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# Plant location analysis in small manufacturing firms

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BOSTON UNIVERSITY

College of Business Administration

THESIS

PLANT LOCATION ANALYSIS  
IN SMALL MANUFACTURING FIRMS

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(B.B.A. Clark University - 1960)

Submitted in partial fulfillment of  
the requirements for the degree of  
MASTER OF BUSINESS ADMINISTRATION

1963

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This thesis was prepared under my supervision,  
and approval is hereby indicated.

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\_\_\_\_\_  
Professor of *Management*  
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## I - INTRODUCTION

This study concerns itself with the factors and methods that are considered in site selection for an initial location or relocation from another site. The material presented will be oriented towards the problems of a small manufacturer rather than the larger firm.

The primary data for this study was obtained from interviews with personnel representing five manufacturing firms located in four towns outside of Boston, all within a twenty-five mile radius of the city.

### PURPOSE OF THE STUDY

The importance of optimal plant location cannot be overstated. A poor location can result in costs that are forever a burden to the firm. These costs may be measured in dollars and cents such as in unanticipated tax increases or unforeseen transportation charges; or they may be in the form of plain old dissatisfaction on the part of management and/or workers; or, ironically, they may be unknown because no one realizes that the costs at the poorer location are higher in comparison to another location, such as slower snow removal or higher heating costs due to an

unprotected wind-blown building.

In addition, if the new site proves unacceptable, the situation may not be easily rectified, for new sources of capital to finance relocation, or to finance renovation may not be obtainable. This is especially true when one considers that small manufacturers use as relocation capital borrowed money or money raised by the sale of stock. Neither of these sources can be used again until either the old indebtedness is paid or the company has proven its worth and has shown future potential.

Optimal plant location is also a necessity in times when the cost of doing business is rising, or if the firm's industry is characterized by intense competition, or if the area the firm is located in is in general economic decline.

This consideration of optimal plant location suggests that one contributing factor towards success in a given location is that the site should be selected so as to minimize the total costs of doing business. Thus, one of the questions this study will explore: What were the factors leading to the selection of a given site in the five small manufacturing companies interviewed in this study?

The small manufacturer has two handicaps that differentiate him from a larger firm. First, the most pressing objective in doing business is the necessity of making and maintaining an adequate profit from year to year. A small business cannot have too many lean years, for it does not have the surplus funds to finance losses as may be the case with a larger firm. Stated in another way, the necessity to stay in business and the margin between success and failure is more poignant with a small company therefore, a poor location could be disastrous for it.

Second, a small company may not have encountered the experience nor have the personnel necessary to assume the plant location function. Therefore, the firm itself will have to either develop what it hopes is an efficient plan for site selection, or go outside the firm for professional advice.

This second handicap can lead to a "state of mind". The owner may think "Why bother, this is where I've always wanted to do business." When such reasoning prevails, this "state of mind" becomes a liability. Three independent studies by the Small Business Administration bear this out concluding that the most frequent mistakes in plant site selection are (1) insufficient preliminary planning, which

results in (2) overlooking important information about the area under consideration. This poor planning came about because (3) consultants and formal investigations are rarely used by small firms. <sup>1</sup>

This lack of experience with the plant location function is the subject of the second question in this study: how much effort was involved in the preliminary planning and actual site selection of the five small companies interviewed? A preliminary plan commonly consists of determining the objectives to be achieved by a new location, the locational requirements necessary to achieve these objectives and the designation of whom it is that will make the preliminary plan.

A third area of consideration for the small manufacturer must also be considered, how can a small manufacturer obtain the necessary information needed to make a wise decision should he be confronted with the problem of relocation or initial location?

Economists have offered a number of plant location theories, each with its own assumptions and boundaries to encompass the full spectrum of economic activity. The theories run from pure competitive to monopolistic to communistic societies. Generally, what has been advanced for economic location theory has not been satisfactory as a guide for practical plant location, for these theories

utilize assumptions, concepts, and graphs that are not applicable to any business situation. Even though the underlying reasons for a given plant location as determined by a prudent plant owner are very much the same as those analytically developed by an economist, there results in a loss of comprehension when the realistic manager is confronted with the theoretical economist.

For this reason the theoretical economist does not provide practical and usable information, therefore, the business man must rely on the other sources for plant location information. There are many private companies or semi-private and public organizations available that make plant site selection their business. For example, Industrial Development's 1962 Site Selection Hand Book lists more than 11,000 such firms. Many of these organizations have on their staffs "practical" economists or statisticians capable of acquiring data and presenting it in such a form as to be useful to the business man. Some of these groups work for a fee while others do not charge for their services.

Of prime interest to the small manufacturer are the numerous agencies of the Federal and State governments that compile statistics and general advice for the small manufacturer. Two of the better known are the Small Business

Administration and the Office of Area Redevelopment. Both agencies publish a large volume of information concerning all phases of business, and part of its literature pertains to manufacturing plant location factors. Much of their information is free and the balance can be obtained at a nominal price.

This, then, is the third area of inquiry in this study. Was professional advice sought? If so, what types of advice?

#### METHOD OF APPROACH

Any report on plant location should outline in general terms classical location theory. It was due to the efforts of Von Thunen, Weber, Hoover, and others that the concept of locating a plant in such a location as to maximize profits and reduce costs was developed.

The next logical step is to consider modern location theory which is a combination of the old with the recent. Modern theory is in a form and language which is of more interest to the present day factory owner. Economists such as Walter Isard and Melvin Greenhut have written books expanding functional location theory.

After describing a common approach to plant location, the body of the paper will deal with actual case studies of firms that have relocated within the past

five years. After the presentation of the cases the resulting facts will be analyzed in such a form as to answer the three questions discussed in the previous section. The final section will restate conclusions and note some unique plant location characteristics of small manufacturing firms that differentiate them from larger firms.

## II REVIEW OF WORK DONE BY OTHERS

A presentation of economic location theory is essential, if for the only reason, to show a manufacturer that he has less to say in his plant location than he realizes. The success of the firm is governed by general economic principles over which he has little control other than to comply with them, and a successful manufacturer will comply as though guided by an "invisible hand".

This is a hint as to why an economist likes to re-define and develop a general economic theory on any area of economic interaction. He does this in hopes of developing general economic principles capable of being referred to as a guide or as an explanation of some action. Needless-to-say, these principles should be general and universally applicable, but in the case of plant location theory the amount of work done by economists has been modest in volume because location factors vary from industry to industry and from economy to economy. Because of the difference in including into a general economic plant location theory all the minute but pertinent factors such as climate, topography, police, and fire protection, etc., "most of the literature on the location of economic activity has been socio-historical or economico-geographical in nature. Such treatises place their emphasis

on the social groupings and movement of people, the growth of industrial centers, the shifting and relocation of industry, and the degree of industrial dispersion and concentration. Other studies emphasize the location factors of importance to a particular industry. Still other writings deal with the factors of location applicable to industry in general." (2)

It is the material in the above quote that is of interest to the business man, but the plight of the location economist should evoke sympathy or at least understanding, therefore, it is the purpose of the following material to show the trend of thought by location economists. This material will be presented in chronological order.

## 1 - LEAST COST LOCATION THEORY

### A - VON THUNEN

Johann Heinrich von Thunen, a German, writing in the middle eighteen-hundreds, offered perhaps the first location theory. Von Thunen's location model concerned itself with what farm products were most economically grown on a given plot of land. The assumptions within his theory "postulate a land surface homogeneous in all

respects save distance from the consuming center. This consuming center or city is situated in the middle of coal and iron mines. Its inhabitants supply the outlying districts with their manufacturers in exchange for agricultural produce, food, and raw materials. Farm produce is sold in each outlying region at the city price less the difference in the cost of transportation to that region and the city. Land rent is lower the farther away a location is from the city and so too the intensity of land cultivation ceases entirely."<sup>3</sup> Even though his analysis is an agricultural location theory, it can be used in conjunction with plant site selection. This is because the cost of transportation and the price of land is the basis for both theories.

As can be seen, Von Thunen's model is strictly academic and not applicable to many locations, if any at all, but it gives direction for more advanced analysis.

#### B - WEBER

Alfred Weber, writing in the early nineteen hundreds, developed a theory diametrically opposite to that of Von Thunen. In Von Thunen's model, the location was

given and the manufacturing process suitable for the location was to be found. In Weber's theory, the manufacturing process is known but the location at which the product could be economically produced is to be determined. Weber's theory breaks down into three factors—transportation cost, labor cost and agglomerating factors. This last factor is another cause which tends to concentrate or disperse industry. For example, proximity to complementary industries, markets, or raw materials tends to concentrate industry in a particular region. Whereas high rent, labor costs, or taxes tend to disperse industry.

Weber divides actual industrial location into two major classifications—transportation oriented and labor oriented locations, and a minor classification—location due to agglomerating forces. His theory involves a "substitution between transport costs and non-transport costs". In other words, at various locations some costs increase while other decrease and vice versa, but the actual location will be where all costs result in the lowest total costs and this lowest cost was achieved by substitution. For instance, a location far from a city has lower rent, but a higher transportation cost. ie, the firm substitutes between rent and transportation to get the lowest possible cost.

Weber felt that dividing location factors into three classifications—transportation, labor, and agglomerating—offered the best approach to a general theory of location which could be applicable to any society, socialistic or capitalistic. Even though his theory is acceptable more logically than Von Thunen's, it is far from acceptable as a criterion on which a present day, capitalistic entrepreneur would base a location decision. Melvin Greenhut points out that Weber excluded institutional and special factors that should be included, but were excluded by Weber because they did not fit into a general "pure theory" of location which is independent of specific economic systems.<sup>4</sup> A few of these institutional factors excluded by Weber were interest, insurance, taxes, etc., and the special forces excluded were climate and management, to name a few.

#### C - HOOVER

Edgar M. Hoover, as did Von Thunen and Weber, centered his plant location theory around cost factors. Even though Hoover was the first to introduce demand determinants as a factor in plant location, the cost factors carry the weight of his analysis. Thus Hoover's contribu-

tion to location theory is not the originality of his work, but rather his more penetrating coverage of location costs.

Cost factors were broken down into two categories: transportation and production. The former consisted of distribution; the latter, agglomerative forces and institutional costs. "Hoover's inclusion of the institutional factors places his theory within a capitalistic framework. This change represents a significant departure from Weber's approach. Indeed, Hoover's entire analysis is less confined than Weber's, for he is interested in all possible locating forces, not only the general factors that affect all plant locations."<sup>(5)</sup>

## 2 - LOCATIONAL INTERDEPENDENCE THEORY

Locational interdependence was founded in the analysis of monopolistic competition. Monopolistic competition vs. pure competition is more in line with our present day economic system.

The locational interdependence theory assumes that buyers are scattered widely rather than located in one area as is assumed by Von Thunen, Webber, and Hoover. Therefore,

if a firm locates in an area, it has the potential of gaining control over the buyers within its scope of operation. This is termed a spatial monopoly. What keeps other firms away is the fact that the existing firm is located in a site where its costs are lower than can be obtained at any other site in the area, therefore, because of its higher profit margin it can adjust prices downward in the event of encroachment by a competitor.

The brief outline that has been offered so far on classical location theory points out that a more realistic view must be taken—a view that must be compatible with a capitalistic economic system. Melvin Greenhut recognizes this and offers a theory formulated for an economic system such as ours. He also states that his theory is more applicable to small firms due to the inclusion of personal considerations.

Greenhut maintains "that locating factors are divisible into three broad groups: (1) demand, (2) cost, and (3) purely personal considerations. The demand and cost determinants are influential in all site selections; and the personal considerations.....apparently influence many small plant locations and are included with the demand or cost factors, as the case may be. The personal considerations of the psychic income type appear effective in the site-selection of some small firms." (6) Psychic income

meaning a personal satisfaction that can almost be measured in dollar income.

He then breaks these three locating factors down into a large number of sub-groups which are of interest because of their pertinence to this study. Greenhut formulated these factors theoretically and established their validity empirically.

"The demand factors include:

- 1 - The shape of the demand curve for a given product.
- 2 - The location of competitors, which in turn partially determines
  - a - the magnitude of the demand, and
  - b - the cross-elasticity of demand at different places.
- 3 - The significance of proximity, type of service, and speed of service; prejudices of consumers.
- 4 - The relationship between personal contacts and sales.
- 5 - The extent of the market area, which itself is partially determined by cost factors and pricing policies.
- 6 - The competitiveness of the industry in location and price; certainty and uncertainty.

The cost factors are also divisible into several sub-groups. Some of the cost factors listed herein are further subdivided in order to specifically illustrate the points of

influence of some "less emphasized" location factors.

1 - The cost of land, which included

a - the rent of land;

b - the tax on land;

c - the availability of capital, which partially depends upon

1 - the banking facilities and financial resources, and

2 - personal contacts;

d - the cost of capital, which is also partially dependent upon

1 - the banking facilities and financial resources and

2 - the type of climate;

e - the insurance rates at different sites, which in turn partially depend upon

1 - the banking facilities and financial resources,

2 - the police and fire protection, and

3 - the type of climate;

f - the cost of fuel and power, which is partially dependent upon

1 - natural resources,

2 - topography, and

- 3 - climate
- 2 - The cost of labor and management, which is influenced by:
  - a - the health of the community, the park and education facilities, housing facilities, wage differences, etc., and
  - b - state laws.
- 3 - The cost of materials and equipment which is partially determined by:
  - a - the location of competitors (sellers and buyers),
  - b - the price system in the supply area (f.o.b. mill, equalizing or other forms of discriminatory delivered prices),
  - c - the extent of the supply area, which in turn is partially dependent upon:
    - 1 - personal contacts and
    - 2 - price policy
- 4 - The cost of transportation, which is partially determined by:
  - a - the topography
  - b - the transport facilities and
  - c - the characteristics of the product.

The purely personal factors include:

The extent to which the minimax principle out-

weighs the quest for maximum profits. The minimax principle can be defined as the subjective choice an entrepreneur has in pursuing profits. It is the process of choosing a position between the two extremes of a small risk with sure profit and a large risk with maximum profit. This principle includes:

- a - the importance of psychic income (size of plant)
- b - environmental preferences, and
- c - the security motive." (7)

In summary, and very briefly, it can be said that Von Thunen presented a location theory that assumed a given location and a product or agricultural good was to be made or grown on it. This product being determined by the cost of transportation and the price of land. Weber reversed Von Thunen's theory and offered a theory whereby the manufactured product was known and the location was to be determined, given transportation and labor costs and certain agglomerating forces. Hoover's contribution was to introduce a more comprehensive coverage of agglomerating factors and institutional factors into Weber's theory, thereby, bringing it into a capitalistic framework. Greenhut developed a modern theory in such language that

makes it especially applicable to present day business activity. His theory broke down into the three realistic location factors of (1) demand, (2) cost, and (3) personal considerations; each with its own inclusive subgroups.

## III AN APPROACH TO INDUSTRIAL LOCATION

The chief criticism against classic location theory is that it offers the business man little practical advice as to where his plant should be located. Modern location theory's redeeming factor is that it goes so much further than classic economics in offering such guide lines. None-the-less, Greenhut's three locating factors of Demand, Cost and Purely Personal Considerations and the subgroups into which these can be broken still do not tally with the format that is found in business magazines such as Industrial Development when it discusses why General Electric located a plant as it did. 8

Prior to the advent of big business, such as General Electric and its professional and costly approach to plant location, the accepted and proven way to effect a successful plant location was the judicious use of common sense. The common sense approach to plant location breaks the decision to locate into three separate steps. The first step is to determine the general area within which the plant is to be located. This general area could be as large as the eastern seaboard or as small as the city of Boston. The second step is to determine the town or section of the city

where location is desired, and the third step is to determine the exact site where the plant is to be built.

As the five companies presented later in this study will show, location requirements will vary from company to company and from industry to industry. Regardless of this, when a firm chooses the general area within which it would like to locate, it is motivated by one of three basic and fundamental reasons.

"Industries may be classified as either market-oriented, raw-material oriented, or attracted to intermediate locations. The latter group is sometimes referred to as a 'weight balancing' industry. As these terms imply, market-oriented industries tend to locate at, or very near, their materials, while material-oriented industries prefer locations in the immediate vicinity of material sources. The bakery industry is a good example of the market-oriented group and the turpentine or rosin industry of the material-oriented group. Among the intermediate-location group, industries which are subject to an in-transit rate (such as the manufacture of livestock feeds) is prominent. The location orientation of a manufacturing industry depends primarily on 'transfer costs'—a concept roughly equivalent to transportation costs. Other things being equal, a firm will try to locate at the point or points where its total

transfer costs will be minimized." (9)

These three classifications were conceived by Edgar M. Hoover whose location theory is briefly described in the first section of this study. These classifications are self-explanatory and obvious to most company owners.

The second step is to determine the community within which the plant can be optimally located. The factors which influence the choice of community overlap into the classification which determined the general area. For instance, if a firm is market-oriented, it may decide to locate where the population is dense. This could mean near any city from Boston to Baltimore. So the factors influencing the choice of community will necessarily have to include proximity to markets and perhaps transportation facilities.

As was mentioned before, no two companies will have the same combination of location requirements ranked in the same order of importance. For this reason, the following is a partial list of common location requirements culled from the five firms presented later in this study from government literature (10) and from private studies. (11)

(12) This list is not ranked as to importance but rather

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(9)  
(10)  
(11)  
(12)

only lists some common location criteria. The order of importance is for an individual company to determine given its own requirements.

- 1 - Proximity to markets
- 2 - location of production materials
- 3 - labor supply
- 4 - labor cost
- 5 - labor climate
- 6 - transportation facilities
- 7 - transportation cost and service offered
- 8 - distribution facilities
- 9 - availability of fuel, power, water, and sewer
- 10 - availability of satisfactory site or building
- 11 - availability of financial aid for building construction
- 12 - laws, regulations and zoning
- 13 - tax structure
- 14 - community appearance and public facilities
- 15 - community attitudes
- 16 - climate.

An article published in the Michigan Business Review,<sup>13</sup> of the University of Michigan by Thomas P. Bergin and William F. Eagin presented an outline of a survey by these two men in 1958 covering firms which had, at that time recently located in Kentucky, Tennessee and Mississippi. The purpose of the survey was to draw some conclusions as to whether the funds spent by state development agencies were used to improve factors that attract industry or if the funds were used to improve factors not of prime importance in influencing plant location. (The results of the survey show that the money was not spent in such a way as to attract industry.) For purposes of this paper, the table produced on the following page shows the factors

which influenced the plant location of the firms contacted in Bergin and Eagin's study and the number of times a particular factor was ranked first.

#### SIMPLE RANKED PLANT LOCATION FACTORS

TABLE NO. I

first place rank	reasons for plant location	number of times ranked first
1	convenience to markets	32
2	availability of labor	31
3	availability of raw material	27
4	availability of buildings or other property	26
5	lower labor costs	17
6	home of management	15
7	transportation costs	9
7	center of particular industry	9
9	adequate power	8
10	favorable tax structure	7
11	less unionization	5
12	decentralization of operation	4
13	local cooperativeness	3
13	financial aid	3
15	transportation facilities	2
15	climate	2

Once again, as it was between the first step and the second step, overlapping occurs between the second step and the third. The purpose of this third and final step is to offer a list of factors which will facilitate the decision as to where the exact site for a proposed plant should be. The following is a partial list rather than a complete list of the more frequently mentioned factors.

- 1 - Size and shape of site
- 2 - topography
- 3 - availability and cost of utilities
- 4 - water supply
- 5 - possibility of flooding
- 6 - drainage
- 7 - soil conditions
- 8 - cost of development
- 9 - location in the community
- 10 - transportation facilities
- 11 - fire and police protection
- 12 - taxes and insurance
- 13 - zoning and other legal aspects
- 14 - suitability of existing building
- 15 - price.

As can be seen, the problems which lead to plant location and the factors essential for solving these problems are myraid. For this reason, it is difficult to list an outline of important factors that have to be considered in plant location that is applicable to all companies. This fact will be borne out in the next section which describes the location process of five small manufacturing firms.

#### IV -CASE STUDIES OF PLANT LOCATION

Five companies were interviewed in this study: Contours Unlimited, a manufacturer of a fibrous molding compound; Metal Bellows Company, a manufacturer of metal flexible bellows; Medway Hat Company, a manufacturer of ladies hats; Franklin Macaroni Company, a manufacturer of macaroni; and Welders Supply Company, a supplier of industrial gases and welding supplies.

In each case, one individual was interviewed, either the president of the company, or one of the companys partners. Regardless, the man interviewed had the prime responsibility of determining the company's location.

It must be said that with the exception of Franklin Macaroni Company, all interviews were arranged through a commercial bank for which the writer had once worked. It is in the opinion of the bank that these four companies were managed by solid, reliable, practical, and successful individuals. The writer wants to emphasize this point for it is a contention of this paper that successful location may be achieved by an individual working by himself using only easily gathered information and common sense as a guide.

The Franklin Macaroni Company was introduced to the writer by the Franklin Industrial Commission.

What was stated in the preceeding paragraph concerning the other four firms surveyed applies also to this firm. This is obvious when it is remembered that this company has obtained the majority of its capital from borrowed money loaned by the federal government.

As was stated in the introduction, this study will attempt to investigate three areas of the plant location function—(1) what factors led to plant location, (2) was a preliminary plan used, and (3) was professional advice sought? These, then, are the three broad areas within which the interviews were made.

## CONTOURS UNLIMITED

Contours Unlimited is located in the town of Franklin, Massachusetts approximately twenty-five miles southwest of Boston. Franklin's population is approximately 11,000, and its physical description would fit any of a hundred New England towns.

The company's production facilities are located in an old two story, wood frame building, badly in need of paint and a good cleaning. Even though the building has many physical and aesthetic disadvantages, its redeeming quality is its low rent, and more than adequate production space. The company's office space is located a half-mile away in a new office building.

Contours Unlimited is engaged in three related areas:

- 1 - The company manufactures a fibrous molding compound
- 2 - it builds and sells steel molds that form the molding compound into a desired shape; the company also sells adhesives and plastic covering for the molded product
- 3 - there is a modest research and development program.

Mr. Martin Gluck is president. The company also has a treasurer, secretary, plant manager, sales manager and three advisors—an accountant, a patent attorney and a financier.

"Contourlite" is the trade mark of the company's molding compound. In essence, the raw material for "Contourlite" is jute that has been needle punched with a plastic resin. This impregnating process is done by another Franklin firm which is Contours only supplier of jute.

The impregnated jute which comes in rolls 56 inches wide and 100 yards long, is processed in a machine which first immerses the jute in a vinyl resin, then rolls out the excess liquid thereby compressing the jute slightly. Attached to the immersion bath and roll press is a long drying oven which dries the twice processed jute. After being dried the jute is about a half-inch in thickness, 56 inches wide and looks and feels like the fibrous pad that is placed under a rug. The final operation is to cut the jute into the desired size. Contours Unlimited does not sell to the final consumer but rather to other firms who mold "Contourlite" into luggage, auto components, typewriter cases, furniture, tote boxes, or any other similar product that can be made by molding.

Molding is done in a straight hydraulic compression press between a male and female die. The two dies are heated to approximately 350° F; at 200 PSI molding takes place in about 45 seconds. "Contourlite" need not be tailored prior to molding. A flat sheet molds completely free from stretch. As can be imagined, this

product and process allows quick production methods at attractive costs.

The advantage of "Contourlite" to a luggage manufacturer, for instance, is that these flat sheets are very versatile. They are capable of being tailored to meet the requirements of any molded product. It can be molded flexible or rigid; it is chemical and fungus resistant; and many different types of finishes can be applied to it.

The cost is very reasonable, comparable to masonite. It varies on a graduated scale running from fourteen cents per square foot for ninety thousandths molded thickness to eighteen cents per square foot for one eighth inch molded thickness.

"Contourlite", at the present time, is manufactured exclusively by Contours Unlimited but due to the potential range of products that can be molded with the compound, the firm has licensed other companies to manufacture the compound. 14

The second phase of their operation is the building of steel cast molds to be used by the firms who buy "Contourlite". This is a service function that

is being performed by Contours Unlimited as an inducement to purchase "Contourlite". The large customers of Contours Unlimited make their own molds, but the smaller firms that have no experience with such molds have been letting Contours Unlimited build the proper molds for them. Sale price of these molds is close to cost and they are serviced frequently.

In addition, the company sells an adhesive which is used to laminate a plastic or cloth cover to "Contourlite". This adhesive, "Contourbond", is manufactured exclusively by Interchemical Company for Contours Unlimited.

A plastic vinyl covering used to cover "Contourlite" is also sold by the company and is made by The Seiberling Company.

The final phase of Contours Unlimited is a modest research and development program which is carried on by anyone with an idea. At present the company is developing a short fiber wood flour molding compound that is similar to "Contourlite". They are also investigating the feasibility of forming fabrics over molded "Contourlite" without the need for tailoring.

The company is in it's second year of business, and had sales during the first year of over \$150,000. A new contract has recently been secured from United States Trunk Company which will push the second year sales up to an estimated \$500,000. The high sales volume

in the first year was due to the ability of Mr. Gluck to secure a backlog of orders before he even opened the doors of his plant.

#### REASON FOR PLANT LOCATION

In a report issued to the stockholders of the company, Mr. Gluck listed five reasons that influenced the present plant location. The raw material for "Contourlite" is mechanically treated jute fibers, and the total supply that Contours Unlimited uses is purchased from one mill also located in Franklin, Massachusetts. This fact influenced strongly the choice of Contours Unlimited's present location.

The first reason Mr. Gluck listed was the need for constant quality in the raw material, therefore, close proximity to the supplier was desirable. Second, in the event of a temporary increase in demand, skilled labor on a part time basis must be available. Franklin offered this, for the main industry in the town for generations has been three or four textile (and related products) mills. Third, Contours Unlimited receives shipment of the impregnated jute at its plant free of charge by the supplier (a distance of about two miles). Fourth, this supplier will also ship Contours Unlimited finished product to its customers via the suppliers own trucks also

free of charge. And, finally, the supplier owns the plant and rents it to Contours Unlimited at a very reasonable rate—approximately \$150 per month for over 20,000 square feet.

Mr. Gluck was not born yesterday, so to speak, and even though the relation between he and his supplier suggests potential loss of flexibility, his arrangement has been highly satisfactory to both. In a prior interview, he said that in the near future a change in location is contemplated because the above advantages are being eliminated.

Prior to incorporation, Mr. Gluck had put a good deal of time into necessary corporate background and foundational knowledge. The manufacturing process of "Contourlite" was established and determined feasible, market research was conducted to see if there was a market for "Contourlite", corporate attorneys attended to patent applications, and a source of supply investigated.

At the time of incorporation, Mr. Gluck had a number of orders guaranteed to keep him in business, and a source of jute. Shortly thereafter, attorneys drew up the proper license forms in the event Contours Unlimited wanted to license its process to other firms.

The above is in the way of background to give the impression that Mr. Gluck bases any decision on good

reasons rather than transitory reasons such as temporary advantages to be derived from a close relationship with his supplier.

The interview disclosed that the first reason Mr. Gluck chose the Franklin location was his desire to have available a reservoir of labor skilled to a degree that would be beneficial to him. He felt Franklin offered this because of its industrial background. He also felt that in a small town skills run in families and where there are generations of families there are sources of skilled labor, or at least labor quick to adapt.

The small community location permeated the interview. Of prime consideration was land evaluation and the rental rates. In his preliminary planning he found that he could acquire the necessary sized plant at a more advantageous rate in a small town than in an urban area. Also, intangible costs that accrue during the year and which are hard to define, or pin down, he feels, will be less in a small town.

Other reasons for a small town location had less to do with dollars and cents and more to do with his personal philosophy. For instance, he feels that small businesses should locate in a small climate for no other reason than: if problems arise between the company and the town they can be solved much faster because

one can sit right down with the local tax man, or town clerk, or licensing board rather than talk to a subordinate as would be the case in a larger city. Also, if a small town acts to attract industry, it may result in material benefits such as using town equipment to clear for a parking lot or the extension of water or sewer lines, etc.

Both these reasons are intangibles, therefore, are only as useful as management is personable or persuasive. Mr. Gluck struck this writer as both.

A final reason brought out by Mr. Gluck was that advertising, or a prominent location, or proximity to similar companies as your own, alerts competition as to what you have. In the case of Contours Unlimited, where patents have not yet been granted and the product seems to have a great commercial potential, the last reason has strong validity.

## METAL BELLOWS COMPANY

Metal Bellows Company is located in the town of Wellesley, Massachusetts about twelve miles west of Boston. Wellesley could be looked upon as a mature town; most of its land is relegated to some use, be it residential, public or industrial. The town is a suburban, commuting community with most residents working in Boston.

Metal Bellows is located in an old three story brick building situated behind a cluster of retail stores. Within this small area of one hundred acres or so, bordered by the Charles River, a railroad track and retail stores, there is a number of small manufacturers, industrial and retail suppliers, an oil storage depot, and Metal Bellows Company. What area is not utilized by roads and buildings, is used for inadequate parking. This site is located off of Route #16, a heavily traveled two lane road running westerly from Boston.

Even though the building has been freshly painted, partitions of natural wood were erected, acoustical tile afixed to the ceiling, and drapes and rugs installed in the reception room, it is an old mill building and no amount of paint or covering will eliminate dirt and dust summerize the feelings of Mr. Ray Shamie, a partner of Metal Bellows.

The company has two areas of operation, manufacturing metal bellows and a recently formed research and development section. The metal bellows manufactured by the company are used in measuring or sensing changes in pressure and for sealing cylindrical shafts so lubricants can not escape. Automatic Parachute Release Device Bellows, Pressure Transducer Bellows, Fuel Control Reference Bellows, Autopilot Sense Bellows, Pressure Sensor Bellows, and Shaft Seal Bellows are the technical names of a small array of bellows manufactured by this company.

These bellows are manufactured with machinery designed and built by company personnel. A metal bellows is made by selecting a sheet of steel having the desired thickness and characteristics and stamping out a series of donut shaped pieces. The edges are crimped, then welded together in such a way as to provide an accordion shaped bellows that is flexible and air tight.

The size of these bellows ranges from approximately one inch to four or five inches in diameter. As can be imagined to be air tight and free to flex, the manufacturing machinery and process has to be par excellence. Needless to say, dirt is anathema in the production of high precision metal bellows.

## REASONS FOR PLANT LOCATION

Metal Bellows was founded in 1955 by Ray Shamie together with two partners. At the time of incorporation, the company had a product and manufacturing process which the three partners hoped would be successful. Time has proven them right, for now they have outgrown their original facilities and in March 1963 will be moving into a newly constructed building in Sharon, Massachusetts located on the Boston - Providence turnpike, Route #1. This location is about fifteen miles from Boston.

The factors which determined location in 1955 were predicted by the fact that the company was starting from scratch with an unproven product and limited capital. Therefore, the location desired by Mr. Shamie and his partners had to be local to Boston for they felt that location near potential markets, banking facilities and transportation was essential. The plant, out of necessity, had to be low in rent; this meant an old and perhaps rundown building. In addition, this building had to be large enough so that in the event of success, there would be room to expand. The present building and location fitted the company's 1955 needs. It was local, rent was low, and there was room for expansion. In fact, the company started on the first floor and now occupies all three.

The decision to relocate from Wellesley to Sharon was determined by the complete inadequacy of the present building and the fact that their product is a success and has a future.

The first reason of inadequacy is that the company has outgrown the present building. Upon walking through the office area, the first impression is that the office resembles a jet aircraft—tourist class—an aisle with two desks abutting on one side and three desks abutting on the other. This arrangement is noisy and results in excess commotion. This bunching is common throughout the plant.

Second, the building is not suited, and never really was suited, to the manufacture of a precision product. It is dusty. It vibrates from constant truck traffic going to and from the oil depot storage area next door, and it also vibrates from internal transportation and foot traffic. The production line is not efficiently laid out nor can it be for there is not the space for a straight line production run. The manufacture of bellows requires heat and in the summer the heat becomes intolerable. The welding section should be partitioned from the assembly and shipping areas, and at present this is not done to satisfaction.

Third, parking is a serious problem. The present lot is small and requires maneuvering to get into and out of it. Parking is done bumper to bumper. The parking problem, Mr. Shamie feels, results in a loss of production because workers arrive at their stations late and not very happy. There is also a tendency to leave early. The problem is multiplied in periods of inclement weather.

In the spring of last year, a new product and development department was formed. The crowded conditions in the main building resulted in the location of this department in a vacant office three blocks away. This is the fourth reason for relocation, the consolidation of all operating functions under one roof.

These four problems that revolved around the inadequacy of the present site resulted in the decision to relocate. In 1962, the company sold its stock to the public on the over-the-counter exchange. The proceeds of this stock sale went towards constructing new facilities. The firm is listed in the OTC listing in the Boston Herald, and the price of the stock is between \$4.00 and \$5.00 currently.

A new location, together with solving the above four problems, had to meet other criteria. The price of land had to be considered. Also the firm had to be located at a point easily accessible to the airport, for sales

personnel travel and completed bellows are frequently shipped by air. Of prime importance, was location near main highways as to be accessible to trucks and employees automobiles.

With these criteria in mind, the company drew circles from the center of Boston spaced at three, five, seven, etc. miles. Areas within each succeeding circle were investigated until a location was found that satisfied all criteria.

The first location settled on was in Stoughton, Massachusetts. The price of the land, the area available, and its accessibility proved satisfactory. The company then surveyed via a printed questionnaire their labor force and all executives to determine who would or would not travel to Stoughton if the company should locate there. The survey showed a negative acceptance of the Stoughton location. The reason for this was that a good segment of the company's personnel came from towns to the west of Wellesley and if forced to travel to Stoughton it would add considerable time to daily commuting.

A second location was found in Sharon, Massachusetts, not far from Wellesley but it would still entail extra travel time for these same individuals. None the less, the site was settled on. The price was reasonable at \$3,500 per acre for fourteen acres. This land was accessible to Boston as well as the airport, and it was on a main highway: Route #1,

between Boston and Providence.

Three other reasons reinforced the Sharon location. Mr. Shamie and his partners felt that there was a larger labor supply south of Boston, that growth indications were stronger in the south than in other areas of suburban Boston, and that a new highway, Interstate 95, would have a cloverleaf one-quarter of a mile from their property.

There was no single factor that Mr. Shamie could point out that was weighed more heavily than another.

## MEDWAY HAT COMPANY

Thomas Pontolilo, sole owner of the Medway Hat Company, designs and manufactures women's hats under the trade name "Thomas of Medway". He has designed and manufactured hats all his life, continuing a business his father started before him. At present, Medway Hat Company is the largest manufacturer of flowered women's hats in the country. A flowered hat is a seasonal, summery creation made by attaching artificial cloth flowers to a semi-rigid, head shaped base. The construction method is versatile thereby allowing the required measure of distinction between models. Mr. Pontolilo's prominence in this field is due to his foresight in designing and acquiring a machine that is capable of turning out artificial flowers in great volume. Briefly, these flowers are made by twisting cloth into a flowered shape and then glueing the proper folds together. Because styles in the women's hat industry, like women's clothes, change from year to year, Mr. Pontililo was able to initiate a trend with his flower making equipment and design that has resulted in a product that is associated only with the Medway Hat Company.

His present location is in Bellingham, Massachusetts, five miles from his old site in Medway. Bellingham is located in the center of an equi-sided triangle with Boston, Providence and Worcester as its peaks. The town is about thirty miles from each. No road of any great importance passes through the town, but Interstate Route #495, an outer belt type of road similar to Route #128 will pass through Bellingham. Construction has not yet started on this road. Completion, though, is expected in four or five years.

Prior to Mr. Pontolillo's occupying the property, it was a textile mill which had gone out of business.

There are six separate buildings at Bellingham with all necessary utilities. The buildings vary in height from one to four floors, and are of brick and granite construction. Some are connected with one another, others are separate. There is adequate space for employee parking and truck delivery. His purchase included the ten acres of land the buildings occupy and ninety more acres of undeveloped land across the street from his plant.

In order to get a proper perspective as to why Mr. Pontolillo bought such a large piece of property in relation to his present production capacity, it is necessary to explain the present state of the ladies hat industry.

The women's hat industry in this country is a dying industry. The most prominent trend supporting this statement is that the sale of women's hats has not kept pace with the population growth of our country. Total volume sales have had very slow growth. Slow to such an extent that if a hat manufacturer increases his volume it is at the expense of his competitors rather than due to an increase in the market size. Mr. Pontolilo remarks, "If it weren't for the churches we wouldn't sell any hats". One reason for this trend is that the hair industry has been more vigorous in expounding their panaceas for beautifying a ladies head than has the hat industry.

There is a noticeable trend towards hats as a fad rather than as necessary accompaniments to fashion. Witness the acceleration in demand for a specific hat style after it has been worn by Grace Kelly or Jackie Kennedy. In the case of Grace Kelly, she introduced a three year boom and Jackie Kennedy's pill box hat is still in demand.

The fact that the manufacture of women's hats is a labor oriented industry rather than equipment oriented has not in itself contributed towards its demise, but it has the effect of attracting part-time, marginal manufacturers into production to take advantage of an unforeseen increase in demand such as mentioned above. This

absorption of unexpected demand, therefore profits, by temporary manufacturers, has a deleterious effect on the individual entrepreneur. This coupled with static sales is very discouraging to permanent manufacturers.

Recent trends in marketing and unionism are contributing factors towards the hat industries decline. It is the practice now-a-days for department stores such as Filenes to lease their individual departments to others who in turn operate them. From this practice developed buying syndicates that purchase in volume for a great many small but related departments. In most cases, when a ladies hat is sold in a department store, the hat industry contracted with a buying syndicate rather than an individual department store, as was the marketing method years ago. This results in a market with only a few buyers.

These syndicates from experience realize that the demand for hats is very inelastic—regardless of the price only a certain volume will be sold. Therefore, they buy a limited volume and make prices very high. This is disadvantageous to the hat manufacturer for his profit is made on volume rather than his mark-up.

Discount house operations, on the other hand, are conducive to the hat manufacturer—both make their profit on volume sales rather than mark-up. The problem

arises, as it has happened, when the buying syndicate threatens the manufacturer with the loss of their business if they continue to sell to the discounters. The syndicate demands this for the hat manufacturers sell the same hats to both.

The essence of this marketing problem is: should the manufacturer sell a limited volume, but at a higher price, to the syndicate; or should he sell a large volume, at a lower price, to the discount house. The problem is further compounded by the fact that it is department store advertising rather than any action by discount houses that stimulate demand for ladies hats. In either case, the manufacturer is confronted with a small number of buyers who are finding it easier and easier to get their way.

Because labor is essential to the manufacturing process, organized labor has a commanding hand in collective bargaining. It's demands are hard and in a market where prices are not easily raised to absorb increased costs, and where no industry unity is in existence, unions also have their way.

#### REASONS FOR PLANT LOCATION

With complete and realistic knowledge of the state of the ladies hat industry, and his own personal

evaluation as to the future, Mr. Pontolilo went ahead and purchased a complex of buildings within which to carry on the manufacture of hats.

It is difficult to rank in importance the reasons why Mr. Pontolilo chose his present location for they include considerations that pertain to the hat industry as well as to his own personal security and future.

Those reasons that pertain to the hat industry revolve around his profit margin at varying levels of sales, his desire for increased and streamlined production, and the effort involved in attaining new markets to sell this increased production.

Mr. Pontolilo and his accountant have kept detailed cost records for many years. He intends to maintain this practice at his new location. Each year he will compare the cost that resulted from a certain volume of sales. Mr. Pontolilo hopes to be able to determine his profit maximization point and produce only sufficient volume to maintain this profit maximization point.

In case the market warrants expanded production and he has not exceeded his profit maximization point he wants to be able to expand at the least possible cost. Where his old plant was a multi-story operation, his new facilities are on one floor thereby facilitating a straight line flow of work. Theoretically this is a prime

factor in reducing costs. Mr. Pontolilo feels this way also.

But Mr. Pontolilo realizes that any increase in his sales results from a decline in sales on the part of some other firm, therefore, the physical and mental effort on his part that goes into increased sales must be offset by what he feels is a satisfactory profit. If not satisfactory, he will not expand his production regardless of the lower costs of streamlined production.

The above can be summed up as follows: Mr. Pontolilo keeps good cost records, therefore, he knows at what level of production profits are maximized. If at this level of production the effort involved in selling this production is not excessive, he will maintain this level, if not he will cut back. He feels his present factory is capable of producing this volume.

Having land and buildings capable of being leased or sold is the second, or personal, reason for Mr. Pontolilo acquiring the Bellingham property.

Mr. Pontolilo as he says it, occasionally gets discouraged because he has a large amount of capital invested in his plant, equipment and inventory, and the rate of return from it is no better than that from a good grade security. Even though there are good years and there are bad years, the present state of the industry is more pessimistic than optimistic. If the industry should decline

to such a point that he loses sales, or his profit should decline, then he is seriously considering retiring from the industry and entering the real estate business using his buildings and land as a base for this business.

Bellingham has a number of redeeming factors that may have strong bearing on the town's future development. Its tax rate is low in relation to many towns in Massachusetts. Area wise, it is one of the largest towns in Massachusetts, meaning a good deal of room for industry. It is located advantageously to Worcester, Providence, and Boston. And within five years, Interstate #495 will pass through the town. Because of these reasons Tom Pontolilo feels that his land and buildings are a good long term investment.

## FRANKLIN MACARONI COMPANY

Thomas Barnical, together with Carl Rowe, are the principle owners and management of the Franklin Macaroni Company. The company is in the process of building a new building in Franklin, Massachusetts (the same town in which Contours Unlimited is located). It is a large cinder block, with brick trim, single story building of approximately 40,000 square feet. The building is divisible into three areas—office space, storage space, and production facilities. The plant is to be fully automated and will employ only thirty-five persons.

The building is located in a section of town already industrialized; a paint factory and a plastics factory are located near by.

There are a number of interesting points about this firm. First, Mr. Barnical and Mr. Rowe, by their prior experience, are macaroni salesmen rather than macaroni producers. Mr. Barnical, the main driving force behind the company, was a macaroni salesman with a firm in Brooklyn, New York that went out of business due to obsolescence and poor management rather than because of an adverse macaroni market. Mr. Barnical says of himself that he is a macaroni salesman with excellent contacts in the federal government, therefore, it came to his mind to go

into business for himself producing macaroni and selling it principally to the government.

A second interesting point is that Mr. Barnical and Mr. Rowe have obtained the funds to build their plant in Franklin from the federal government under the Area Redevelopment Law. The government will loan 65% of the needed funds provided the recipients of the loan put up 15% and an Industrial Development Commission in the town in which the plant is to be located will loan the remaining 20%. In this case, approximately \$200,000 was advanced by the government.

#### REASONS FOR PLANT LOCATION

The main determinant as to where Mr. Barnical and Mr. Rowe would locate was predicated by the fact that the funds necessary to build their plant was coming from the federal government. For this reason they had to locate in a disaster area of high unemployment as defined by the Area Redevelopment Commission.

The secondary determinants that influenced the exact location are of the more common variety. The production and transportation of macaroni deem it essential that the plant be located on a rail road siding and be accessible to major highways. This is necessary so as

to receive raw materials, and ship boxed macaroni as speedily as possible. The plant is located on a siding of the Boston and Maine Rail Road, and near by is Route #140 to Worcester and Route #1 to Boston and Providence. Interstate #495 will also pass through Franklin. The plant also needs town water and sewerage; surprisingly, this criteria was difficult to meet in most other sites looked into by Mr. Barnical.

Franklin was also chosen over the other areas which were acceptable to the Area Redevelopment Commission such as Lowell in the north-eastern part of the state, because in the southern part of the state where Franklin is located there is a larger concentration of people. In addition, there is evidence of a population trend towards this area. Mr. Barnical hopes that this larger population will develop into a macaroni market.

Because the plant employs only thirty-five people, labor was not a major reason for location in Franklin, nor was skill thought essential, for these people will be employed mainly in the warehouse.

## WELDERS SUPPLY COMPANY

Welders Supply Company is located in Burlington, Massachusetts, a small town twenty miles northwest of Boston. Burlington has been the site of a number of large "Space Age" plants for the reason that Route #128 passes through it.

Mr. Everett Johnson together with a partner started Welders Supply Company in 1939 at a location in Cambridge, Massachusetts. The company now, and as it did in 1939, distributes industrial gases and welding supplies to manufacturing firms, laboratories, and other users. At present, its old Cambridge location and another location in Everett, Massachusetts are only pick-up stations. The present location in Burlington, immediately off Route #128, fills the bottled gas tanks, stores welding supplies, and maintains the offices.

In 1959, the present building was built on a two acre site tangent to an exit-entrance of Route #128. The building is of cinder block construction, two stories in the front and one in the rear where trucks are unloaded and pick-ups made, and where the gas tanks are filled. The building can easily be seen from Route #128. There is ample parking available for the company's thirty-five employees and for the eleven delivery trucks. At the

present time, the operation of Welders Supply Company utilizes just over one acre of the two acre tract. Even though Mr. Johnson felt that one acre was sufficient for his company, he and his partner purchased the whole tract which was for sale. It was thought excess land should be available in the event business increased to such an extent as to warrant expansion.

#### REASONS FOR PLANT LOCATION

As with the other companies interviewed for this report, the decision to relocate resulted from a number of reasons that built up over a period of time to be capped off by a final factor that resulted in relocation.

In the case of Welders Supply Company, the factor that triggered relocation consideration was the relocation of one of Welders Supply Company's biggest customers. This customer moved from Cambridge to a site on Route #128. Over a span of years a number of other smaller accounts had also moved into the general area of Route #128. This trend, coupled with the realization that the Cambridge location had been too small for a number of years led to relocation.

Mr. Johnson and his partner spent a number of days traveling the area around Route #128 looking for an

acceptable site. No brokers or other professional persons were consulted; the search for a site was done strictly by Mr. Johnson and his associate. Within a short time, they located the two acres of land which they now occupy, and in comparison to the other sites investigated, it proved to be the superior for their purposes.

At this point the two men weighed carefully the selling price of the land, which was high, and the cost of construction against the benefits that could be derived from the new location. They were as follows:

- 1 - The company would be accessible to old customers that had themselves relocated
- 2 - there would be space to expand their facilities
- 3 - the company would be in the center of an industrial complex, therefore, sales could be increased
- 4 - Route #3 to Lowell, Route #128, and the Middlesex Turnpike to Boston were all within sight of the location
- 5 - and finally the site was adjacent to an exit-entrance of Route #128.

These five reasons proved the site acceptable so the company bought it and constructed the present building.

After being there since 1959, each of the above proved to be a true advantage. There also was a bonus of two other advantages:

- 1 - The company uses only one acre of land of the two acre

tract. The remaining land has appreciated in value at a greater rate than was anticipated so that now this vacant acre can be sold for a price equal to the total cost of both acres.

- 2 - The location, being central, attracts help, therefore, the company is in an unexpected labor pool.

## V - ANALYSIS OF COMPANY DATA

### 1 - COMPANY DETERMINED FACTORS THAT LED TO THE SELECTION OF A GIVEN SITE

Each company interviewed in this study had different objectives for locating as it did or where it purposes to. The major objectives revolved around the need for expansion and the need for adequate transportation and ease of accessibility. One of these two objectives entered into all five companies preliminary plan.

Room for expansion was a prime requirement to Metal Bellows, Welders Supply, and Medway Hat Company. Available space for immediate expansion was essential to Contours Unlimited. Franklin Macaroni looked upon the expansion motive as being too far into the future to warrant consideration at the present.

Ease of accessibility by workers influenced the decision of Metal Bellows to locate in Sharon, Massachusetts on Route #1, rather than at their first site selection in Stoughton, Massachusetts. The Stoughton location would have meant additional driving time for a major segment of Metal Bellows employees. Also, Metal Bellows Company wanted to be located conveniently to an airport, for the sales personnel of the company have to make frequent selling trips.

Mr. Barnical, of Franklin Macaroni Company considered transportation as a prime objective of his firm. His company had to locate near a rail-road siding, for this is the way in which his flour and ingredients arrive from suppliers to his plant. Also, the rail-road will ship packaged macaroni to his customers. The bulk of shipping packaged macaroni, though, will be done by truck; therefore, his desire to be near main highways.

Because certain industrial gases, such as nitrogen, can disipate in a day from the best of containers, and because other customers must be serviced on a day to day basis, Welders Supply Company has to be located near customers, or be able to service them in a short time, therefore, Mr. Johnson's desire to be located near major roadways.

Being able to use, free of charge, the trucks of its supplier was a prime inducement for Mr. Gluck to locate in Franklin, Massachusetts. If and when this fringe benefit should stop, Mr. Gluck will have to rely on some form of common carrier. Franklin is located in an area convenient to rail roads, trucking facilities and major highways.

Tom Pontolilo, of Medway Hat Company, was perhaps the only man not overly concerned with the problem of accessability and transportation facilities. His new

Bellingham location is only five miles from his old building which was in the town of Medway, Massachusetts. The area between the two locations has no hinderances such as a large population center or devious winding roads to impede his work force, his receiving of raw materials, or his shipping finished hats. His new location is only ten minutes from his old, and to the trucking company shipping Mr. Pontolillo's hats to New York, this is a small factor.

As can be seen, only Franklin Macaroni needed plant facilities which included a rail-road siding. The trucking industry and a network of good roads has made for versatility in plant location.

Secondary factors which determined the sites are as diverse as the companies surveyed. Martin Gluck of Contours Unlimited sought a small town location in order to have a measure of control over conditions outside his company. For instance, a small town location will facilitate keeping his manufacturing process away from competitors until patent rights are secured. Also small town officials are easier to contact and work with than in a big city.

Tom Pontolillo wanted a factory within which he could expand production or lease space. He wanted to be able to cover his investment whether he stayed in the ladies hat industry or entered the real estate business.

As with Martin Gluck and Tom Pontolillo, Tom Barnical's secondary motives are also personal. He was a salesman of macaroni with what he considered good government contacts so he negotiated for a government loan, obtained it, and built his plant. This motive of having the courage to enter into business is one that has been displayed by all five men, and for that fact, all business men. It should be noted that the objective of wanting to go into business for oneself is secondary to the prime objective of producing a commodity saleable at a profit.

## FACTORS THAT DETERMINED LOCATION IN FIVE SELECTED COMPANIES

TABLE NO. 2

		<u>FACTORS THAT DETERMINED LOCATION</u>
CONTOURS UNLIMITED	INITIAL LOCATION	<ul style="list-style-type: none"> <li>1 - use of suppliers trucks lowered transportation costs</li> <li>2 - location near production material</li> <li>3 - low rent</li> <li>4 - resevoir of skilled labor</li> <li>5 - desired small town location</li> </ul>
METAL BELLOWS COMPANY	RELOCATION	<ul style="list-style-type: none"> <li>1 - need for new quarters</li> <li>2 - maintain employee satisfaction</li> <li>3 - accessible to transportation</li> <li>4 - expansion of production</li> <li>5 - adequate area for future growth</li> <li>6 - population growth thought best south of Boston</li> </ul>
MEDWAY HAT COMPANY	RELOCATION	<ul style="list-style-type: none"> <li>1 - expansion of production</li> <li>2 - financial security</li> </ul>
WELDERS SUPPLY COMPANY	RELOCATION	<ul style="list-style-type: none"> <li>1 - regain old customers by relocating near new markets on Route #128</li> <li>2 - expansion of production</li> <li>3 - seek new customers</li> </ul>
FRANKLIN MACARONI COMPANY	INITIAL LOCATION	<ul style="list-style-type: none"> <li>1 - satisfy Area Redevelopment Commission</li> <li>2 - accessible to rail roads and highways</li> <li>3 - need for town water and sewer</li> <li>4 - population growth thought best south of Boston</li> </ul>

## CASE ANALYSIS AS TO THE LOCATION PROCEEDURE

In trying to choose a location that satisfied the factors listed in table no. 2, it was found that the pattern as explained on page 20 in Section III was not followed. That pattern being first to determine the general area, then the community, and finally the site.

The reasons for this are numerous. First, the general area within which the factory owner would like to locate is known; be it a geographic region such as southern New England, or a local area such as the south shore of Massachusetts, or a metropolitan location such as the city of Boston. The reasons for this are numerous. A small manufacturer, due to his size, resources, and ability is subject to uncertainties, such as the uncertainty of business trends in a new section of the country, or uncertainty of customs, taxes or banking connections.

Also, for the small business man, the transition period necessary to become successfully relocated in an area he is not accustomed to may be too much for him to attempt again. Or a small businessman may not want to sever business relations that have served him well in the past.

Regardless of how large or small an area is under consideration beyond which location is not desired, and regardless of how emphatic a small manufacturer is in not

wanting to locate outside this area, certain points must be considered which should influence the specific site within the acceptable general area.

Location economists classify industry into three broad categories that are inclusive enough to govern the general area within which a firm should locate. Under this classification, industries are either market-oriented, raw-materials oriented, or oriented towards an intermediary location.

It is simple on the part of a manufacturer to determine within which category his firm operates. Market-oriented firms are those whose products deem it essential to be located near its markets. Be it because the company's finished product requires gentle and/or expensive shipping, or because its product needs constant service, or because the firm manufactures specialty parts on demand.

An example of a market-oriented firm would be Welders Supply Company. The firm sells nitrogen gas which can disipate within a day, therefore, fast delivery is essential. Also, the company is a service organization stocking and repairing welding equipment for immediate delivery or repair.

A firm that is raw materials-oriented must locate near its source of supply of this material, perhaps

due to the high cost of shipping it any distance, such as petroleum refineries located near population centers, or the inability to ship it any distance such as lumber and pulp mills located near rivers which are accessible to timber lands.

The factors that influence an intermediate location are more nebulous. Such a location could be determined by transportation costs, rental values, personal considerations, or by any other factor or factors that influenced managements choice of a location. What can only be said about an intermediate location is that in the opinion of management the total operating costs are near their composite lowest point.

The Metal Bellows Company is a firm that could locate almost anywhere. Metal sheets, its raw materials, are easily shipped from the supplier. The finished product, small metal bellows are also easily shipped to the buyer. If this firm had started in New Hampshire or Maine, management would have been just as satisfied there as in Wellesley, Massachusetts.

The important point about these three broad influences upon location is they are so elementary that when considering location preliminary planning may not even cover them, for they are assumed to be intuitively known by all concerned. There is a degree of danger in

this unspoken assumption—the danger of locating in a site where costs are not minimized. It is easy for firms such as Welders Supply to decide where to locate for it is oriented towards its markets, but it is harder for a firm such as Metal Bellows or Medway Hat to locate because the location of minimum cost may be hard to determine. No firm can hope to optimize all of its location objectives but it must make sure that more effort is expended towards those that weigh more heavily from a cost viewpoint.

A conclusion can be drawn from the three firms mentioned that were involved in relocation, rather than initial location, stating that none relocated in an area that if classified as to market-oriented, raw materials-oriented, or intermediately-oriented, chose an area different from their initial location. Therefore, it can be argued that these influences in determining a site were given little thought as a factor for serious consideration. But if not given conscious thought, it was given intuitive consideration for achievement of this factor is a prime reason for long run success.

The second step in the procedure presented in section III is the determination of the community having the combination of advantages that is necessary for the success of an individual firm, and the final step is to determine a specific site within this community.

But because it was important to each company that the factors listed in table No. 2 be satisfied, there is evidence that the search for a satisfactory site skipped over the selection of a community and dwelled instead on the selection of an adequate site within the acceptable general area. This was true of Medway Hat Company, Metal Bellows Company, and Welders Supply Company. Only Contours Unlimited and Franklin Macaroni made any attempt to find a community first, then a site within the community.

Going directly from the acceptable general area to a site within that area and not bothering about a community analysis was the result of two reasons. One, the general area within which the company wanted to operate was very small. This was the case with Welders Supply Company. Two, the number of available sites that were acceptable to management was very small. This was the case with Metal Bellows Company.

This raises a conclusion that the procedure for small manufacturers in selecting a satisfactory plant location is to first determine the type of business he is: market-oriented, raw materials-oriented, or intermediately-oriented; then determine a specific area which conforms to the type of business which he is. And third, from this specific area select the most advantageous site.

This raises a conclusion that the procedure for small manufacturers in selecting a satisfactory plant location is to first determine how he is oriented—market-oriented, raw materials-oriented, or oriented to an intermediate location. Rather than determining a broad general area within which he would like to operate, he will select an acceptable specific area which conforms to the type of business he is in. The acceptance of this more specific area will, more than likely, be based upon personal reasons. From this specific area he will then select the most advantageous site.

## 2 PRELIMINARY PLANNING

The purpose of the preliminary plan is to facilitate plant location by organizing the thinking that has to be done. The preliminary plan contains the objectives to be achieved by relocation or initial location, the locational requirements necessary to satisfy the above objectives, and designation of who will make the preliminary plan.

The preceeding section describes the rationale that the small manufacturers in this study used in selecting a site. This last section is actually the climax of the site selection procedure and should not be looked upon as coming before this section on preliminary planning, but rather as the putting into effect the plan.

The question arises then, and it is the second question of this study, were the factors listed in table two actually thought out before hand or were they only on the spot justification for a site? In other words, was there a formal preliminary plan prior to site selection that listed the factors in table no. 2, or not?

Two of the companies interviewed, Contours Unlimited and Metal Bellows, had a comprehensive preliminary plan but Mr. Pontolilo of Medway Hat Company and Mr. Johnson of Welders Supply Company could easily tell you the object-

ives they felt were essential and the type of area to which they would locate. These four firms fall into a category whereby their moves were predicated by essential objectives together with extraneous objectives. Essential objectives are those that contribute to the success of the firm in a major way.

Mr. Barnical of Franklin Macaroni Company was in a less flexible position than the others. His objectives were all essential; he had no extraneous objectives that would influence his location. In order to borrow the necessary money from the Federal Government to construct his plant, he had to follow the regulations of the Area Redevelopment Commission. This meant that he had to be sponsored by a local industrial development corporation to the Department of Commerce of the State of Massachusetts, which in turn approved and passed on his request for loanable funds to the Area Redevelopment Commission. Mr. Barnical's only degree of real flexibility in choosing his location was to determine within which depressed area he wanted to locate.

In essence, Mr. Barnical's preliminary plan was taken care of by the exigencies involved in obtaining the necessary funds, and the manufacturing and shipping of macaroni.

The fundamental reason Mr. Gluck chose Franklin was not essentially determined by preliminary planning but

rather to capitalize on the cost advantages offered by his suppliers promise to transport jute to the company, and Contours molding compound to customers free of charge.

Contours Unlimited preliminary plan also included the production of "Contourlite" on a sample basis two years prior to going into business. In this two years, market research was engaged in to see if the product had a potential. Research and development was carried on, as were experiments to determine the limits of "Contourlite". Potential customers were approached and as time went on contracts were entered into so that when Martin Gluck opened his doors he had a backlog of business together with a product with which he was completely familiar.

Secondary reasons, or extraneous reasons, for locating in Franklin also evolved from preliminary planning. First, he wanted his product out of the eye of competitors until patent rights were completed. Second, Franklin, with its small town atmosphere, offered many advantages which he felt were conducive to him as an entrepreneur such as the ease of meeting public officials. And, third, a small town offered cost advantages such as lower rent, and a reservoir of skilled labor at a lower wage.

Metal Bellows Company did not have as an inclusive plan of operation as Contours Unlimited when they first

opened shop in 1955, but the preliminary plan involved in their proposed move to Sharon, Massachusetts can be described as more than adequate.

This company was more systematic in determining their location requirements than were any of the other companies interviewed. Mr. Shamie used the technique of drawing circles of odd mile radii one, three, five, etc., from his present location in Wellesley, Massachusetts and actually going out and visiting certain sites that appeared to have the location requirements to satisfy his objectives. His preliminary plan included contacting real estate brokers and industrial development corporations, one of which was the Industrial Development Corporation of Stoughton, Massachusetts. The company almost located in Stoughton but upon polling its employees it was found that the location was too far from the homes of the majority of workers. Therefore, another site in Sharon was chosen.

Tom Pontolillo's preliminary plan consisted of philosophical reflections as to the duration of his stay in the ladies hat industry. Hoping to maintain his investment of capital regardless of events, was the determining factor in his selection of an old complex of mill buildings and ninety-odd acres of land in Bellingham, Massachusetts. Here he could either expand his ladies hat business or rent factory space; which ever offered the better profit in

relation to the time and effort involved. Mr. Pontolilo and his accountant have kept extensive cost figures for past years which will be compared to the future figures from his new site. Comparison of cost to profit will determine the use to which he puts his buildings.

Mr. Pontolilo found his present property with the help of a real estate agent who was not actively solicited but offered his services when he heard of Mr. Pontolilo's requirements for a site.

Mr. Everett Johnson of Welders Supply Company had little formal preliminary planning in the way of written objectives and locational requirements. This is not to say that his present facilities in Burlington, Massachusetts were selected in a haphazard manner. Mr. Johnson knew the advantages of a relocation—he could supply old customers who had moved away from the Cambridge location, he could make new ones, and he could expand his operations. Mr. Johnson's location objectives were clean-cut expansion of his business. (Mr. Shamie and Mr. Pontolilo had extraneous reasons to influence their location preference—worker satisfaction and multipurpose property.) Therefore, Mr. Johnson and his partner investigated the general area to which a number of his old customers had moved and decided on a site with little fanfare or trouble.

The designation of the individual to be in charge of the site search posed no problem for any of the companies interviewed. In the case of a single owner, this man did all the work, and in the case of partners, the responsibility was shared between them even if one had to put in the most time on the project.

Using the composite experience of the five companies interviewed, it can be said that the selecting of a site can be divided into three sections:

- 1 - determining the objectives a relocation has to achieve which are broken down into:
  - A - essential objectives
  - B - extraneous objectives
- 2 - determining the requirements a location has to have to achieve the above objectives
- 3 - determining whose function it is in defining the objectives and requirements.

The first step in organizing a preliminary plan is to get a clear perspective on the reasons that have led to the decision to relocate and from these formulate the objectives a relocation has to satisfy. It is conceivable that the effort and money that will be expended for new facilities could be better utilized renovating present quarters. A clear perspective means being concise, there-

fore, set down on paper the objectives that a relocation has to achieve in order to be successful. For example, the reduction of raw materials cost, the desire to be closer to markets, or ample space for future expansion. All are valid objectives.

Objectives fall into two broad groups: those that are essential to the success of the firm, and those that are extraneous to the success of the firm or contribute to it in a minor way, if they contribute at all. Reduction of costs, increasing sales, or making provision for expansion are examples of essential objectives. A desire to have enough area to build a soft ball diamond or the desire to locate in a residential town are examples of extraneous objectives. It is difficult to conceive of a location that will satisfy every criteria an owner envisions, but warning should be given to the individual who will allow more flexibility in his essential objectives than in the non-essential or extraneous objectives.

Defining the locational requirements necessary to achieve the above objectives is the next step in a preliminary plan. For instance, if a manufacturing operation must be free from vibration, such as in the case of making precision metal bellows, a country location away from truck traffic may be desirable. The purpose of

associating a company's predetermined objectives with the factors that contribute to the success of these objectives is to reduce the time and expense involved in a site selection. There is no profit in canvassing areas which in no way can contribute to the success of a firm.

After the decision has been made to move and all objectives and requirements have been listed, it is wise to make a detailed cost estimate of present facilities. These operating figures will then be available for a cost comparison study between costs at the present location and the estimated costs at the proposed site. This operating cost estimate, if made by a competent accountant, has the advantage of being objective, therefore, providing the best evidence on a cost basis, for or against the proposed site.

If through the use of a cost comparison there is evidence of lower costs at the proposed site, then these lower costs must be compared to the lump sum cost of moving. If there is still a noticeable cost advantage at the proposed site, and this site stacks up to the objectives and location requirements, a move may be feasible.

The question arises as to whose function is the responsibility of determining the above objectives and requirements. One firm may find it advantageous to hire a consulting firm, another may delegate a vice-president

or a committee, and another may, as the case usually is with small manufacturers, rely solely on the president or owner.

In regard to who will carry out the preliminary plan, Dr. James Thompson, in a study for the Small Business Administration writes, "There is no pat answer as to the form of organization which companies should use in plant location. The comparative effectiveness of the various possible methods depends on the size of the firm, scope of the project, special problems faced, and other factors.

A serious danger is that the president or owner of the firm will conduct the search as a one-man project, asking and receiving little or no assistance from either within or outside of the firm. While some successful site surveys have been handled in this way, it is a course of action which increases the possibility of locational mistakes. He should consult regularly with other members of management and utilize whatever sources of technical information exist among the company's personnel. Delegation of part of the "leg work" to a subordinate may also be possible. For instance, the "first round" of community visits might be also delegated. Beyond this, if the firm has a staff member who is particularly well-qualified for site selection, it may be desirable to assign the entire field investigation to him. In such a case, the president's

role could be limited to making the final choice among several recommended sites." (15)

### 3 - USE OF CONSULTANTS

It requires only an examination of the firm to get the essential information for the preliminary planning stage. The problem now arises; how does a firm obtain the information necessary to form a valid judgement as to the general area, community, or site. This problem can be broken down into the acquisition of two types of information-- information acquired by the firm's own efforts, and information compiled by others which is offered or bought by the firm.

Information obtained by the firm's own efforts includes field trips; using published information that has not been specifically compiled for plant location, such as U. S. Government census and population trends; advice from friends or disinterested third parties who offer informal evaluation. There are also various mechanical aids that can provide information such as topographical maps; aerial photos; still and moving pictures; highway, street, and zoning maps; and published check lists.

Information compiled by others which is offered or bought by the firm can range in usability and reliability from very helpful to not at all helpful. Some of these sources are:

- a - professional consultants
- b - the Small Business Administration

- c - rail roads
- d - electric power companies
- e - area redevelopment groups
- f - state development agencies
- g - chamber of commerce
- h - local groups
- i - real estate brokers

In the five companies interviewed, only two used an outside source (other than a real estate broker) in its site selection study. The Metal Bellows Company in very serious negotiation with the Industrial Development Corporation of Stoughton, Massachusetts, selected a site in Stoughton that met all the qualifications Mr. Shamie and his partners deemed essential, with one exception—a majority of their workers lived to the west of Stoughton and a plant in this area would add over twenty minutes to their commuting time each way. For this reason the location was turned down.

Tom Barnical, because of the necessity of using government money, had to work with a local industrial development corporation that was located in a depressed area. Because of the advantages of Franklin, as presented by the Franklin development corporation, Mr. Barnical located his macaroni plant in this town.

In one other case, outside help was sought in sort of an off-hand manner. Tom Pontolilo of Medway Hat Company

let it be known to a few real estate brokers that he was looking for a new plant that was capable of expansion and one floor operation for his hat business, and that was also large enough to be subdivided for leasing. It was from the efforts of a real estate agent that he found his present plant—six buildings of various heights on 90 acres of land.

Everett Johnson and Martin Gluck used no outside assistance in their site selection. Mr. Johnson and his partner drove to a location they knew old customers of Welders Supply had moved, evaluated the area in terms of delivery time, roads to other markets and future development of the general area, picked a two acre site at an interchange, bought it, and built a plant.

Mr. Gluck was enticed to locate Contours Unlimited in Franklin, Massachusetts because of the advantages offered him by his supplier of impregnated jute.

Even though information compiled by others outside the company was not relied upon in these five companies, each did have a plan of formal investigation. This was brought out in part two of this section—Preliminary Planning. The majority of data that was collected by each firm fell into the classification of information obtained by the firms own efforts.

## VI - CONCLUSIONS

The empirical evidence gathered in this study indicates that the resources and abilities within a small manufacturing firm are adequate to perform a successful site selection. Given that these five firms are representative of conscientious, small manufacturers, five conclusions or observations may be drawn that are universally applicable to the majority of small firms.

First, in every company interviewed for the study there was one, or perhaps two, main factors that determined where a site would be and what the site would be like. It should be noted that these were strong economic factors such as to expand production, to obtain lower costs, or to move closer to markets. In addition, these factors were supported by secondary reasons such as the preference for a small town location. Viewing this evidence it would appear on the surface that plant location was decided on a whim; this is far from the case. That the motivation for plant location resulted from only one or two location factors is understandable when one considers the sphere of operation of the small manufacturer. Compared to a larger firm, the small company is uncomplicated and this allows the principle figure in the company to be completely aware of all areas of action within and outside

his firm. His counterpart, on the other hand, in the large firm relies on second-hand or committee originated information for his knowledge of his firms sphere of action.. In essence, this means that a decision to enter into some action involving the larger firm must be justified by many more factors than is the case with the small firm.

In answer to the first question posed in this study—What were the factors that led to a given site?—it can be shown from the evidence that even though the factors that motivated plant location were few in number, they were supported by strong economic logic. From the experience of the five firms in this study, it can be concluded that the reason for plant location should be obvious and not garlanded with adjectives to camouflage their weaknesses.

Second, a number of independent studies expound as a site selection procedure the following: determine first the general area where location is desired; second, select a community or city in this area; and third select a specific site from within the selected community. In the cases presented in this study, this pattern was not adhered to. First, the general area within which the

firm is to be located was never considered as a location criteria because it was known. In other words, as a rule, the small manufacturer does not locate in an area far removed from his present site or his present home.

Furthermore, the second and third steps are intertwined so that the site selection procedure of the small manufacturer is to disregard the community selection and to determine in the area out of which he will not locate, the specific site that is most satisfactory for him. The reason for this is that the area away from which he will not locate is relatively small, therefore, the number of sites available to him are limited, be it for physical or cost reasons or because they are just not available. Limiting the site selection to the confines of one community is to limit the number of sites available.

Canvassing a small area for a site involves a good deal less effort than if site selection followed the pattern mentioned above of determining three areas expounded by other studies. This leads directly to the third area of observation, that of noting the amount of effort involved in preliminary planning.

It can be added that in no case was a site arbitrarily decided on without some reflection as to what the site had to be like, and had to contribute to the success of the firm. It must be said, though, that none of the firms showed

any similarity in the preparation of a preliminary plan; nor did they really consider their preparatory work prior to selecting a site as a formal preliminary plan. More, the case was that their preparatory work was guided by the following criterion: concentrate on transferring from one site to another those factors which have made the firm a success in the past.

This gives rise to the conclusion that, as one man put it, if some one has been in business long enough to grow to the point where relocation is necessary, then this same ability will be the factor which will insure the success of the relocation.

The above conclusions can also be used to summarize the fourth area of observation, that of the use of consultants or some professional factory location service.

In only two cases were the services of a consultant used. Both were a semi-professional factory locating service. In one instance the services were required to fulfill the requirements in borrowing money. The proposal of the second was seriously considered but was eventually dropped through no fault of the industrial development commission. It would be academic to speculate if these five firms had used consultants of some sort would they be more successful than they are now. The only way to answer this question is to return after a suitable period and

reinterview them. Generally it can be concluded that successful relocation or initial location can be made, as far as the small business man is concerned, without the expense involved in hiring a professional consultant.

As a final conclusion, it must be said that small manufacturing firms have unique characteristics that differentiate themselves from a larger firm. This point is worth discussion if only for the following reason.

In writing this study the author had the opportunity to brief certain publications of chambers of commerce and local industrial development commissions, and also to talk with a president of an industrial development commission that was characterized as being very aggressive. Prior to writing this report the author felt that these local business betterment organizations were largely ineffectual in attracting business to their communities due to the caliber and type of information they tended to emphasize when extolling the virtues of their respective towns. After having written this report, and having interviewed a number of business men, and having had the opportunity to study with a reasonably critical eye a large volume of such information, the author still feels that his earlier impression founded was not in bias, nor on insufficient information.

When soliciting small manufacturing firms the author feels that the theme of this study would contribute

towards the improvement of such organizational material, if certain unique characteristics of small manufacturers are kept in mind. This study has mentioned or inferred a number of these, and an awareness of them would be helpful to the above organizations as well as to small manufacturers themselves.

The most noticeable characteristic of the five firms interviewed was that none had relocated at any great distance from its old location; in the case of initial location, the site selection was near the family residence of the principles in the company. The implication of this is that none of these firms saw fit to spend time in a regional analysis of a large geographic area. Their time was taken up with community and site analysis, with the emphasis placed on site analysis.

Characteristically, these five firms did not find the need to consult professional factory location services. In only one instance was the help of a semi-professional industrial commission used, and in this case the industrial commissions sponsorship was essential for the granting of a federal government loan. This fact is borne out by other studies; small manufacturers can do on their own a very satisfactory site selection analysis.

In contrast with a large firm all decisions as to location were made with relative ease by one or two men.

There was no need to consult a board of directors, or a committee, or the home-office located half way across the country. This reliance on one or two individuals is as much a disadvantage as it is an advantage, because in a small firm personal considerations may be weighed as heavily as the dollars and cents economic considerations. It would be unfair to say that any one of the five firms interviewed attempted to justify their personal reasons for relocation by economic reasons, rather than the other way around. But none-the-less, reliance on personal reasons is a unique characteristic of a small manufacturer.

Perhaps similar to a large firm, no two firms ranked in the same order their respective location requirements. In fact, the five firms interviewed had five different reasons for relocation or initial location. This points up the fact that a list of location factors culled from many sources will never be complete and should only be used for a guideline.

Characteristicly, the five firms interviewed placed a great deal of emphasis on transportation costs, availability of space for future expansion, availability of space for present expansion, and the nearness to markets or raw materials. The five firms did not seem particularly interested in the labor supply or the price of labor, nor to any great extent in the tax structure.

The reason for this lies in the fact that small manufacturers do not relocate from one economic or geographical region to another but rather relocate within one general locality. Therefore, these firms assume that the supply of labor, the price of labor, and the tax structure is similar within this local area.

A final characteristic of the five firms interviewed was that the money needed for relocation was borrowed, or in one instance, raised by stock subscription. This gives more justification to the observation that an adequate location analysis is essential to the successful location of a firm, for it is due to the success of the firm that old indebtedness is paid back or the company proves itself.

## FOOTNOTES

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- (5) Greenhut, p. 19
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- (8) Rahdert, Karl G. "A Case Study in Plant Location", Industrial Development, October 1957, pp. 29 - 32
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- (10) Basic Industrial Location Factors, U. S. Department of Commerce, Paper No. 47, November 1947
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- (13) Michigan Business Review, Volume XII, No. 1,  
January 1960, p. 23.
- (14) Because all basic patents have not been granted,  
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