP

| <u>Item</u> | Trade Groups | | | |
|---|--------------------|---------------------|---------------------|---------------------|
| | 1 <u>(Food)</u> | 2 <u>(Steel)</u> | 3 <u>(Misc.)</u> | 4 <u>(Dist.)</u> |
| | (Number of Plants) | | | |
| Directly influenced location choice | 2 ¹ | | | |
| Anticipation of one influ'cd choice | | 2 ¹ | | |
| Not influence choice but ... | | | | |
| Has been of value | | | 2 ¹ | |
| Would be of value | 4 | 1 | 3 | 5 |
| Not important as location factor ² | | 1 | 2 | 3 |
| Total No. of Plants | 6 | 4 | 7 | 8 |

¹ Plant located near Central Artery extension.

² Some executive feel expressway completion date so distant as to offer no potential value.

Table B-5

IMPORTANCE OF ATTRACTIVE PLANT TO 'INTOWN'
PLANT MANAGEMENT BY TRADE GROUP

| <u>Item</u> | Trade Groups | | | |
|-------------------------------------|--------------------|---------------------|---------------------|---------------------|
| | 1 <u>(Food)</u> | 2 <u>(Steel)</u> | 3 <u>(Misc.)</u> | 4 <u>(Dist.)</u> |
| | (Number of Plants) | | | |
| Considered Unimportant ¹ | 6 | 3 | 4 | 3 |
| Considered Important . . . | | 1 | 3 | 5 |
| For Employee Morale | | 1 | 3 | 2 |
| For Owner Pride | | 1 | 1 | 2 |
| As Sales Factor ² | | | 2 | 4 |
| As Investment Factor | | | | 2 |
| To Match Pleasant Neighborhood | | | | 1 |
| Total No. of Plants | 6 | 4 | 7 | 8 |

¹ Some executives consider attractive plant desirable but not important.

² Includes the prestige of having a pleasant plant and also the philosophy that a "shabby plant indicates shabby operations."

APPENDIX C

LABOR SOURCE AND MODE OF EMPLOYEE ACCESS
FOR 'INTOWN' PLANTS

Table C-1

PREDOMINANT LABOR SOURCE FOR 'INTOWN' PLANTS,
BY TRADE GROUP

| <u>Item</u> | Trade Groups | | | | | | | |
|--------------------------|--------------------------|------|-------------------------|------|-------------------------|------|-------------------------|------|
| | 1 | | 2 | | 3 | | 4 | |
| | 0-99 <u>Employees</u> | 100+ | -99 <u>Employees</u> | 100+ | -99 <u>Employees</u> | 100+ | -99 <u>Employees</u> | 100+ |
| Close-In ¹ | | 4 | 1 | 2 | | 5 | 5 | |
| Suburbs ² | | | | | | 1 | | |
| Entire Metropolitan Area | 1 | 1 | | 1 | | 1 | 3 | |
| Total No. of Plants | 1 | 5 | 1 | 3 | | 7 | 8 | |

¹ Generally, the MTA service area.

² Generally, beyond MTA service area.

Table C-2

MODE OF EMPLOYEE ACCESS TO 'INTOWN' PLANTS,
BY TRADE GROUP

| <u>Item</u> | Trade Groups | | | | | | | |
|--|--------------------------|------|-------------------------|------|-------------------------|------|-------------------------|------|
| | 1 | | 2 | | 3 | | 4 | |
| | 0-99 <u>Employees</u> | 100+ | -99 <u>Employees</u> | 100+ | -99 <u>Employees</u> | 100+ | -99 <u>Employees</u> | 100+ |
| Majority by Auto ¹ | 1 | 2 | 1 | 2 | | 4 | 7 | |
| Majority by Transit | | 3 | | 1 | | 3 | 1 | |
| Transit Used by Substantial Minority ² | | 2 | | 1 | | 3 | 3 | |
| Transit Used at all | 1 | | 1 | 1 | | 1 | 3 | |
| Transit Not Used by Any | | | | | | | 1 | |
| Total No. of Plants | 1 | 5 | 1 | 3 | | 7 | 8 | |

¹ Extensive use of car pools was reported at 11 of the 17 plants included in this category.

² Either more than half of the minority or a large gross number.

Table C-3

PROVISION OF EMPLOYEE PARKING SPACE AT
'INTOWN' PLANTS, BY TRADE GROUP

| <u>Item</u> | Trade Groups | | | | | | | |
|---------------------------|------------------|------|------------------|------|------------------|------|------------------|------|
| | 1 | | 2 | | 3 | | 4 | |
| | 0-99 | 100+ | -99 | 100+ | -99 | 100+ | -99 | 100+ |
| | <u>Employees</u> | | <u>Employees</u> | | <u>Employees</u> | | <u>Employees</u> | |
| No Parking Provided | 1 | | 1 | 1 | | | | |
| Parking Provided for Some | | 3 | | 1 | | 2 | | 1 |
| Parking Provided for All | | 2 | | 1 | | 5 | | 7 |
| Total No. of Plants | 1 | 5 | 1 | 3 | | 7 | | 8 |

APPENDIX D

"THERE IS A SOLUTION TO THE OLD MULTI-STORY
INDUSTRIAL BUILDING"

(Condensed from The Realtor, Official Publication of the Real Estate Board of Newark, Irvington and Hillside, North, New Jersey, Vol. XX, No. 5 (May, 1959), pp. 3 ff.)

By G. H. Grossnickle¹

Are the old industrial buildings really obsolete and should they be abandoned?

Newark, New Jersey, like a great many other cities in this country, is faced with the problem of losing industry due to the old obsolete multi-story building

The 75 year old Westinghouse plant with 350,000 sq. ft. of space in Newark was faced with the same problem. Should the plant be abandoned and moved to a new plant or could it be rehabilitated?, . . .

A thorough manufacturing analysis was made, flow charts developed and manufacturing area layouts developed to fit into our old plant. We found we still needed approximately 40,000 sq. ft. of space . . . However, we did have an open courtyard of 18,000 sq. ft. where a building could be built with ceiling heights to accommodate modern facilities, such as cranes and conveyors, to service our heavy punch press and screw machine areas. . . .

We have developed modern manufacturing operations in an old multi-story building with air conditioned offices. The old multi-story building has offered some advantages as conveyors will run in a vertical position as well as a horizontal position and in many cases decrease the length of material flow lines.

¹ Mr. Grossnickle is Manager, Works Department, Westinghouse Electric Corporation, Meter Division, and Chairman, Established Industries Sub-Committee, Newark Chamber of Commerce.

The economics are obvious, a new building would cost approximately \$5,000,000, moving would cost \$2,500,000, training and building a new organization could easily cost \$3,500,000. (ED: A total of \$11,000,000!)

Rearranging, rehabilitating and building a new building would cost \$2,200,000.

We are approximately 50% through our program and the moves that were made to date look better and are offering advantages that were not apparent in our proposed layouts. Therefore, enthusiasm is developing with each move....

Where industry is faced with a similar problem I would recommend that a similar type of analysis be made as I feel confident that the economics will, in many cases, dictate that rehabilitating and rearranging will prove to be the most economical solution to their problem.

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