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The Evolution and Character of the Bedding Plants Industry in Kalamazoo County, Michigan

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THE EVOLUTION AND CHARACTER OF THE BEDDING PLANTS INDUSTRY IN KALAMAZOO COUNTY, MICHIGAN

by

Robert F. Wiseman

A Thesis
Submitted to the Faculty of the School of Graduate Studies in partial fulfillment of the Degree of Master of Arts

Western Michigan University
Kalamazoo, Michigan
November 1969
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During the last year and one half the author has been a casual observer in many bedding plants operations and has been closely involved with others. The writer wishes to acknowledge the assistance of all contacted growers in the Kalamazoo area, and especially Melvin Klooster and Robert Ouding, president and general manager respectively of the Kalamazoo Valley Plant Growers Co-operative, Incorporated. The assistance of Vernon Hinz, Kalamazoo County Agricultural Agent, and Dr. William H. Carlson, Assistant Professor of Horticulture, Michigan State University, is also appreciated. Most importantly, I thank my advisor Dr. Oscar H. Horst for the constant encouragement and limitless patience he extended to me on the occasion of this thesis.

Robert F. Wiseman
MASTER'S THESIS

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INTRODUCTION

The agricultural reputation of Kalamazoo has long been associated with the production of celery. At the turn of the Century, Kalamazoo secured the title of "Celery City" because of both the quantity and quality of the local production of this crop. Today very little celery is grown but in its stead Kalamazoo might well lay claim to a new title, the "Garden Flower Capitol" of the Middle West. Within the past decade there has arisen a bedding plants industry\(^1\) of garden flower and vegetable plant production whose product is valued at over two million dollars annually. Kalamazoo County is recognized as having the most concentrated flower and vegetable plant industry in the State of Michigan and possibly the Middle West.\(^2\) Because this business has developed only recently, very little is known of its character. This study is an attempt to rectify this lack of knowledge by tracing the development and the present nature of the

\(^1\)Bedding plants industry is defined for this study as the commercial cultivation of annual flowering and vegetable plants.

\(^2\)Reported in an interview with Vernon Hinz, Agricultural Extension Agent for Kalamazoo County.
bedding plants industry in Kalamazoo County, Michigan. Furthermore, a thorough investigation of this business and its trends will facilitate comment on future developments. Will this industry experience a boom and bust cycle as did its forerunner, celery? If so, what phase of the cycle is it in? Will production climb or fall in the immediate future?

Kalamazoo County is located mid-way between Detroit and Chicago, approximately 35 miles north of the Indiana State border. Within the County there are three areas of bedding plants production. Figure 1 shows the locations of these areas and their positions relative to the Kalamazoo urban area. To facilitate the identification of these for this study they have been arbitrarily designated as North Westnedge, Comstock, and Portage. The North Westnedge area lies just north of the City of Kalamazoo with a small sector falling inside the City limits. The Comstock area is located just east of the City and is included in the Township of Comstock. The Portage area lies immediately south of Kalamazoo and is within the City of Portage. Figure 2 depicts the location of individual operations within the three production areas.

The situation of the production areas is most fortunate in regards to the surrounding highway and road
Figure 1

LOCATION OF THE BEDDING PLANTS PRODUCTION AREAS IN KALAMAZOO COUNTY, MICHIGAN, 1969

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Figure 2
LOCATION OF BEDDING PLANTS GROWERS
KALAMAZOO COUNTY,
MICHIGAN, 1969

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network. Interstate 94, which connects Detroit and Chicago, passes through the study area just north of Portage. U.S. 131, the major north-south expressway in this portion of the State, lies immediately to the west of the study area. All three producing nodes enjoy good linkages by improved roads to these important highways.

The rapid growth of suburban America has created a great demand for annual garden plants. Whether for purpose of displaying affluence, breaking up the monotony of mass-produced housing, or the desire for aesthetic rewards, the demand for flowering plants has expanded greatly within the last decade. No longer is the home owner content to plant seeds and cultivate patiently for months in hopes of enjoying the results of his labor only in late summer. Today he desires instant flowers which require a minimum of care. Through the extensive use of greenhouses, modern packing techniques, and rapid shipping this demand can now be met. By examining the antecedents of the bedding plants industry in Kalamazoo, this paper will show that local areas were very well endowed to enter this expanding market.

To fully understand the bedding plants industry, more than its history will have to be examined. The physical elements which relate to current plant production and the facilities used by this industry must be
described. Areas of production and consumption will be presented as well as alterations in pattern. An analysis of the economic aspects of this business will be undertaken. This will include an investigation of variations in output. Description and analysis will lend itself to comments concerning the future of the bedding plants industry.

To secure the information necessary for a thorough understanding of the bedding plants industry, many sources were consulted. Unpublished reports, histories and geographies of the area, government publications, and newspaper accounts have been examined. Extensive field observation and interviewing was undertaken. The interviews were conducted both formally and informally with growers, truckers, laborers, and others involved with the industry over the one-and-one-half year study period. Thus, results obtained from the interviews relate to the 1968 and 1969 growing seasons.
CHAPTER I

PHYSICAL SETTING

Landform and Soil Characteristics

Original settlement in Kalamazoo occurred within the prairies and their forest margins. As settlement progressed forested areas were also occupied. The swamps north, east, and south of the City of Kalamazoo were some of the last areas to be claimed because of their malarial character and the difficulty involved in clearing and draining the land. As late as 1890 the Comstock region east of the City of Kalamazoo was still either forested or in heavy brush; farming occupied only the higher ground. With the influx of Dutch immigrants throughout the Nineteenth Century the value of these muck areas for vegetable production became known. These industrious people began clearing and draining the "muck pans,"

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2 "Muck pan" is a local term applied to the muck areas because of their panlike shape.
creating an incipient truck farming industry.

Those engaged in clearing muck areas found swamps consisting of either swamp forest or marsh grass vegetation. The swamp forest consisted of trees of yellow birch, red maple, and black ash which may still be seen around the margins of these areas. The marsh vegetation included tall grasses and reeds which were as difficult to clear as were the trees. Draining these areas proved to be the most difficult undertaking and was accomplished by ditching around the margins of the fields. Even with draining, the swampy character of the muck pans was evident for the horses used in the fields had to be outfitted with large wooden shoes to keep from sinking into the wet soil.

The Soil Survey of Kalamazoo County, Michigan\textsuperscript{3} published in 1926 designates all soils within the study regions as muck except those in the Comstock area. These were classified as Oshtemo Loam, "a brown mellow loam" underlain by a "yellowish loam" to a depth of 36 inches. Field observation reveals that this is not the case. The Comstock area of flower production and of older celery cultivation lies within a muck pan which has an average

depth between five and six feet. This muck soil appears to be quite similar to that of the other study areas. These muck soils consist largely of decayed organic matter. The surface is mellow, black, and of a fine texture. In lower levels (where decomposition has been retarded) the muck assumes a peaty texture. This peaty soil is acidic, brown, and more fibrous than the upper levels.

The muck pans which comprise the study areas were formerly utilized extensively for the cultivation of vegetables, peppermint, and spearmint. Although organic content was high, fertilization was necessary for the cultivation of vegetables, especially celery. Until World War I, manure, obtained from the Chicago stock yards, was applied in great quantities. Chemical fertilizers supplanted manure after the arrival of the automobile and have assumed additional importance today in the more specialized production of greenhouse flower and vegetable plants.

The depth of this soil, including both muck and

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4 Leonard Platteborze, "Historical-Chronological Case Study of the Edward Tunier Farm, 5859 East L Avenue, Comstock, Michigan" (unpublished report, Department of Geography, Western Michigan University, 1958), p. 3. This was also reported to the author in the course of informal interviews in the Comstock area.
peat, is consistently reported to be five or six feet throughout the Comstock and Portage areas and approximately four feet in the North Westnedge area. Some variation exists within each unit, especially about the margins of the muck pans. Most growers interviewed reported that this average depth was considerably less than was the case when the swamps were first cleared. The exact amount of change due to compaction, wind erosion, and factors relative to cultivation is subject to widely conflicting reports. What is important to note is that immediate concern for the depletion of this soil is seldom expressed.

Climatic Characteristics

The climatic regime which obtains within this general region is classified as cold and snowy in winter, hot and rainy in summer. Approximately 35 inches of precipitation are well distributed throughout the year. There is a wide fluctuation in annual temperatures, the yearly mean for Kalamazoo being 49.6°F. July is the warmest month with an average of 73.5°F., while January has the coldest mean monthly temperature of 25.7°F.  

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Of the many factors which govern climatic conditions a few are of local significance. Kalamazoo's proximity to Lake Michigan moderates seasonal temperature extremes and increases the number of cloudy days. The incidence of cloud cover significantly affects the amount and intensity of solar insolation received. Elevation and surface configuration determine local variations in the length of the growing season.

The various elements which comprise the total climate of the Kalamazoo area are of import to both the cultivation of celery and the bedding plants industry and must be examined in their relationship to these two distinct industries. Many factors which were very important to the grower of celery are not as crucial to operators in the bedding plants industry. However, the plant grower of today has his own set of climatic factors with which to contend.

Of importance to the agricultural community engaged in celery production was the occurrence of late spring frost and the general length of the growing season for this area. Early varieties of celery required a long growing season. Thus, celery was subject to frost. At the 32° freeze threshold temperature, the mean date of last spring frost is recorded as May 9. The early autumn frost at this temperature falls on or near
October 9. Between these dates is an average frost-free growing season of 152 days. However, it is necessary to note that all of the official weather data for the Kalamazoo area comes from the Kalamazoo State Hospital which is located on top of an outwash plain. This surface stands at an elevation of over 900 feet above sea level. The muck areas of concern in this study lie at elevations of 760 feet in the Comstock area, 770 in the North Westnedge area, and 840 to 860 feet in the Portage area. This dissimilarity in elevation is bound to produce not only differences in the number of occurrences of frost but also in the date of the last spring and the first fall frost in the area of the low lying muck pans. The rapid thermal conductivity of these light, fibrous soils is also likely to contribute to more numerous frosts. Thus, the length of the growing season in these areas must be considerably reduced.

To resolve this question relating to the duration of the frost-free season some of the farmers previously engaged in celery production were interviewed. No uniformity in responses resulted, but most of the interviewees distinctly remembered exceptionally late spring

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frosts. Perhaps this is even more significant for it is on this basis that the farmers perceive their growing season. Their planting is in direct response to this "recolletion" of disastrous frosts. All did agree that the official growing season of 152 days, as calculated from records at the Kalamazoo State Hospital, was grossly exaggerated. It was in an effort to lengthen this short local growing season that the celery producers began to utilize greenhouses.

Precipitation was important to the celery farmer. Of the annual rainfall, totaling 30 to 35 inches, a higher proportion fell during the spring and early summer months, the season during which the crops require much water. Although this was sufficient to grow most crops, the unreliability of this rainfall throughout the growing season forced many celery growers to install irrigation.7

Other weather phenomena were of sporadic concern to the celery grower. High winds often carried away some of the light muck soils. Large hail could break the

7 The initial use of irrigation was deemed necessary by the Comstock growers when the water table in that area dropped considerably. This was blamed on increased pumping to supply water to industries which were springing up on the fringes of the area. Irrigation proved successful and quickly spread to the other celery areas.
glass panes in the greenhouses. Excessively heavy snowfalls would actually collapse the houses. The crop, however, was not as highly susceptible to these vagaries of weather as is the bedding plants industry of today where even a temporary interruption of the greenhouse environment can destroy the year's crop.

The bedding plants industry is less affected by temperature and precipitation than was celery cultivation; but, other weather elements pose serious problems for the plant grower. Hail and heavy snowfalls still present a problem to the bedding plants grower of today. However, because of the relatively inexpensive wood and plastic greenhouses now used, storm damage is not expensive to repair. The plastic covering on these houses is replaced yearly. Therefore, the actual covering is exposed to the weather element only during the four month growing season.

Wind was only a minor problem to the celery grower, but, to the plant grower it can be quite detrimental. The first plastic covering materials were easily torn by strong spring winds. Today's heavier plastics are less susceptible to damage from high winds.

Although the receipt of precipitation is no longer important to the local growers, the degree of cloud cover associated with precipitation is of prime concern. The
Kalamazoo region, with Lake Michigan lying upwind, experiences 35 to 50 per cent more cloudy days than do areas immediately west of the Lake. This cloud cover is significant to the grower trying to produce top quality plants. The blocking of available sunlight by clouds has both economic and biological affects. The more sunlight the greenhouse receives, the less heat is necessary to maintain a proper growing temperature of 60 to 65°F. If the plant does not receive enough light, taking into account both intensity and duration, it will become "spindly" in character. This may also cause the plant to remain green longer or retard the blooming of the plant. The advent of plastic coverings, fiberglass, and now the practice of double lining greenhouses with plastic, has added to this problem of lighting. The use of artificial lighting involves an outlay of capital of such magnitude that the smaller concerns would be hard-pressed to undertake this additional expense. Therefore,

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9 Spindly refers to the extreme elongation of the plant's stem caused by its "reaching" for increased light. This condition produces weak-stemmed plants that appear very tall and with few leaves. This appearance is not conducive to the sale of the plant.

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natural light is integrally tied to both the growing time and the condition of the plant.

The temperature outside of the greenhouses is not of immediate concern to the plant grower. However, it has cost him a great deal of money both directly and indirectly. The temperature during the growing season—late winter and early spring—is sufficiently cold to require the grower to invest heavily in heating his greenhouses. More favorable climates would not demand this, if indeed greenhouses would be necessary at all.

Cold winter temperatures and related factors have caused the grower additional expense for construction of "dirt houses" or shelters for the planting soil. In order to secure the planting media needed to fill the flats for planting, operators are forced to store the soil in piles during months when there is no deep ground frost. Obviously, the removal of soil from the frozen earth would be most difficult. Merely stockpiling the soil in the autumn would resolve the problem of freezing, but other factors rule this out. The outer layers of these mounds are apt to be frozen when the planting season begins. Furthermore, this soil has been sterilized to purge it of weeds and insects. Leaving it piled outside exposes the soil to new incursions of weeds and pests. If the pile is left uncovered, it may soak up
excessive moisture, making the handling of this planting media most arduous. With the advent of mechanized flat-filling equipment, excessive moisture has become more of a problem. Wet soil tends to plug up the machine, thus requiring additional labor to agitate the mixture in the filler. To resolve these problems growers have turned to the construction of "dirt houses."

The weather in general, or those elements which contribute to the total impression of the weather people perceive, is most important in the current bedding plants industry. Most of the year's crop is harvested in only six weeks. Regardless of the crop or market conditions, the plants must be sold during this brief period or they will never be sold. Because there is very little contracted growing the producer is literally at the mercy of market conditions during these six weeks. If the weather in the Mid-West is exceptionally cool and/or wet, psychological factors operating in the retail market work against the purchase of bedding plants. If the weather is dismal and not conducive to outside yard work, people simply do not purchase bedding plants in the same quantities that they do in nice weather. This year, 1969, witnessed six cool and damp weekends and the effect on local plant sales was obvious. In nearly every greenhouse there were flats of plants long
past their prime, wilting in the sun. This loss caused by the weather elements must be absorbed by the grower.
CHAPTER II

HISTORICAL BACKGROUND

The Era of Celery Cultivation

"Kalamazoo Celery" is a title which brought fame to Kalamazoo County in the late Nineteenth Century. Not only did celery growing put Kalamazoo on the map, it also did much to stimulate the local economy. At its zenith, the celery industry is purported to have generated a product valued at over two million dollars annually. By the mid-1930's the industry stabilized, as large and as well developed as it would ever become. By the late forties, production was less than 65 per cent that of the peak years only a decade earlier. By the late fifties celery was rapidly disappearing, and today it is difficult to find any commercial cultivation of celery within what was once called the "Celery Capital of the World." This spectacular rise and demise warrants closer investigation for it has had a direct influence upon the present-day bedding plants industry.

An area within the City of Kalamazoo extending along what is now Crosstown Parkway was the first muck land to be planted in celery. Dr. Willis Dunbar places
the date for the first harvest near 1871. Between 1871 and 1885 the muck pans north (North Westnedge) and south (Portage) of the City also became involved in this embryonic industry. Comstock joined the other areas of production in 1890, when commercial harvesting was well under way. Prior to 1890, Kalamazoo supplied more than one half of the State's total harvest.

During the first quarter of the present century, Kalamazoo celery attained a national reputation. It is difficult to say whether the quality or quantity of the crop or good merchandizing was responsible. It is a fact, however, that other areas of celery production within the State marketed their product under the label of "Kalamazoo Celery." One would suspect that part of this fame comes from the fact that Kalamazoo is a rather "catchy," if not an exotic name, and that the name became thusly interwoven with the marketing of the product. Another significant contribution to the fame of local celery was the active "peddling" or selling of celery to

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2 Oscar H. Horst, "The Decline of Celeryville" (unpublished manuscript, Department of Geography, Western Michigan University, 1960), p. 5.
passengers aboard the trains which stopped en route between Detroit and Chicago. If it was not a new product, it was certainly a unique event for these passengers. Whatever the reason, the fame of Kalamazoo Celery grew in direct proportion to local production.

Throughout the celery area, cultivation occurred on small plots of muck land and often no larger than 50 feet wide and 100 to 300 feet deep. A small holding and abundant cheap labor were the only prerequisites for entering into this business during its early stages. All tasks were accomplished manually except for ploughing and early cultivation for which horses were utilized. Because celery growing was labor intensive and produced such a high value, low bulk item, these small plots were economically profitable. There was little contracted or wage labor, as this was a family undertaking in which all able-bodied members participated. The profits emanating from this venture were relatively large compared to capital investment.

The earliest varieties of celery required a long growing season. In this area a sufficiently long season was often precluded by the occurrence of untimely frosts. In attempting to lengthen the natural growing season, most growers soon constructed greenhouses in which they germinated the celery seed. Seeding was accomplished in
early February and by late April the seedlings were planted in the prepared fields. In late June the earlier varieties, such as "White Plume," were ready for harvesting.

Until the mid-1920's, most of the celery was cut by the farmer and hauled in wagons to the shipper. The shipper would then wash the celery, tie it, and pack it in crates for short distance shipments to Detroit and Chicago. The shipper would use barrels and pack the celery with ice for longer freight deliveries to Pittsburgh and elsewhere. During this period and until the 1930's the shippers were the largest employees of wage labor. This labor was engaged primarily in the processing and in-town transporting of packaged celery to the Michigan Central Railroad Terminal (now the New York Central). With the growing of late harvested varieties such as "Golden Yellow," this activity of shipping continued until late November. The advent of cold storage techniques later allowed shipping to be extended into the winter months.

During the first quarter of this century, cultivation was intensive within the fields and yields often ran as high as 3,600 bunches per acre.\footnote{Platteborze, "Case Study of the Tunier Farm," p. 3.} Celery prices
averaged 25 to 30 cents per bunch during this period. At these prices, celery crops yielded a value more than $1,000 per acre. Cash outlays were limited to seed, horse and wagon, hand tools, greenhouse facilities (very small by today's standards), and, perhaps the largest outlay, manure for fertilization. Production was such in 1900 that Wood, in the Geography of Michigan, states that Kalamazoo ranked next to Detroit in express receipts, averaging shipments of seven and one half tons daily over a nine month period. In 1913 he says production encompassed 4,000 acres on 400 "plantations" with a total employment of 3,500 persons.

The late Nineteen Twenties and Thirties

In the late 1920's and through the 1930's some important changes were taking place in the celery industry throughout the State. Tractors were being introduced to muck land cultivation and a less intensive, more mechanized type of celery growing emerged. Dusters were used to spread pesticides. A two-man seedling planter was introduced which allowed much faster planting and,

4Ibid., p. 4.

therefore, more extensive operations. Although these devices saved labor and increased productivity, the scale of operations had to be increased to pay for their use. Therefore, acreage under cultivation increased and the family labor supply had to be augmented by hired labor. Further innovations included use of irrigation to protect against water table fluctuation and the utilization of chemical fertilizers to replace the dwindling availability of manure due to the replacement of the horse by automobiles. Although production was expanding to all-time high levels, inputs of capital were increasing even faster. The Depression produced a drop in prices, but growers were not as hard hit as were other sectors of the economy for the demand for celery remained relatively high and the wages of hired labor was reduced.

Perhaps the most significant innovation during this period was the advent of the truck. With this increase in mobility, the farmer was no longer limited to a one-and-half day's journey by horse to the market. Therefore, he was no longer at the mercy of shippers who had formerly fixed prices by gentlemen's agreement. Now the grower could sell his produce directly in Detroit and Chicago as well as to smaller cities in lower Michigan and northern Indiana. The shipper came to be eliminated
altogether. In this manner the farmer became involved in the trucking business, and collected added profits on the sale of his crop. He also established contacts in wholesale and retail produce markets in all the sizeable cities of Michigan and northern Indiana, as well as Chicago. Some enterprising grower-truckers ranged far beyond these points.

The late Nineteen Thirties through World War II

The Kalamazoo Celery grower who had expanded his operations and purchased much of his necessary equipment immediately before World War II was to reap additional market benefits. His operations were now as large as they would become, very efficient, and mechanized to the fullest extent that a ten to thirty acre farm could be. Further land consolidation was impossible because the numerous residents boosted the price of small lots. The Government was promoting a nutrition improvement program in which the vitamin virtues of green vegetables were being extolled. The War brought up the price of celery to $1 per bunch of 12 stalks. An additional boost was given to the Kalamazoo grower by the Federal Government when it removed Japanese from the West Coast of the United States. Many of these Japanese had been engaged in vegetable and specifically celery cultivation in
California. Previously they were actively cutting into the national celery market. The relocation of these Japanese effectively removed a significant portion of the competition to Kalamazoo celery.

The labor shortages produced by the War effort pushed up the prices of wages, subsequently an old labor market was tapped with renewed vigor, the part-time school-age child. The grower discovered that a large part-time labor force could be put into the field cheaply, thus augmenting the family labor which was re-entering the production picture.

After the War, the bottom virtually fell out of the market for Kalamazoo celery. Between 1946 and the middle 1950's production declined rapidly and demand for Kalamazoo celery dropped even faster.

The Demise of Celery Cultivation

Celery was important in Kalamazoo as early as the late 1800's. The actual amount of money contributed to the local economy through the various periods can only be guessed at. In 1932, 20 growers in the Comstock area reportedly produced a crop valued at $1,000,000 on only 500 acres of muck land. In 1937, 1,100 growers were

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6 Kalamazoo Gazette, November 15, 1932.
harvesting a crop worth $2,000,000. Other figures could also be given demonstrating that celery had assumed substantial proportions by the 1930's.

For various reasons celery production fell precipitously from the late 1930's onward. Table 1 shows that acreage engaged in celery cultivation from 1939 until 1952 declined steadily with only a brief increase during World War II. By 1957 it is estimated that only 100 acres of muck land contained celery. The last Kalamazoo celery shipper reported in 1961 that only 15 years ago he was distributing 2,000 boxes of celery a week, now only 50 to 60 boxes left his warehouse in a good week. In 1962 Michigan was the third ranked producer of celery in the nation. What had happened to Kalamazoo whose name had been synonymous with celery?

It is necessary to examine the reasons for the decline of celery closely, for some of the same factors may be operating to the disadvantage of today's bedding plants industry. There are almost as many causes suggested for the decline of local celery as there are

7 *Kalamazoo Gazette*, March 16, 1937.

8 *Kalamazoo Gazette*, May 1, 1957.

TABLE 1

KALAMAZOO COUNTY CELERY PRODUCTION
IN ACRES FOR VARIOUS YEARS\textsuperscript{a}

<table>
<thead>
<tr>
<th>Year</th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>1939</td>
<td>860</td>
</tr>
<tr>
<td>1945</td>
<td>600</td>
</tr>
<tr>
<td>1946</td>
<td>800</td>
</tr>
<tr>
<td>1947</td>
<td>600</td>
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<tr>
<td>1948</td>
<td>550</td>
</tr>
<tr>
<td>1949</td>
<td>525</td>
</tr>
<tr>
<td>1950</td>
<td>450\textsuperscript{b}</td>
</tr>
<tr>
<td>1951</td>
<td>400</td>
</tr>
<tr>
<td>1952</td>
<td>400</td>
</tr>
</tbody>
</table>

\textsuperscript{a}Michigan Cooperative Crop Reporting Service, as reported in the \textit{Kalamazoo Gazette}, April 22, 1952.

\textsuperscript{b}Designates estimated acreage.
growers. Although many reasons relate to individual decisions, there are broad areas of concurring opinion. Because so many causal factors are given, only those which are repeated in various sources will be presented. It will be noticed that many of these factors are inter-related.

In the celery areas close to the City, many farmers blamed urban spread for the declining acreage in celery. It is true that in a small portion of the celery areas urban functions were able to pay much more for the utilization of land than could farming. This encroaching urbanization had at least two effects. First, any urban development produced a rise in land values. Secondly, any rise in land values would soon be followed by a rise in taxes and, eventually, assessments for streets and services. This was actually the case in areas very close to the City such as North Westnedge and Axtell Valley. However, most of the muck land was removed far enough from the city to escape this fate. Land values

10 The reasons for collapse of celery production have been collected from many sources. The author has heard many explanations in the course of interviewing present-day plant growers. The Kalamazoo Gazette, at various times, has reported and speculated on these causal factors. In 1958 a field geography class undertook extensive interviews of those still engaged in celery cultivation. The reports of this class have also been examined.
in these areas were reported at $100 per acre in the late 1950's. Intensive agriculture such as celery cultivation could be profitably carried on with land values as low as this.

The decline of soil fertility and the spread of pests within the muck soils was also cited by "retired" celery growers. In the 1920's and 1930's the farmer was forced to switch from manure to chemical fertilizers. Some growers said that this changed the taste of the celery and the reputation of Kalamazoo celery. Later growers complained of many problems with the soil in these muck areas. This is very possible for these areas had been intensively cultivated for at least 50 years and there had been little scientific analysis and/or assistance. In the Comstock area the proliferation of industries on the City's eastern fringe had caused a drop in the surrounding water table. Although irrigation compensated for this in part, the resultant dryer muck soils were more susceptible to diseases. "Aster Yellows" and other dry muck land diseases were contagious and most difficult to control because of little previous experience. In 1953 a parasitic infestation, nematodes,

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11 Related to the author in the course of current interviews with bedding plant growers.
is reported to have "sickened" 50 per cent of the old muck areas.\textsuperscript{12}

Other farmers cite the small scale of celery opera-
tion as the prime reason for the passing of celery. It is true that the local celery farms were very small, seldom reaching a size of ten acres or more. As long as the market was good and labor was cheap, a small plot could be very profitable. Problems arose with the advent of mechanization and the competition of local industry for the labor of the celery areas. Agricultural labor could not be paid industrial wages. Mechanization could replace labor but it was expensive and had to be operated efficiently to be worthy of the investment. The small individually owned plots could not yield enough to warrant this capitalization. Even if the machinery were introduced it would stand idle for much of the year and be under-used during the required season.

The most often cited reason for the demise of celery was strong, outside competition. The California celery growers were operating on a very large scale and had much available Japanese and later "bracero" labor. California introduced the pascal variety of celery which held up much longer in the stores than did Michigan

\footnotesize{\textsuperscript{12} Kalamazoo Gazette, July 18, 1953.}
celery. This affected the market, especially when it was coupled with intensive advertising and attractive packaging. Grading and inspecting the California celery insured constant high quality. This was not the case with the local product.

All of the above reasons are probably contributary factors, yet one overriding explanation is never mentioned--the inability of the local growers to adjust to changing conditions. This is not to say that there had been no change, for there were instances where it came swiftly when operators were directly threatened. An example of this is the implementation of irrigation in some areas. This came about only after a drop in the water table forced the grower to change. One suspects that resistance to change is inherent in all societies and people. However, the grower's failure to see that continual alterations in old horticultural patterns were necessary probably proved his downfall.

Each of the stated reasons for the passing of celery from the Kalamazoo area can be related directly back to this inability to change fast enough with evolving conditions. The decline of soil fertility and the problem of infestation and diseases was common to other vegetable producing areas. In other regions of the nation active experimentation in the hybridization of celery strains
and in soil improvements was being undertaken. The development of California Pascal celery decimated the sale of Michigan and Kalamazoo celery. Yet, strains of Pascal which could be grown in this area were eventually found, but only belatedly adopted in this area.

Marketing, packaging, and shipping techniques were also very slow to change. The individual grower and his truck, often underloaded, comprised most of the marketing machinery. The few shippers that were still around in the 1950's were cooling, storing, and packaging the celery the same way they had in the 1930's. Although they too were now using trucks, much of their product was still shipped by rail. Whichever way it was shipped, it arrived in the same condition: beginning to wilt, very pale, and in need of trimming. The California Pascal celery arrived well washed, inspected, trimmed, and packaged in individual plastic bags. Obviously, it was cleaner in appearance, fresher looking, and easily displayed to advantage. Local growers and shippers could see that something had to be done. However, to reach any kind of agreement was very difficult for these people were most competitive in nature. In the late 1950's local celery was shipped in such poor condition that conscientious growers and worried shippers pressured for a statewide inspection commission. In 1963, the
Michigan Inspection and Grading Commission was established. Unfortunately, Kalamazoo had already disappeared from the celery growing picture.

Some of the local growers could foresee the inevitable fall of "King Celery." In 1953 the end became obvious when California Pascal was figuratively dumped upon the national and Mid-West markets. This was the result of recent mechanization and extremely good harvests. The affect upon Michigan celery was devastating. Not only did the price and demand drop but much of the local crop was actually thrown away that year. In the late 1950's growers joined to form the Michigan Celery Promotion Association. Various promotional devices were resorted to, including: contests, scholarships, gift boxes, and purchased advertisements. It was all to no avail for little had been done to improve the actual quality and desirability of the product.

To the local grower's credit it must be said that in some respects it was very difficult for him to change. The encroachment of urban land uses and the resultant rise in taxes could not be controlled. However, it must

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13 Kalamazoo Gazette, July 18, 1953.
be remembered that this urban spread impinged upon only a few areas. The small size of the land parcels is another factor which the local grower could not regulate. He also could not govern the price of labor. Neither the cost of labor nor the cost of machinery needed to replace that labor could be undertaken profitably on such small farms. Land assembly was not possible for the entire area, especially the North Westnedge and Comstock portions, had been densely settled in an earlier time with the result that each small parcel of land contained a house. How could the land be purchased without the house? Even if this were possible, the fields would always remain fragmented.

Given these problems and a resistance to innovation and change, the celery industry in the Kalamazoo area slowly faded from the landscape. All that was left were relic features, fields of tall weeds, and many equally tall tales of the days when celery was "King."

The Rise of the Bedding Plants Industry

The origins of the bedding plants industry have yet to be clearly demonstrated. The industry did not originate in the Kalamazoo area as claimed in the case for celery. To precisely establish the first locale of Kalamazoo production requires a more accurate definition.
of the industry. For this purpose the utilization of flats for planting and distribution has been established as the criterion for defining bedding plants. Even with this limitation the local account of the inception of the bedding plants industry is most difficult to establish.

Accounts of the beginning vary among each of the three producing areas. Within this portion of the State, the Battle Creek area is credited with the first plant production in flats. Post Gardens in Battle Creek were under contract to produce tomato and other vegetable plants for Henry Ford during the Depression. These plants were given to Ford Company employees for home cultivation in order to supplement their diets.

The earliest flat producer in the Kalamazoo area was probably John Hezalager of Portage. Around 1931 he grew 300 flats of tomatoes which he distributed locally to retail outlets. He later moved to the Comstock area where he continued to produce flats of tomatoes as an adjunct to his primary business, celery cultivation.

In the Comstock area the second grower to enter the "flats business" was Claus De Vries. In 1947 he produced

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15 All of the following accounts were related to the author in the course of formal interviews.
approximately 1,000 flats, consisting mostly of tomatoes and a few petunias. Again, this was undertaken in conjunction with the raising of celery. Both De Vries and Hazalager grew their plants in empty celery greenhouses. They first produced their required celery seedlings and after transplanting these to the fields would sow flats of tomatoes and petunias. Thus, the early growers made greater use of their greenhouse facilities.

Although Hazalager and De Vries appear to have been the first and second plant growers, many Comstock producers claim to have been third. After these two men there was a rapid increase in the number of part-time tomato and petunia planters. All were primarily engaged in the cultivation of celery and only planted in flats after the greenhouses were emptied of celery seedlings.

In the early and middle 1950's most of the Comstock celery farmers cultivated both celery and bedding plants. The change to the exclusive production of bedding plants occurred after the middle 1950's and continued into the 1960's. During this period celery literally disappeared from the area. There is only one grower still producing it. The number of plant producers in the Comstock area grew until 1963, after which it stabilized. There has not been any significant increase in the number of producers since this time.
Another account of the early bedding plants industry is given by the Portage producers. The largest growers in this area are credited with the first production in the late 1940's. These growers were actively engaged in the raising and sale of celery. In trucking in their celery to market they became aware of the demand for flats of tomatoes, petunias, and pansies. In response to this demand they began to grow flatted plants.

Still another account is commonly given by the producers in the North Westnedge area. Even during the last days of celery production, some growers here (and elsewhere in the Kalamazoo area) were planting field pansies. These supplemented declining celery acreage. The pansy was planted directly in the muck fields and at maturity clumps of plants were transferred into small wooden baskets. This basket was common to the retail fruit and produce stands of the 1940-1950 period for displaying fruits. A rather substantial pansy industry evolved in the Kalamazoo area which primarily served a local market. Due to familiarity with flower cultivation, pansy market connections, and empty greenhouse space these growers began to experiment with tomato and petunia production in flats. This small beginning of bedding plants cultivation is reported to have occurred in the early 1950's.
Therefore, it is safe to assume that the production of bedding plants in flats first occurred in one of the other two muck land areas.

The relationship of pansy growing to bedding plants is not clear. There can be no doubt that some celery growers cultivated pansies in their muck fields. By the mid-1950's John Schuring, a large grower-shipper in the Portage area, was raising pansies in flats inside his greenhouses. However, some growers never made the transition from field pansies to the flattened, indoor grown pansies. They still grow field pansies for sale in baskets, as well as raise bedding plants in greenhouses. The basket or field pansy market is rapidly yielding to bedding plants in flats. Attractive and convenient packaging of bedding plants, as well as their better holding quality, are forcing pansy cultivation indoors along with other greenhouse plants.

Of the three different accounts concerning the inception of local bedding plants industry it is difficult to determine which is most accurate. Perhaps a combination of all three is closest to the truth. One can be reasonably sure that tomatoes were the forerunner of today's industry. Petunias soon joined tomato production in the celery seedling houses. Field pansies as well as a few grown in flats demonstrated the marketability of
plant production to the celery farmer. Certainly, by the early 1950's many celery growers were also raising bedding plants in their greenhouses. By the late 1950's most of these growers had changed to bedding plant production. By 1957, 500,000 flats of flowering plants (probably including vegetables) were reportedly being raised in the Kalamazoo area. More than one-half of these flats were grown by the larger operations in the Portage area. John Schuring, a large Portage grower, is reputed to have been growing 75 different varieties of flowering plants. This grower was producing 30,000 flats annually in 11 houses (most were plastic covered). These greenhouses were fairly small by today's standards for only 2,000 to 3,000 flats were raised in each house compared to 5,000 or 6,000 currently. Whatever the size of these operations, this area was considered to contain the most concentrated flower and vegetable producing area within the State of Michigan in 1957.

Perhaps just as important as where and when the local bedding plants industry began are the reasons for

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16 *Kalamazoo Gazette*, May 1, 1957.

17 One suspects that this figure includes different colors as well as different species, for today most growers only raise 15 to 20 varieties.
its conception. Questioning produces a variety of responses all hypothesizing causal factors. Most explanations revolve about the Dutch heritage of local celery planters. It is supposed that these people from Holland have a history of plant and vegetable cultivation, and that these growers just naturally "took-up" the growing of bedding plants. This is most unlikely for the planters now engaged in this business are of second, and in some cases, third generation Dutch extraction. Even a most noteworthy national heritage of flower growing does not qualify one, much less one's offspring, for that occupation.

The most likely explanation appears to be that the local celery growers were looking for some new product to supplant a badly sagging celery market. The national bedding plants boom occurred at a most opportune time for local growers. The profitability of this new industry could be seen in the operations of Claus De Vries, John Hazalager, and John Schuring. A celery grower could change to bedding plants as fast as he wished. After his celery was in the field, he could experiment with a few flats in his empty greenhouses. If the market was as promising as it appeared to be, the celery grower could construct a plastic house in his spare time for very little cost. Thus, raising of bedding plants did not
prevent anyone from cultivating celery and it involved very little initial risk. The nature of bedding plants cultivation and the initial small scale of operations allowed some growers to be employed in outside occupations. Soon the whole family became involved in the venture and with expanding annual profits and investments in larger operations the part-time nature of the industry began to disappear.
CHAPTER III

PHYSICAL EQUIPMENT OF THE BEDDING PLANTS INDUSTRY

Greenhouse Development

Before examining the present day bedding plants industry it is necessary to relate those items of the "Era of Celery" which carried over into the present endeavor. Many of these, necessary for the cultivation of celery, were modified to perform tasks in the bedding plants operations.

Of all the physical equipment involved in the transition to a bedding plants industry, the greenhouse is the most significant. More than one type of shelter evolved in the search for celery seedling shelters, and these different types are still utilized for bedding plants production.

The first attempts at shelter construction were very crude. The earliest were nothing more than covered compost pits. This was followed by the introduction of cold frames consisting of a shallow hole with wooden sides extending above the ground. A covering of window sash facilitated the heating of cold frames by sunlight.

It was an easy change to progress from the cold
frame to the sash house. As the name implies it was constructed primarily of window sashes, thus making maximum use of the solar heating principle. Most sash houses resembled the greenhouses of today with above-ground construction, glass sides, and a sloping glass roof. The greatest differences between the old sash house and the greenhouse of today appears to lie in building techniques and size. The sash house was of simple construction, it contained much more wood, and was generally smaller than today's greenhouses.

Cold frames and sash houses enjoyed popularity only briefly for sash houses came to be internally heated by wood stoves in order to induce faster plant growth. Thus, the sash house attained a definite advantage which more than compensated for its higher cost.

After the turn of the century greenhouses designed for wood and glass fabrication became very popular. They could be purchased precut and all the grower had to do was assemble the structure. In 1922 the Dietsch Company offered such unassembled greenhouses for sale at prices ranging from $805 to $1,900.

Construction materials in these greenhouses were primarily wood, cement, and glass. Cedar, cypress, and redwood were most often used for the framing. Glass was lighter, cut smaller, and more easily replaced than in
the old sash house. Foundations and footings (lower portions of the side walls) were made of concrete and later cement blocks.

The internal components of the greenhouse were rather simple. Window sashes at the peak and pullies to operate them comprised the ventilation system. Rather than placing plants at the cold floor level, beds or benches were made with tile bottoms resting on cement footings. Heating elements at first consisted of wood and coal stoves. Much care had to be exercised in utilizing these units for the entire crop could be gassed or killed in one careless day. From the late 1920's and onward, radiant heat by steam or hot water became common. Although such systems were expensive they eliminated gassing and provided better distribution of heat within the greenhouse.

Although the greenhouses varied greatly in size, appearance, materials used in construction, and the type of heating utilized, they provided the necessary shelter to germinate celery seeds and protect seedlings in the early spring.

In the late 1940's and early 1950's these older glass greenhouses provided the basis for the fledgling bedding plants industry in Kalamazoo County. The cold frames and sash houses continued to decline in popularity.
Still, they never completely disappeared for they were very cheap to construct and could be used as cold houses for growing mature bedding plants in the late spring.

As some growers withdrew from celery production many of the glass houses fell into disrepair. Others, however, witnessed the transition from celery to bedding plants and were kept in good condition. These structures are being used as seed houses today. In some cases the old boiler and steam or hot water heating systems continue to be utilized in these greenhouses.

In the 1950's bedding plants proved to be a profitable alternative to celery cultivation. The change to bedding plants required the expansion of greenhouse facilities. Celery seedlings could be grown in flats or beds more closely spaced than mature bedding plants. Also, an expanding market demanded increased production facilities. However, enlarging the production area required huge outlays of capital for greenhouses and heating equipment. This cost would be more than an equal increase in celery production would have demanded for now the entire crop was to be grown and harvested in the greenhouse.

Fortunately, relatively inexpensive greenhouse
materials became available at this time. In other areas of the United States sheet plastic was being utilized as a temporary greenhouse covering. This new plastic was not only much less expensive than glass panes, it was also easier to apply. One needed only to nail or staple it over wooden frames spaced three feet apart instead of glazing or calking glass in 18-inch widths. This new covering was much lighter in weight than glass; therefore, the old iron framework necessary to support the glass could now be substituted for by a smaller number of wooden ribs. The one disadvantage of this new material was its temporary nature. The plastic had to be replaced each year and the wooden structure lasted only about ten years in the humid interior of the house. Yet, this low cost and easy to construct plastic greenhouse allowed for the rapid and inexpensive expansion of operations.

The transition from celery to bedding plants not only brought about a change in materials used in the construction of greenhouses but also in the size and layout of the houses. A greenhouse could now be

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1 Today a glass house costs about $3.75 per square foot as opposed to $0.75 or $1.00 per square foot for a plastic house.
constructed in any length desired.\textsuperscript{2} Houses of 300 feet and longer are now commonplace. The old overhead ventilating systems were replaced by large hinged windows built into the side of the house. In some cases large fans were built into the units. New types of forced air heating produced better circulation of air inside the house, enabling the plants to be placed on or very near the floor. This permitted the elimination of tile benches or planting beds. With the removal of these obstructions the grower could now use a small tractor to move flats, soil, and wagons around inside the greenhouses. To provide egress for the tractor and other equipment, large overhead garage doors were installed in one end of the house. Many other individual innovations have been undertaken.

The heating equipment has been changed considerably in the new plastic houses (Figure 3). The old hot water or steam boiler systems still see limited service in the seed house (generally the old glass houses) but not in the new plastic shelters. All the areas of production are served by natural gas and for various reasons the

\textsuperscript{2}The width is limited to the size of two-by-fours used in roof construction. The normal length is 18 feet. Utilizing one of these for either side of the roof with a pitch (angle) of six to eight inches per foot provides a normal greenhouse width of about 30 feet.
Figure 3. Overhead forced-air gas heating unit inside of a typical plastic greenhouse.
utilization of small overhead gas heaters is very popular. These heaters have blowers built into them which increases the circulation of air within the structure. The blower may also be used for ventilation during hot weather. This type of heating equipment is much easier to install than the old boiler system and is much less expensive. Furthermore, it requires very little maintenance. The utilization of forced air gas furnaces also introduces a supply of carbon dioxide into the air which is beneficial to plants.

Another innovation in the greenhouses of today is the "dirt house." As was mentioned before, the soil for the entire year's crop must be stored away from frost, moisture, and weeds. To answer this need, plastic houses 15 to 20 feet high are constructed. These units are seldom heated and are usually equipped with one overhead door. The equipment is stored in these structures as well as the soil. This attests to the relatively low construction costs of the new plastic houses.

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3This extreme height is necessary to accommodate the loading of soil into a flat filling machine normally located in this structure.
Other Equipment

The transition from celery to bedding plants negated the utility of much old equipment but allowed the carryover of some items aside from the greenhouse. Generally, most of the field machinery used to cultivate the muck land for celery was retained. The cultivators and ploughs are still utilized for preparing the fields through the summer months prior to scraping off some of the muck for flat filling. The old tractor is still found in all operations but often additional equipment has been fitted to it.

In many operations there is additional greenhouse equipment that has been converted to use in the new business. In the old glass greenhouses there was often a misting system of semi-automatic watering equipment. These are now used for watering in the germination and seedling operations. Old narrow wheelbarrows and, in some cases, roller tracks are now employed in the movement of bedding plants within the greenhouses. Old fertilizer and disease control systems are still utilized in the cultivation of plants. Other equipment of lesser importance could also be enumerated.

Much of the machinery and equipment necessary for the operation of today's bedding plants industry has
been especially purchased or constructed for use with these plants. The front end loader tractor attachment is absolutely essential to efficient movement of soil. A soil shredder, which may be found in a variety of types, is considered indispensible in some operations. In the largest farms the use of fork lift vehicles is gaining popularity in the movement of large numbers of flats. In all scales of operations there will be found a supply of converted farm trailers and modified automobiles used to transport flats around the farm. Figure 4 shows only two of the many types observed in this area.

A recent innovation is the flat filling machine. Various commercial fillers are available to the grower but the price is often prohibitive. Having seen this machinery in action, some of the local growers have constructed their own. These machines are made from salt spreading hoppers common to road maintenance vehicles. By adding a conveyor system and a sifting drum the grower can obtain a filler (see Figure 5), for a $600 or $700 investment. Whether the equipment is commercial or homemade, the mechanism is approximately the same. It consists of a hopper with or without an agitator. A conveyor or auger feeds the mix from the bottom of the hopper into a revolving screen drum. This deposits the soil into the flats which are passed underneath the drum.
Figure 4. Two types of utility vehicles employed by local growers.
Figure 5. Flat filling machine in dirt house.
on another conveyor. This type of machine produces uniform flat filling and obviously saves a great deal of labor. If the soil is not too wet, up to 800 flats may be filled in one hour by two men.

Almost all operations have a truck of some sort in which materials, equipment, and often mature plants are transported. In the smaller farms this truck is often a pick-up with a removable box in which may be placed flats of plants. The larger growers have vans and, in many cases, tractors and semitrailers especially equipped with removable racks for the shipping of bedding plants. During the brief harvest season many growers rent additional "semi-rigs" and vans. This trucking equipment is becoming more common with each passing season.
CHAPTER IV

GENERAL CHARACTER OF THE BEDDING PLANTS INDUSTRY

Annual Cycle

Although the actual growing season for bedding plants is only four months long, there is much related activity which occurs throughout the year. In late summer or fall the soil procurement operations begin. The soil is scraped from adjacent muck land and additional peat moss, sand, or inert materials are acquired. The soil must be sterilized to purge weeds, fungi, nematodes, and insects from it. A few growers who have good steam facilities pile the soil over a steam pipe and cook the mound at about 180°F. for a brief period. Most of the growers in this area, however, utilize one of the chemical sterilizers such as methyl bromide. This is introduced into the piled earth under pressure. The soil is then aerated and combined with the other "mix"¹ constituents. The mix is then hauled into a dirt house for storage.

¹Mix refers to the plant growing media.
In late September or October the growers install plastic covering on their greenhouses. This is accomplished in the lower sun season to reduce the possibility of heat damage to the thin plastic. Yet, in this period, and later into winter, winds are often too high to allow easy covering throughout the day. Thus, the growers are limited to covering houses only on calm days.

Enclosing the greenhouses involves placing a four mil\textsuperscript{2} layer of polyethylene over each structure. In some operations a second layer of two mil plastic is applied to the inside of each house. The inner cover is positioned horizontally across the roof, thus producing a flat ceiling. This double lining serves two purposes. First, it produces a large air space for insulation, thereby saving the grower expenses on fuel. Secondly, it acts as a catchment for condensation which falls from the roof of humid greenhouses. This dripping is potentially damaging to plants, and is therefore caught and carried to the sides of the house by the inner lining of plastic.

During this preparatory phase, the heating units are readied for operation and floor space is prepared.

\textsuperscript{2}Mil refers to the gauge of the plastic. In this case the sheet is four thousandth of an inch thick.
If plastic ductwork is utilized for better distribution of heat, it is now constructed. Flooring materials, if any are used, are now laid in the portions of the greenhouses which will be the first to receive flats. Usually a layer of plastic or occasionally boards are used for this purpose. In a few operations cement beds or tile benches may still serve this role. Various reasons are given for the flooring of the greenhouses. It would appear that the plastic keeps the flats in a more sterile environment. The use of boards with or without the plastic floor elevates the plants just enough to escape cooler ground temperatures and the puddling of water on the plastic floors.

During the late autumn and early winter the materials requisite to the growing of plants are obtained. In the past, and even today in some operations, the grower and his "help" are occupied in the assembly of wooden flats. The slats are secured locally and the grower merely nails them together producing a flat. Increasingly, growers are utilizing molded plastic flats which require no labor for construction. Seeds, fertilizers, and various soil additives are also acquired during these months.

By early January all activity shifts indoors and into the dirt house where the soil which has already
been mixed and prepared is now placed in the flats. In small operations this is accomplished by hand with a shovel. More frequently a flat filling machine is utilized. After the flats have received the mix, they are watered and loaded on trailers or pallets, then taken to the greenhouses. Once inside the greenhouse, the filled flats are piled 20 high and covered with plastic to prevent the evaporation of moisture. In some instances, this filling proceeds simultaneously with the sowing and transplanting phases.

Sowing generally begins in early January. Seeds are acquired from national wholesale seed companies. Much care is taken during this phase of the growing cycle for often there are upwards of 2,000 seedlings in each flat (Figure 6). The media or soil mix used for the sowing phase is much lighter than the regular planting media, and a special premixed soil combination is often purchased for this purpose. Even those growers that rely on their own soil must add many inert ingredients such as vermiculite or perlite. These minerals lighten the soil and help retain moisture in the shallow flats.

As Figure 6 demonstrates, the sowing is accomplished in closely spaced rows within each flat. The flats are then thoroughly watered and covered with plastic or burlap to further ward off evaporation. The sown flats are
placed in the seed house on elevated platforms (Figure 7). Keeping the flats off the floor insures a heated soil media for warm root environment. The soil temperature at seed level should be kept at 70 to 72°F. to stimulate even germination. In most operations a misting system is utilized to insure proper moisture in all portions of the individual flats. This mechanism shoots a fine spray of water over the plants at pre-timed intervals.

As soon as leaves emerge, the seedlings should be transferred to a new environment where the temperature is gradually dropped as low as 40 to 50°F. In many operations this step is omitted and the seedlings remain in the seed house. At lower temperatures, the seedlings may be kept for a long period before transplanting into the final flats. Cool, bright, and airy conditions produce hearty seedlings with good root systems. Humidity should be kept down to 40 to 45 per cent.

Sowing is carried on over an extended period of time, as are most other phases of this annual industry. Depending on the size of operations, sowing may begin as early as the first of January and proceed well into early April. Plants, such as petunias, which require

\[3\text{This is sometimes referred to as "bottom heating."} \]
Figure 7. Flats of seedlings in seed house.
longer growing time are sown first. By sowing on a weekly basis and storing seedlings, the sowing season is lengthened, spreading labor requirements over a longer period.

Transplanting begins in late February and occasionally continues well into May. In most instances this "planting"--actually transplanting--is accomplished inside the greenhouse. Figure 8 shows women placing the seedlings into the prepared flats. A board with rows of short pegs is pushed own over the filled flat, producing evenly spaced planting holes of uniform depth. Seedlings are removed from the sown flat and carefully separated. One seedling is placed in each hole. The soil is tamped into place with the fingers of one hand while the other supports the plant. After the flat is planted an identification tag is placed in one end and the flat is positioned on the floor of the house. This placement is the last time flats and plants will be handled until sale.

As soon as the first plants have been transplanted the routine of the growing season begins. This is actually much more involved than just watering the flats once each day. The microenvironment of the plants must be checked and adjusted many times daily. The temperatures should be kept at a constant 60°F. to guard against
Figure 8. Women transplanting seedlings into flats.
excessive evaporation and uneven plant growth. If the temperature is allowed to fall below this point the plants will not mature in time for sale. If too much heat reaches the plant, more watering is required causing the plant to become weak. The eventual sale and removal of the plant to an outside environment requires that plants be hearty and able to withstand the shock of transplanting, wind, rain, and strong sunlight. If the temperature is kept near the 60°F. level a thorough watering once each day is sufficient. Too little water or too much heat may produce "drooping or wilting," a falling-leaf condition, in the plants. Too much water invites the invasion and spread of diseases and pests.

Maintaining the proper temperature requires a careful application of heat and ventilation. To assure that heat or cool air are actually reaching the plants, circulation within the greenhouse must be carefully attended to. As might be expected, the air inside of the house tends to stratify with the warmer air rising and the cooler air settling near the plants. Only constant and proper movement of air resolves this problem. If good circulation is maintained, excessive humidity is more easily held in check.

Insecticides, fertilizers, and growth retardants are necessary to further insure a crop of good quality.
Occasionally fertilizer is added to the soil mix in the flat; however, fertilizers more frequently are applied in liquid form directly to the plants. Growth stimulants and fertilizers are used to speed up plant development if this is deemed necessary. Pesticides are utilized as needed and applied by sprayer or mister.

Just as the grower may desire to hasten the development of the plants, he may wish to inhibit growth. Growth retardants are available for this purpose, but are used only on rare occasions. If the weather has been very hot and he has not been able to shade or effectively cool the plants, he may have to resort to these retardants. A few growers are now applying these inhibitors to all their crops, thus producing "bushier"—shorter and more attractive—plants.

In early April the first flats are ready for marketing. In some instances the flats are taken from the floor of the greenhouse and sent over roller tracks to a semitrailer waiting at the door of the house. In most operations the flats are placed on small trailers with specially designed racks. These trailers are then pulled by tractor to the waiting semitrailers which haul the plants to market. Figure 9 shows a "rack" or wagon of flats being loaded into a semitrailer for shipping. This activity continues at an increasing pace into the middle
Figure 9. Rack of mature plants being loaded into semitrailer.
of June with peak shipping occurring just prior to Memorial Day.

By mid-June the growers are busy clearing out the last flats and are beginning to tear the plastic covering off the greenhouses (Figure 10). The flooring materials are removed and all boards are stacked in sheds or piled and covered. The heating units are disconnected and wrapped in plastic. At this time the framework of the greenhouses is inspected, necessary repairs are undertaken, and every three years the structure is painted. Equipment is repaired and stored for the next season and the fields, which will supply muck in the fall, are ploughed to hold the weeds in check. This then brings to a conclusion the annual cycle of bedding plants cultivation.

**Bedding Plants Production**

Current national bedding plants production may only be estimated for data from the latest agricultural census are not yet available. However, there are statistics to suggest the present dimensions of this activity. In

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Figure 10. Idle greenhouses without covering during summer months.
1959 more than one half of the nation's commercial flower growers were engaged in bedding plants cultivation. In the country's floriculture industry one-tenth of the gross sale value was contributed by bedding plants. Table 2 depicts the change in bedding plants and all floriculture production between 1949 and 1959. Obviously, bedding plants production has expanded rapidly within the United States.

A survey of 300 growers in Pennsylvania in 1966 indicated that greenhouse space increased 89 per cent from 1959 to 1966, and three-fourths of that space was claimed by the cultivation of bedding plants.5 Interpolating from these survey figures and the national data one may assume that production is continuously expanding by as much as 9 per cent annually. If this estimate is correct, the bedding plants industry's product value is approaching 80 million dollars. Bedding plants now account for a greater percentage of floriculture sales than any other aspect of the flower industry, whether it be roses or potted plants.

According to the U. S. Agricultural Census, it has been estimated that the increase in local plant production is much greater than the national growth rate of

5Ibid.
### TABLE 2

VALUE OF BEDDING PLANTS AND FLORICULTURE
SALES IN THE U. S., 1949 and 1959
(In Millions of Dollars)\(^a\)

<table>
<thead>
<tr>
<th>Type</th>
<th>1949</th>
<th>1959</th>
<th>Per Cent Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bedding plants</td>
<td>16.9</td>
<td>32.8</td>
<td>94</td>
</tr>
<tr>
<td>All floriculture</td>
<td>191.0</td>
<td>292.6</td>
<td>53</td>
</tr>
</tbody>
</table>

\(^a\)Data taken from the U. S. Census of Agriculture: 1960.
9 per cent per year. Table 3 indicates the increase in greenhouse operations (those not engaged in vegetable production) for the 1959 to 1964 period within the State of Michigan. Kalamazoo, in 1959, was ranked sixth in the State in total cut flower, potted plants, florist greens, and bedding plants sales. In 1964 this area had assumed the third position. Despite a sales increase of 157 per cent, well over the State average of 113 per cent, Kalamazoo lost 11 farm operators. Thus, the operations were tending to become larger although less numerous. The most significant figure, square feet of greenhouse space, shows Kalamazoo in 1964 with more square feet than any other county in Michigan. Many counties actually drop in this category from the 1959 values, while Kalamazoo demonstrates nearly seven times greater growth than any other county.

Correspondence with Dr. William H. Carlson, Assistant Professor of Horticulture at Michigan State University, and interviews with Vernon Hinz, Agricultural Extension Agent for Kalamazoo County, reveal the following estimates. Kalamazoo County is considered the State's leading producer with approximately one million flats annually. The Detroit area (Wayne, Oakland, and Monroe Counties) is considered second with nearly one million flats. The Ottawa and Muskegon County area is
TABLE 3

GREENHOUSE PRODUCTION OF CUT FLOWERS, POTTED PLANTS, FLORIST GREENS, AND BEDDING PLANTS FOR THE TOP TEN COUNTIES IN MICHIGAN, 1959 TO 1964

<table>
<thead>
<tr>
<th>County</th>
<th>Sales in Thousands of Dollars</th>
<th>Farms Reporting</th>
<th>Thousands of Square Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Per Cent 1964 of 1959</td>
<td>1964</td>
<td>Change from 1959</td>
</tr>
<tr>
<td>Wayne</td>
<td>2,062</td>
<td>112</td>
<td>65</td>
</tr>
<tr>
<td>Macomb</td>
<td>1,902</td>
<td>95</td>
<td>60</td>
</tr>
<tr>
<td>Kalamazoo</td>
<td>1,463</td>
<td>157</td>
<td>51</td>
</tr>
<tr>
<td>Oakland</td>
<td>1,213</td>
<td>86</td>
<td>47</td>
</tr>
<tr>
<td>Kent</td>
<td>808</td>
<td>103</td>
<td>39</td>
</tr>
<tr>
<td>Washtenaw</td>
<td>555</td>
<td>142</td>
<td>26</td>
</tr>
<tr>
<td>Ottawa</td>
<td>440</td>
<td>96</td>
<td>50</td>
</tr>
<tr>
<td>Muskegon</td>
<td>435</td>
<td>191</td>
<td>26</td>
</tr>
<tr>
<td>Monroe</td>
<td>389</td>
<td>188</td>
<td>23</td>
</tr>
<tr>
<td>Calhoun</td>
<td>383</td>
<td>89</td>
<td>14</td>
</tr>
<tr>
<td>State Total:</td>
<td>13,867</td>
<td>113</td>
<td>791</td>
</tr>
</tbody>
</table>

third with 500,000 flats. It is further estimated that the State produces more than three million flats with a retail value in excess of six million dollars each year.

Various attempts at the exact enumeration of production in the Kalamazoo area have been undertaken but have met with only limited success. The U. S. Census of Agriculture has received data on the industry but has grouped it with cut flowers, potted plants, and florist's greens in all of its reports. This invalidates any meaningful analysis of these data. The State of Michigan's Extension Service has utilized some of these data but unfortunately has the same broad category of greenhouse operations.

In an attempt to rectify this lack of knowledge a Michigan Greenhouse Industry Survey was undertaken in 1968 by the Co-operative Extension Service. The results of the survey have not been published. To determine the actual scope of local operations, the value of product, and to check the validity of estimates concerning Kalamazoo's production the author undertook interviews of local growers.

A formal questionnaire was utilized for the purpose

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6The author was allowed to examine some of the local responses to this survey. Information on individual operators was not disclosed.
of obtaining more exact data on local bedding plants operations. All phases of the industry were included in the survey. Although the questionnaire was formal, an attempt was made to conduct the interviews in an informal manner. Because only 52 growers constitute the producer population any attempt at random sampling was dismissed. The author went into the field and contacted as many growers as was possible in each of the three areas of bedding plants cultivation. After a brief conversation those growers who appeared amenable to formal interviews were given the questionnaire. In this manner 22 of the 52 producers were included in the survey. The number of interviews undertaken in each of the three producing areas was nearly proportional to the number of operations in those areas. In instances where the grower was reluctant to comment on certain aspects of this operation, the formal structure of the questionnaire was aborted and another topic was considered.

Generally the results of this survey method appear to be quite satisfactory. As might be expected, questioning people about their source of income was most difficult. Many of the growers were hesitant to give "value of product" information but were agreeable to queries concerning the approximate number of flats produced. Because the wholesale value of all flats is
reported to be the same throughout the area\(^7\) an approximation of the value of individual product may be determined. Many of the smaller growers claimed to have no production records but could remember the number of empty flats purchased or some other surrogate figure. The smallest producers were the least co-operative, often refusing any data relating to production or even to operations in general. It is admitted that the results of any survey such as this are not as accurate as one might wish. However, they constitute the only meaningful data available for analysis of the bedding plants industry.

Table 4 gives the responses of growers to questions concerning production. These have been ranked according to gross receipts. The values range from as low as $1,700 to as high as $130,000. There is no concentration of growers in particular size groupings; rather, the distribution might be termed evenly spread.

Twenty of the sampled growers, representing less than one-half of all local producers\(^8\), reported a

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\(^7\)One must question this assumption of price uniformity for it is suspected that purchases of large quantity and the factors of supply tend to cause minor price fluctuations.

\(^8\)Because a nearly proportionate sample was taken from each of the three areas, the sample is probably quite representative of the entire area.
TABLE 4
REPORTED GROSS RECEIPTS, NUMBER OF FLATS PRODUCED, SQUARE FEET OF GREENHOUSE SPACE; AND CALCULATED PRICE RECEIVED AND SQUARE FEET OF SPACE UTILIZED PER FLAT FOR INDIVIDUAL BEDDING PLANTS OPERATIONS IN KALAMAZOO COUNTY, MICHIGAN, 1968-1969a

<table>
<thead>
<tr>
<th>RANK</th>
<th>Reported Gross Receipts</th>
<th>Number of Flats</th>
<th>Square Feet of Greenhouse Space</th>
<th>Calculated Price Received</th>
<th>Square Feet Per Flat</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$ 1,700</td>
<td>1,005</td>
<td>2,000</td>
<td>$ 1.69</td>
<td>1.99</td>
</tr>
<tr>
<td>2</td>
<td>1,850</td>
<td>9,590</td>
<td>13,110</td>
<td>0.19</td>
<td>1.37</td>
</tr>
<tr>
<td>3</td>
<td>2,060</td>
<td>1,000</td>
<td>ng</td>
<td>2.06</td>
<td>--</td>
</tr>
<tr>
<td>4</td>
<td>2,500</td>
<td>2,610</td>
<td>ng</td>
<td>0.95</td>
<td>--</td>
</tr>
<tr>
<td>5</td>
<td>ng</td>
<td>6,525</td>
<td>6,400</td>
<td>--</td>
<td>0.98</td>
</tr>
<tr>
<td>6</td>
<td>8,000</td>
<td>ng</td>
<td>ng</td>
<td>--</td>
<td>ng</td>
</tr>
<tr>
<td>7</td>
<td>13,500</td>
<td>7,500</td>
<td>12,000</td>
<td>1.08</td>
<td>1.60</td>
</tr>
<tr>
<td>8</td>
<td>15,000</td>
<td>9,800</td>
<td>18,754</td>
<td>1.53</td>
<td>1.91</td>
</tr>
<tr>
<td>9</td>
<td>22,000</td>
<td>16,000</td>
<td>19,500</td>
<td>1.38</td>
<td>1.21</td>
</tr>
<tr>
<td>10</td>
<td>27,000</td>
<td>19,600</td>
<td>39,000</td>
<td>1.73</td>
<td>1.98</td>
</tr>
<tr>
<td>11</td>
<td>28,000</td>
<td>17,330</td>
<td>26,000</td>
<td>1.62</td>
<td>1.50</td>
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<tr>
<td>12</td>
<td>32,000</td>
<td>23,250</td>
<td>15,020</td>
<td>1.38</td>
<td>0.65</td>
</tr>
<tr>
<td>13</td>
<td>36,000</td>
<td>29,700</td>
<td>ng</td>
<td>1.21</td>
<td>--</td>
</tr>
<tr>
<td>14</td>
<td>37,000</td>
<td>ng</td>
<td>26,200</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>15</td>
<td>39,000</td>
<td>18,200</td>
<td>ng</td>
<td>2.14</td>
<td>--</td>
</tr>
<tr>
<td>16</td>
<td>40,000</td>
<td>27,600</td>
<td>ng</td>
<td>1.45</td>
<td>--</td>
</tr>
<tr>
<td>17</td>
<td>50,000</td>
<td>23,450</td>
<td>44,870</td>
<td>2.14</td>
<td>1.91</td>
</tr>
<tr>
<td>18</td>
<td>55,000</td>
<td>31,000</td>
<td>48,000</td>
<td>1.77</td>
<td>1.55</td>
</tr>
<tr>
<td>19</td>
<td>60,000</td>
<td>34,000</td>
<td>55,000</td>
<td>1.76</td>
<td>1.61</td>
</tr>
<tr>
<td>20</td>
<td>67,000</td>
<td>36,300</td>
<td>57,000</td>
<td>1.85</td>
<td>1.58</td>
</tr>
<tr>
<td>21</td>
<td>86,000</td>
<td>48,000</td>
<td>72,000</td>
<td>1.79</td>
<td>1.50</td>
</tr>
<tr>
<td>22</td>
<td>130,000</td>
<td>75,000</td>
<td>ng</td>
<td>1.73</td>
<td>--</td>
</tr>
</tbody>
</table>

Average $1.73 1.51

aData for four operations revealed gross inconsistencies as in the case of number 2 above. These were replaced by data of nearly the same rank, numbers 6, 8, 12, and 17 recorded in 1968 by the Co-operative Extension Service.

bng designates data not reported.
combined annual crop of 434,460 flats. This tends to verify area production estimates of one million flats.

Comparing gross receipts to number of flats produced provides a check on the validity of reported data.\(^9\) All of the producers stated that they were selling their flats at $1.80 in 1968 and $1.90 in 1969. The average, $1.85, will be utilized for this study.

The values received per flat, calculated in Table 4, were determined by dividing the number of flats produced into the gross receipts. The results show a surprising amount of variation. It will be noticed that the larger growers (lower on the chart) closely approximate the $1.85 price, while the other growers tend to fall short of this figure. This is interpreted as meaning: (1) the growers did not sell their entire production or, (2) the growers have not reported the data as

\(^9\)In an effort to establish the validity of estimates of production, aerial photographs were examined. It was hoped that some measurement of the area of each house might be determined. The total greenhouse area in the County would then be divided by the number of square feet necessary to grow one flat, establishing the maximum number the area was capable of producing. For two reasons this undertaking proved unsuccessful. First, the plant growing structures could not be distinguished from the non-growing, i.e., seed houses and dirt houses. Secondly, there appears to be a differing amount of double cropping—raising two crops in one greenhouse—among the individual operations. Thus, the average square foot factor per flat could be nothing more than a crude estimate.
accurately as possible, or, (3) the growers did not sell all of their flats at the stated price of $1.85. Because the larger growers all show values just under this stated price (they definitely have the best records of production), one suspects that they over-produced enough to explain the difference. The other growers probably over-produced just as much or more but have not been able to supply data as accurately as the larger producers. In a few instances they may have sold their flats for less than $1.85, but it will be noticed that three growers show a value well above the stated price. This is an economic contradiction; it can only mean that the data reported are faulty.

Table 4 also shows the square foot per flat calculations for each reported operation. All growers in this area utilize the 22 by 18 inch flat. This is 2.75 square feet. Thus, one would expect 2.75 or even three square feet of greenhouse space reported for each flat produced. This is obviously not the case. No grower reported more than two square feet of space per flat. This suggests that all producers in the Kalamazoo area double crop during the growing season. Without allowing any additional space for aisles and storage areas in the reported greenhouse space this averages 55 per cent of the total space necessary to accommodate at one time all
the flats produced. Thus, the double crop average is nearly 50 per cent. The smallest growers stated that they did not double crop. The moderate-sized producers reported about 25 per cent of their crop as over and above a single yield per house. The largest growers said they could not be sure of the amount of double usage of greenhouse space. However, they often reported that a particular house had been utilized for three and, occasionally, four crops of transplanted flats. From the data in Table 4 one can say that double cropping is very common throughout the Kalamazoo area, perhaps more prevalent than the growers themselves realize.

Labor and Other Inputs

As might be expected, the actual costs of production are very difficult to establish. Although wages per job classification are nearly the same throughout the local industry, varying amounts of labor are utilized in the individual operations. The costs of most other inputs are rather easy to determine and appear to covary with the volume of production. Labor is the single most

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10 Actually all growers double crop to some extent. Because sowing, transplanting, growing, and harvesting phases overlap considerably, it is possible that small growers are unaware of their double cropping practices.
expensive input.

In only the largest operations is there any full-time, year around employment. In almost all farms which produce more than 15,000 or 20,000 flats the owner may be considered as being employed full time. Only in operations growing more than 50,000 flats is any additional labor employed on a full-time basis the year around. The labor cost of the owner-operator or manager is impossible to determine. His job is the most indispensable for it is his skill and experience that make the entire farm function. Not only does he have to determine all phases of cultivation, purchase all materials, supervise all the personnel, but also he must instruct the employees in every task.

Most of the labor required in this industry does not demand special skills or extensive previous training, therefore, the wages are very low. The people employed in and around the greenhouses perform menial tasks such as moving materials and attending to environmental requirements of the plants. Because much of this labor is part-time, and often high-school aged, wages are commonly below the "minimum wage" level of $1.25 per hour. Pay rates below $1.00 an hour are not uncommon. In a few of the larger operations there may be found older workers employed full time during the growing season. The pay
is more lucrative for these people, sometimes exceeding $2.00 an hour. Generally, the pay is low, the work is tedious, and the hours are numerous.

The job of transplanting the seedlings into the flats is done almost entirely by women who are employed for only two or three months of the year. The wages paid vary between 14 and 16 cents per flat. A fast "transplanter" can fill about 20 flats per hour earning up to $3.00. The speed is normally slower with the resultant wage close to $2.00 per hour. The grower does not have to concern himself with the productivity of this labor and he can gauge his transplanting costs rather precisely. The women employed can set their own work schedules which is satisfying because most have school-aged children and would experience great difficulty if they were required to be on the job at 8:00 a.m. before the children have left for school. Likewise, these women may leave work at 3:00 p.m. before the children have returned home. Without this relaxed schedule, the grower would be hard-pressed to hire women for only a few months out of a year.

To actually fix the cost of labor for any particular sized operation is very difficult for several reasons. There exists a tradition of family employment in both the old celery industry and now in bedding plants.
This additional labor may or may not receive a fixed wage. Younger children and wives work for undetermined wages. Many times they receive a bonus for their services at the end of the season. In many farms the grower does just as much as he can possibly do to save on his labor costs. An owner-operator, with the occasional assistance of his spouse, could conceivably produce up to 10,000 flats by himself. There are instances where an owner-operator is actually employed full time in another occupation during the entire growing season and still produces 2,000 to 3,000 flats without any hired "help."

The cost of raw materials has been carefully determined by a few growers in the Comstock area. They report that the cost of seed averages approximately ten cents per flat. Of course, there is much variation in the price actually paid for seed. A fancy hybrid marigold may cost as much as 35 cents per flat. However, the price of other seed, such as Rutgers tomatoes, may be as little as two or three cents per flat. The cost of plastic trays, flats, and soil is fixed at 33 cents per flat. The plastic flat sells for 16 cents and the tray holder for 11 cents. To process and purchase all necessary soil ingredients costs six cents a flat.

The average per flat costs of greenhouse construction
and maintenance are difficult to establish. Expenses for plastic house construction average slightly less than $1.00 per square foot. Because each flat requires nearly three square feet of floor space (determined on a single crop basis) it is obvious that more than one season is required to calculate the cost of shelter per flat. The expenses of maintenance must also be considered. New plastic must be laid over the greenhouses each year. Although the polyethylene is relatively inexpensive, applying this covering involves a great deal of labor. The costs of this operation are often unknown because the grower usually provides the necessary labor. With all construction, maintenance, and heating costs prorated over a ten year period, growers estimated a cost of 50 cents per flat.

Estimates of all determined production costs are shown in Table 5. The total production cost of $1.14 per flat does not include general labor nor the owner's entrepreneurial abilities. Therefore, this total is undoubtedly an understatement. The wholesale price per flat in 1968 was $1.80, and in 1969 $1.90. At first glance one would suspect that profits are very large, however, after additional labor costs are deducted, as well as losses due to disease, neglect, or poor market conditions, the profit margin is considerably narrowed.
TABLE 5

ESTIMATED COSTS OF SELECTED PRODUCTION ITEMS IN THE BEDDING PLANTS INDUSTRY OF KALAMAZOO COUNTY, MICHIGAN, 1968\textsuperscript{a} (In Dollars Per Flat)

<table>
<thead>
<tr>
<th>Production Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seed</td>
<td>$0.10</td>
</tr>
<tr>
<td>Plastic flat</td>
<td>0.16</td>
</tr>
<tr>
<td>Plastic tray</td>
<td>0.11</td>
</tr>
<tr>
<td>Prepared soil</td>
<td>0.06</td>
</tr>
<tr>
<td>Labor for transplanting</td>
<td>0.15</td>
</tr>
<tr>
<td>Greenhouse facilities, maintenance, and heating</td>
<td>0.50</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td><strong>$1.14</strong></td>
</tr>
</tbody>
</table>

\textsuperscript{a}Estimates obtained from various growers in the Comstock area, and especially Robert Ouding.
Many growers intimate that if market conditions are poor the cost of production is very difficult to absorb. Because production costs are quite high, gross overproduction or unfavorable market conditions in two or three successive years could force some growers out of business.

Although transportation costs do not actually enter into a determination of production costs, they will be mentioned briefly for they do relate to out-of-town wholesale prices. The precise expense of transportation is impossible to establish for those growers who haul their plants to market appear to be only aware of the original price of the truck and the cost of gasoline. Maintenance costs and wages paid to drivers are seldom recorded. In most cases the relationship between the owner and trucker goes beyond the bounds of business association. Often the driver is a member of the immediate family or a close relative and his wage is not disclosed. Most owners merely state that the driver is paid on a commission basis or receives a portion of the season's profits.

Distribution of Product

The market area for local bedding plants is easily delimited but it is difficult to precisely describe. One can name the destinations of the local crop but the
amounts sent vary considerably. Many of the growers interviewed could not accurately specify the ultimate point of sale for their flats. In some instances, the producer was more reluctant to comment on this phase of his operation than any other. In these cases the grower was asked to make an estimate of the percentage of his crop that went to each of a number of known destinations. It is on this basis that the distribution pattern for the local bedding plants industry has been made.

The various scales of operation have a great deal to do with the crop distribution pattern. The smallest operations sell most of their plants to the local market. The middle-sized producer sells his product to a variety of buyers, most of whom are brokers or retailers in other cities. The largest growers wholesale nearly all of their plants in other cities. The buyers in these urban centers are often chain stores or wholesale produce concerns. The chain stores include department stores, garden centers, grocery, and produce stores.

Perhaps as much as 65 per cent of the local crop is sold to "truckers." This ubiquitous and ill-defined individual may be a produce buyer, a broker's representative, an independent trucker, or an actual trucking company. In almost all instances the trucker has been sent to Kalamazoo by either a broker or (wholesale or retail)
plant outlet. Yet, his load may not be specifically contracted for by his potential customer. In some cases, he may sell much of his load before he arrives at his destination. Often he will call a favorite grower on very short notice and order plants to be readied for his arrival. Smaller truckers and independent carriers may just arrive at the greenhouse and ask to purchase plants. Even the large brokers seldom give the grower more than a few day's notice.

These rather casual transactions remain from the earlier days of this industry. When growers began to produce flats in large numbers they sold locally, and some personally hauled to the Chicago and Detroit markets. Prospective buyers, including large retail outlets, brokers, and independent truckers soon came to know that Kalamazoo was producing bedding plants. Rather than wait for good buys and proper quantities at the Chicago market (and other markets), the buyers sent trucks directly to this area. Word of mouth advertised low "at the greenhouse" prices and the influx of out-of-state purchasers began.

Of the one million flats produced in the local area, approximately 20 per cent are sold in Michigan. Most of the plants sold in-state are sent to major urban centers: Detroit, Grand Rapids, Lansing, Muskegon, and Benton.
Harbor. Although growers near Detroit do most of the business in that region, it is still the largest in-state market for Kalamazoo's plants.

Eighty per cent of Kalamazoo's bedding plants are sold outside of Michigan. Chicago leads all of the out-of-state markets, receiving approximately 60 per cent of the local product. The plants sold in Chicago are sent by brokers to nearby areas such as Milwaukee. Indianapolis is the next largest market. The remaining points of sale in the order of importance are: Nashville and Memphis, the Carolinas, Georgia, and Florida.

This distribution area is sharply delimited to the east and west by competing areas of production. Large producers are found in the Detroit and Toledo regions. Akron, Ohio, various places in Pennsylvania, and Niagara, New York are also important bedding plants producing areas. These growers dominate the Northeastern market. Producers in St. Louis, Missouri preempt distribution to the west. The Far West is under the control of California growers. With this distribution of competing producers the elongated north-south pattern of Kalamazoo's markets is readily explained.

Scale of Operations

Similarities exist among all scales of operations.
Small growers producing less than 15,000 flats, medium operations raising 15,000 to 40,000 flats, and large farms with more than 40,000 all report that they grow approximately 15 varieties of flowering plants and four or five kinds of vegetable plants. The sample data indicates that small growers produce approximately 8 percent of the total Kalamazoo crop while medium and large operations probably account for 56 and 36 percent respectively. All producers utilize plastic trays in packaging some of their plants. Every grower employs plastic greenhouses extensively and most have a smaller amount of planting space in older glass houses.

In the packaging of plants there was much variation in 1968. The larger producers tended to utilize the less expensive wooden flats, a few of whom were still constructing these flats during the "off season." Most were purchasing the flats preassembled in a nearby village for two cents less than the price of plastic flats. This year, 1969, almost all growers are producing in plastic flats. Although the new flats cost a bit more than the wooden ones, they are less prone to harbor disease, more attractive, and easier to store for they may be nested one inside of the other.

Plastic trays, placed in the flat to divide the plants into smaller groupings, are not utilized in all
flats. Originally growers produced only "whole flats" and the customer who desired fewer plants had to cut out a portion of the flat. When a flat is thus "broken" the roots are often damaged during separation and exposed to the air. Because the buyer generally desires less than a whole flat, the growers are now employing compartmentalized plastic trays. The largest operations produce all of their plants in eight-pack trays (eight containers per flat) while the smaller farms sell about 25 per cent of their crop in whole flats. The latter grower is also more apt to produce plants in six-and one-half-pack trays. This suggests that the smaller grower either produces for a different type of consumer or he is very slow to adjust to changing market conditions.

The marketing mechanism of bedding plants also differs with the scale of operation. The smaller producer tends to grow for the local market and often retails the plants himself. Although he does wholesale much of his crop, he seldom employs a middleman or wholesale establishment. The wholesale portion of the crop is sold to truckers or hauled personally to nearby markets. Often as much as 40 to 50 per cent of his plants are retailed at the place of production.

The middle and large-sized growers sell all their plants wholesale. The medium-sized producer sells most
of his crop to truckers or wholesale concerns which come to his greenhouses to pick up plants. In only a few instances does this grower personally haul his plants to retail outlets in other cities.

The largest producers are actively engaged in the trucking business. They often own a small fleet of tractors and even more trailers. During the short shipping season they rent extra "rigs" and especially extra trailers to help dispose of their crop. These large growers have many established customers in places far removed from the Kalamazoo area. Being in the trucking business has several advantages. The grower has his markets spread throughout a larger portion of the nation and enjoys a semi-monopoly at the moment. Not only is he able to charge according to local market conditions but he also derives additional profits from the trucking function. Being far removed from the retail outlet allows the grower to insist upon early orders and a rough commitment from the buyer. Because he supplies so many out-of-state markets it is easier for this grower to rid himself of surpluses at the end of the season. If these markets demand more plants he may obtain them from other local growers. In this manner the largest producers are assuming a "jobber" or wholesaling role in the local bedding plants economy. Furthermore, as was mentioned
above, these growers can double crop extensively, disposing of early crops in southern markets.

Another variation that arises among different sized operations is the proportion of glass to plastic greenhouses. The smaller grower has a greater percentage of his operation in glass greenhouses than does his larger counterpart. In the case of the latter, as much as one-third of his total crop is grown under glass. The moderate-sized producers generally have less of their crop in glass houses, although there are instances where one-half of their plants are under glass. The largest producers have very little of their total growing space under glass and where it exists it is utilized only for the sowing phase of their operations. In a few cases the largest growers have turned to fiberglass houses which are much more expensive than plastic but are more desirable.

Other obvious and expected differences are to be found among the various sized farms. The smallest operations employ a few part-time employees during the busiest months. The moderate-sized concerns employ eight to 15 part-time laborers for the peak months of April and May, while fewer are on the payroll during the less busy months of the year. Only the largest growers have any full-time help throughout the year.
Not all the owners of bedding plants operations derive their entire income from plants production. All smaller growers are actively employed in other occupations most of the year and are only part-time farmers. The middle-sized producers and the largest growers do not have outside employment. Obviously, this is an important distinction, for part-time farmers will have a different outlook on the industry than will those whose entire livelihood depends upon this endeavor.

The present nature of individual operations indicates a change in scale will be forthcoming. Interviewing revealed some striking differences in the ages of the operators. There appeared to be two distinct age groups, those between 30 and 45 and those between 50 and 55. It was found that the older group invariably was associated with middle-sized operations while the younger men were in charge of the largest farms. In most cases, the younger men had been preceded by a father who had "made it big" in celery and had subsequently retired, leaving the son in charge. Often the older, moderate-sized growers complained that their sons were not interested in maintaining the enterprise. Of all the operations investigated, only three were partnerships, the rest were individually owned. Combining these responses with the fact that there exists a definite heritage of
father-son involvement in celery cultivation and now the bedding plants industry, a question arises of what will become of the many average-sized operations when the older group is ready to retire. Already a few larger concerns, operated by younger men, have been able to purchase these businesses, especially in the Comstock area. On this basis one may predict that there will be agglomeration of the various producers in the future and that the large growers will become even larger. Economically this is desirable but, even if it is possible, the resultant operation would be fragmented for there is no way to actually combine the production facilities now located on small individual plots. This hypothesized series of interlocked greenhouse operations will allow further mechanization but true economics of scale will be less easily obtained than if all greenhouses, equipment, and personnel are located at one point.

Some small and medium-sized operations will continue to function despite a trend toward large-scale operations. Under these circumstances growers might raise a specialty crop, such as geraniums, which demands greater labor inputs. Thus, augmenting the production of the larger operations, they may establish a permanent place for smaller businesses within the industry. Another option open to the small grower is to produce for the local
market. Short hauls, personal contact, and sales of small lots may keep this type of business in operation. The small producer's greatest security lies in joining a co-operation organization. This would allow substantial savings on supply and material purchases as well as enable him to effectively compete for large accounts.

Three Areas of Production

The three areas of production shown in Figure 2 are characterized by different scales of operation and, therefore, dissimilarities exist among the growing areas. North Westnedge (with the exception of one middle-sized producer) contains only small-scale operations and probably produces less than ten per cent of Kalamazoo's total crop. Most have greenhouse space of less than 7,000 square feet and grow fewer than 5,000 flats. The wholesale value of their product is less than $10,000 per year for individual concerns. It is probable that many of these operations do not gross more than $5,000 annually. There appears to be much family labor and only a little part-time, high-school help. In many cases the owner is actively engaged in full-time employment elsewhere, even during the growing season. The typical farm consists of a small glass greenhouse and one or two small plastic houses, seldom longer than 60 or 80 feet. Invariably, this grower sells many of his plants right off
the floor of his greenhouse to retail customers from the surrounding area. In a few instances he utilizes an enclosed pick-up truck or a small van to sell flats to retail outlets in nearby cities. Only a few truckers from other states patronize these small producers.

The growers in the Comstock area producing approximately 45 per cent of local plants output are most difficult to stereotype for this area contains all scales of operation. Furthermore, nearly all of the 27 growers in this area are members of the local co-operative organization. Greenhouse space varies from as low as a few thousand square feet to as high as 60,000. All operations are the owner-operator type, with the owner being actively employed in the growing of bedding plants. He is not above performing the most menial of tasks. In most operations the entire family is active in the business throughout the growing season. There is more hired labor in the Comstock area than in the North Westnedge area for the scale of operations is generally larger. Yet, unlike the Portage area, there are no concerns which have full-time, year around employees who are not owners or members of the immediate family. The larger farms in this area permit the owner-operator to be employed full time in the plants business. Very few Comstock growers labor in other pursuits during the off
season.

The various scales of operations in the Comstock area result in different patterns of crop distribution. The smallest growers are engaged in retail sales at their individual locations. However, even in some of these cases, more than 50 per cent of the plants are wholesaled to truckers or brokers. The middle-sized operations distribute all of their product wholesale, mostly to brokers or out-of-state truckers who transport the plants to retail or wholesale outlets in other cities. The largest growers also sell all of their product wholesale. Besides selling to brokers and truckers, they haul most of their plants to their own wholesale customers. Thus, most of the largest growers in this area have a small fleet of trucks. Those middle-sized growers who do not have their own trucks often rent small vans or else sell all of their plants at the door of the greenhouse.

The growers in the Portage area can all be considered large producers with the exception of very few medium-sized farms. Collectively, these growers produce 45 per cent of Kalamazoo's plants. Only three growers retail directly to the public. The casual signs advertising "flowering plants" which are common in other areas are replaced here by more elaborate establishments.
similar to the old "produce stands." One Portage operation has its own retail produce outlet.

All but four producers in this area have a fleet of their own vehicles. Generally the plants are sold out-of-town by the grower. Thus, the broker or trucker so common to the Comstock area is seldom found here. Exceptions occur when a regular customer in another city drives to Kalamazoo and purchases his supply of plants directly at the greenhouse, thereby saving himself hauling charges.

The three producing areas also divide along less tangible lines. In each area there exists a feeling that "we produce the best quality plants in the County." Some of this competitive attitude is to be expected, but often it is suggested that the other areas may ruin the entire market if they continue to produce a sub-standard crop. Much of this is an exaggeration in the author's opinion. The observable quality at the time of sale appears to vary as much among the individual operations as between the three areas. Some of this may be due to a different growing philosophy among the Comstock and Portage areas. The Comstock producers keep their plants cooler and dryer than those in Portage. Thus, it requires a little longer time for them to mature. The results in the end product appear to be negligible.
The variation in growing philosophy is probably created by a very real difference in the distribution of plants from the three producing areas. Because the Portage growers are larger and haul plants to their own markets, they have been able to capture more of the Southern market. Plants are marketed in Florida and Georgia beginning in late February and early March. The major Northern markets of Indiana, Michigan, and Illinois do not open until the first of May. Thus, the Portage grower-trucker can begin disposing of his plants up to eight weeks earlier than most producers. This allows him to hurry along the production of a large second crop.
CHAPTER V

COMPARISON OF THE BEDDING PLANTS INDUSTRY
TO THE ANTECEDENT CELERY INDUSTRY

There are many obvious similarities between the old celery industry and that of the modern day bedding plants. Each endeavor occupies the same physical area. Plants are sown and transplanted in greenhouses and the calendar of events is somewhat comparable in both industries. Many of the growers engaged in the bedding plants business were previously celery producers. Because of this carryover of personnel, much of the Dutch character which was synonymous with celery farming is still found in the area.

Each industry, celery and bedding plants, appears to have passed through definite phases in their respective life spans. In the initial stage of celery cultivation there were many people involved with different scales of operations and the number of celery growers expanded very rapidly. The bedding plants industry of today has perhaps just passed through such a phase. The number of plant producers grew dramatically from the early 1950's until 1963. Since then no new growers have entered the local industry. The celery era was
characterized by many people who planted on very small plots, just as the plants industry still has many growers producing in very small greenhouse operations. The early phases of the celery industry witnessed an expanding market which was considered limitless by those involved. The bedding plants industry is still experiencing a rapidly growing market; production appears only to be keeping up with demand.

Still, there are signs that the bedding plants industry is passing into a new stage of existence. Although nearly everyone professes to foresee an ever-expanding market for plants, a few growers are beginning to think that perhaps the market is merely experiencing sustained growth of rather definite proportions. During the ten-year period, 1949 to 1959, the national bedding plants industry expanded in very nearly the same proportions as did national income and employee compensation (Table 6). Although local production grew much faster than did the national industry, the fact remains that the bedding plants market is limited and probably susceptible to glutting.

In this second phase of the bedding plants' existence many subtle changes are taking place. Just as celery was once concerned with small farms and much labor, the plants industry of today is producing in small
TABLE 6

GROWTH OF THE NATIONAL BEDDING PLANTS INDUSTRY COMPARED TO OTHER ECONOMIC INDICES, 1949-59 (In Millions Of Dollars)\textsuperscript{a}

<table>
<thead>
<tr>
<th>Item</th>
<th>1949</th>
<th>1959</th>
<th>1949-1959 Increase (Per Cent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bedding plants</td>
<td>16.9</td>
<td>32.8</td>
<td>94</td>
</tr>
<tr>
<td>National income</td>
<td>218.0</td>
<td>400.0</td>
<td>83</td>
</tr>
<tr>
<td>Employee compensation</td>
<td>141.0</td>
<td>279.0</td>
<td>98</td>
</tr>
</tbody>
</table>

greenhouses and employing as much of the immediate family as is available. Once again, as in the days of celery, labor is the most expensive input to production. The labor that is utilized must be made more productive to obtain greater profits or the price must rise. But production and price are dependent on market conditions. As with celery, the grower cannot control these factors, therefore, he must turn increasingly to mechanization in order to reduce labor costs and increase productivity.

A certain degree of mechanization was adopted in the celery industry in an attempt to supplant a decreasing labor supply, but the small size of operations prohibited the wholesale adoption of machines. Only the larger planter could afford the equipment and use it efficiently. Today mechanization is just beginning to appear in the bedding plants industry. A good example is the flat-filling machine. For an investment of $600 or $700 and his own labor the grower can construct this labor saving device. Yet, only a handful of these machines are being utilized today. This suggests that only a few growers deem the investment profitable in terms of their scale of operation, or they cannot comfortably spend $600 for a non-essential item. Actually, this is a very small business investment; what will happen when these growers must purchase thousands of dollars
of equipment to automate watering or transplanting?

Marketing

Other close similarities to the old celery industry exist in marketing procedures. In the 1920's and 1930's celery growers came to be involved in the trucking business. They did away with the shipper and began to haul the crops to market themselves. This produced a fierce sense of competition among the growers and glutted nearby local markets. The larger plant growers are currently engaged in the shipping business as were their celery counterparts. Now the middle-sized and often the small plant farmer is getting into the trucking business. Of course, there is nothing wrong with this as long as the competition does not become excessive and a flooded market does not occur.

Some celery areas were actually driven out of existence by the encroachment of urban land uses. The North Westnedge area and the Comstock area are beginning to experience the same problem. As urban functions invade an area the value of land increases and taxes rise. One soon begins to ask whether this greenhouse activity could not just as easily be carried on elsewhere. In the case of celery cultivation it was not possible to leave the muck areas for they were absolutely necessary for
production. In the case of bedding plants it would be relatively easy for an operation to be moved. The buildings are almost all of temporary construction and the soil could be hauled in for each season, just as some components of the planting media are now.

The market areas of both celery and bedding plants are very similar. In each case the distribution area is bounded on the west by St. Louis and in the south by the Gulf and Atlantic states. In the east, however, there is a distinct difference. In the early celery period rail shipments went as far as Philadelphia and even occasionally to New York. With the demise of the celery shipper and the rise of the small local trucker the eastern celery market tended to shrink. In part this was due to competition from New York celery farmers. If the celery market of the 1930's is examined, it will be found to closely approximate the plant market of today. In both cases there is very little movement of crops eastward beyond the Ohio area. Besides this coincidence of market boundaries, today's plant destinations are often the same wholesale produce markets and retail outlets which previously bought celery from the Kalamazoo area.
Organization

Some of the problems the celery grower experienced are also being felt by today's plants industry. In the middle 1950's, when celery markets were declining rapidly, the growers became concerned with marketing techniques and the quality of their product. In 1957 local growers formed an association and hired a farm agent to control a promotional program as well as to try to standardize the quality and price of the local crop. Although this attempt was an example of "too little too late" the thought has not been wasted upon the present plants producers. Wild price fluctuations, cut-throat competition, and widely varying quality cause concern to bedding plants producers despite a very good market. Twenty-seven local growers now belong to the Kalamazoo Valley Plant Growers Co-operative, Incorporated. This Co-op was formed to standardize prices and quality in local production. Although membership was initially small, this organization probably produces as much as 40 per cent of local plants output.

The results of the present Co-operative are much

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1 Kalamazoo Gazette, December 30, 1962.
more significant than those of the belated attempt at organization in the celery industry. Because of the efforts of the Co-op this area produces most of its flats with the tray pack. Although retail customers preferred this packaging method, local growers, as well as those in other areas, were slow to adopt trays for this involved an additional expense. The Co-op believed that they could induce greater sales and expand their market areas by utilizing this package. Agreements on standard prices allowed the members of the organization to introduce the new package and raise prices by 50 cents per flat. This more than covered the 11 cents per flat cost for purchasing the new tray. Obviously, a price increase of this magnitude would not have been possible if there had not been widespread support of the organization.

This Co-op promotes the general welfare of the local industry as the celery organization had hoped to do. Members of the Co-op share growing techniques, equipment, and pay the expenses of a general manager. New market areas are being explored and new shipping techniques are being tested. Experiments with containerized shipping and an active attempt at enlarging the Southern markets are projects that the celery farmers could only dream of.
The success of this organization is the result of two factors. First, the growers involved in the plants industry personally witnessed the decline of celery. They realized too late that organization by farmers might have saved the waning celery industry. One still hears talk of "what if we had been organized and had sent some of our best celery to the West Coast as California did to our markets?" This is, of course, wishful thinking but it demonstrates that the local growers feel co-operative effort is necessary.

The other major reason for wide acceptance of the Co-op lies in the fact that the present-day grower is often a second or third generation muck farmer. The younger grower does not have his father's degree of conservatism nor his fierce sense of individual competition. The younger men are thinking in terms of out-of-state competition and markets. Today's grower realizes that when his father undersold the neighbor he was only hurting himself and other local farmers. Thus, the tragic experience with celery has not been wasted upon the bedding plants grower.
CHAPTER VI

IS THE PAST A PROLOGUE?

Market Forecast

The national bedding plants market appears to be constantly expanding. In the 1949 to 1959 period sales of bedding plants increased more than 9 per cent annually. Although current data are not yet available, all indications are that this trend of steady growth will continue. Most estimates predict that the rate of increase will be even greater.

Intuitively, one would expect this strong market to continue for many reasons. Increased incomes and higher standards of living will work to the benefit of the industry. The natural growth in population should produce more consumers of bedding plants. The expansion of gardening as a hobby and the desire of the suburban American to beautify the grounds surrounding his home can be expected to continue. The home gardener is the largest buyer of bedding plants, but among other consumers there

\[1\] Mary Zehner, "Consumer Purchase Patterns for Bedding Plants," reprinted from the Michigan Florist (volume not cited), pp. 5-29.
exists a market potential which has yet to be thoroughly explored. Some of these might include industrial, commercial, and institutional accounts.

Marketing research has only recently been undertaken in regards to bedding plants. If the results of this type of study are carefully examined and acted upon, the industry could witness an unparalleled boom in the next decade. Mary Zehner, a Consumer Marketing Specialist in the Department of Agricultural Economics at Michigan State University, reports that 78 per cent of a group of sample families questioned purchased bedding plants within the past year. Ninety-four per cent of the sample lived in single family dwelling units and 93 per cent of these owned their own homes. The greatest number of purchases and the most money spent was reported by homemakers in the 30 to 44 age bracket. Respondents with incomes under $10,000 spent an average of $5 or less for bedding plants while those reporting incomes over $10,000 spent an average of $11. The typical purchaser of plants today is the suburban housewife aged 30 to 44, living in her own home, with an annual family income above $7,000.

2 This sample included 617 families in eight Michigan cities and was undertaken in 1968.
This stereotype of the bedding plants buyer may represent a large proportion of the population, but what has been done to attract other segments? What about people over 60 who do not have gardens or who cannot care for their yards? What about the large number of Americans under 30, living in multi-family dwellings, who have not been able to join the suburbanite? Do these people enjoy the aesthetic value of plants any less, or do they feel that they have no place for bedding plants? Is the ownership of property a prerequisite for the purchase of commercially produced plants? Modern advertising and consumer education could bring these people into the plants market. Packaging in decorative window-box planters or containers which could be placed on the porch or balcony of apartments might expand the plants market considerably. Many things could be undertaken to increase sales of bedding plants in the future.

Modern merchandising could also have a beneficial impact on the industry. Although the author knows of no research which deals specifically with the merchandising of plants, growers, wholesalers, and retailers are coming to realize that the purchase of plants is often a hurried emotional decision rather than a logical step. Large, colorful displays sell more flats than small groupings. Attractive packaging, such as the eight-pack tray,
produce more sales. Sales personnel who are familiar with the proper care of bedding plants also stimulate larger purchases. Everyone in the business agrees that weather conditions during the sale period is one of the prime factors dictating the amount of purchases that will be made. Wet and/or cool weather always discourages sales. Thus most plant sales, or at least those which establish the difference between a good year and a disastrous one, are the result of impulse buying. As more is learned of the psychology involved in the purchase of plants, retailers will move toward greater sales.

The purchasing pattern of bedding plants is shown in Table 7. It is apparent that the independent garden center and florist account for most sales. In this age of agglomerated commercial functions, one may anticipate that the large chain stores, both department and grocery, will report a greater proportion of total sales in the near future. These outlets can display in large quantities, advertise heavily, and offer attractive prices. By their very size they have the greatest opportunity to attract the impulse buyer. Furthermore, in this larger setting, often indoors, the vagaries of inclement weather are more likely to be forgotten. Thus, the future of the bedding plants market appears to be most attractive if
TABLE 7

RETAIL OUTLETS FOR PURCHASE OF BEDDING PLANTS:
BASED ON A SAMPLE OF 617 CONSUMERS
FROM EIGHT MICHIGAN CITIES, 1968a

<table>
<thead>
<tr>
<th>Outlet</th>
<th>Per Centb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent garden center</td>
<td>47</td>
</tr>
<tr>
<td>Florist or greenhouse</td>
<td>34</td>
</tr>
<tr>
<td>Garden center in department or discount store</td>
<td>23</td>
</tr>
<tr>
<td>Roadside market</td>
<td>21</td>
</tr>
<tr>
<td>Supermarket</td>
<td>16</td>
</tr>
<tr>
<td>City or farmers' market</td>
<td>13</td>
</tr>
</tbody>
</table>


bIncludes multiple responses.
progressive merchandising and marketing techniques are initiated.

The prospects for the local industry's markets have the same potential as those of national bedding plants. However, the actual expansion of the local endeavor will be related directly to several factors. First, the local producers must maintain the quality of their plants. They cannot afford to alienate any markets with inferior products as local celery growers did 20 years ago. Secondly, local producers must be able to change growing techniques. They must also be receptive to changes in consumer preference if they are to maximize market potential. Just because 50 per cent of today's crop is petunias, the grower cannot ignore a latent desire by the consumer for other plants. As the purchaser becomes more educated to bedding plants, the demand for more "sophisticated" plants such as the begonia must be met. Finally, the local industry must unite in a common effort to meet competing forces in other areas. Organization of growers could affect advertising and consumer (as well as outlet personnel) education in bedding plants. A community-wide effort might well afford experimentation with more economical shipping techniques for local plants resulting in quantity movement of bedding plants to other portions of the United States. If these steps are not
taken, competing areas could easily step into the breach and, just as in the waning days of "King Celery," the competition might appear "unbeatable."

**Competition**

It must be admitted that in the immediate future there is little concern about competing growing regions. Many other production areas exist close by and, as was noted above, actually delimit the local market area on the east and west. In most instances the difference between local plants and those from other areas is a matter of quality and packaging, not price. The plants produced locally, with few exceptions, are of better quality than those the author has seen from the Detroit and Toledo areas. Kalamazoo growers reflect the same opinion. The price of both local and outside products are comparable.

Besides the difference in appearance or quality of the plants, there is an obvious variation in packaging. Local growers now produce as much as 80 per cent of their plants in plastic trays. Although this increases the price of the flat, it has obvious advantages in the market place. Most of the competing areas appear to be slower in adopting this change in packaging.

Although Kalamazoo growers are not encountering strong competition at the moment, they may experience it
in the not too distant future. The expanding market may
be the reason why other producing regions have not tres-
passed on Kalamazoo's market. This blissful situation
cannot last forever. Eventually the national market
will near the saturation point and keen competition,
based upon production-transportation costs and quality,
will prevail.

At this moment, competing areas have advantages
only in the transportation factor. All competing re-
gions are in the northern United States, with the excep-
tion of California which is considerably removed from
the Mid-West and Eastern producers and their market
areas. Because all producers must utilize greenhouses,
additional heat and water, and hired labor, there is
little difference in production costs. Transportation
costs have helped to localize the market areas about each
producer. Thus, each growing area has a large nearby
market center to which it sends the majority of its pro-
duction; for example, Kalamazoo to Chicago, Detroit to
Detroit, Toledo to Toledo, and so on. What will happen
to this pleasant marketing pattern if production costs
vary enough to allow additional transportation costs to
be assumed by the grower in one area?

Presently there is no competition in the south des-
pite a strong local market. Although labor is available
at low wages and the construction of greenhouses might not be necessary, only a few bedding plants operations have sprung up in this region. Northern growers say that the sun is too strong and temperatures are too high in the south to produce "top notch" plants. Experimentation with hybrid plants and warm weather growing techniques is already in progress. If competition should arise farther to the south and these areas prove to be advantaged over Kalamazoo, the effects would be felt immediately. Because of reduced transportation distances, local southern markets would fall from Kalamazoo's control. If production costs could be cut by reducing labor costs, lower heating bills, or abolishing greenhouse expenses, this area could afford greater transportation costs and could conceivably cut into the Chicago and Indianapolis markets now held by Kalamazoo.

Still other advantages could be had by competing areas of bedding plants production. Some individual growers in other regions already produce over one-half million flats annually. With operations of this size come economies of scale, superior management abilities,

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3 One local grower moved to Georgia in 1968 for the purpose of establishing a bedding plants business in the South. It may be significant to note that this grower, John Hazalager, was one of the first plants growers in the Kalamazoo area.
costly yet rewarding modern production techniques, easier financing, and reduction in costs stemming from large volume purchases and sales. Some rural plant farms may never fear the skyrocketing real estate valuations and corresponding high taxes. Other areas may be favored by lower wage costs or other benefits. Whatever the advantage, it will eventually enter and affect the outcome of competition for markets throughout the United States.

Changes in transportation are to be expected in the near future. Growers throughout the country are experimenting with different methods of shipment. Local growers have utilized crates and removable or collapsible racks to assure the full loading of semi-trailers. Experiments with cardboard containers are to be attempted next year to test the feasibility of shipping local plants by common carrier. A grower in Connecticut utilizes five-by-seven foot cabinets for "containerized" shipments. He reports that he can ship on flat-bed trailers (less expensive than the enclosed types) and can cut his loading time from hours to only 45 minutes. Thus, he uses fewer vehicles but secures greater benefit from them.

Some of these innovations may never reach all bedding plants operations but any change in transportation will revolutionize the industry. Trucking costs will decrease
per unit, thus heightening market competition on the basis of production costs.

Local Advantages

The Kalamazoo area was most favorably endowed during the early years of bedding plants production. Greenhouses and heating equipment utilized for bygone celery production were readily available. In all instances there was a first-hand knowledge of basic greenhouse operations and plant culture. Each grower had years of experience in the operation of his greenhouse. In some cases the farmer had already gained experience in the production of tomatoes and pansies. Little, if any, additional expense or risk was involved in changing over from celery growing to bedding plants production.

An established market provided another local advantage in the early days. Almost all purchasers of celery (wholesale and retail outlets) also bought bedding plants. The large wholesale produce markets in Chicago and Detroit were already dealing in flats of plants and appeared to have an insatiable demand for more. As news spread that Kalamazoo had plants for sale, produce brokers and retailers came to this area from the larger urban centers of Michigan, Indiana, and Illinois to purchase plants just as some had come for celery.
Another early advantage was the small parcel of muck land owned by each farmer. When sand or top soil was added to the muck a good planting media resulted. Thus, the largest component of the soil mix did not have to be purchased. Equipment for moving the soil was also at hand.

The early advantages have passed, but other less tangible factors remain to benefit the local area. The proximity of major market areas is of especial importance to the future of local operations. Although large producing areas are found closer to Detroit, the location of Kalamazoo along Interstate 94, only two-and-one-half hours removed from Detroit, allows the local product to be sold in that area at favorable prices. The Chicago market is even larger and other significant producing regions are much farther removed from it than is Kalamazoo. Unless other producers locate nearer Chicago or are able to cut shipping costs to Chicago, Kalamazoo's advantage should not be challenged for some time.

The scale of county-wide plants production is an obvious advantage. Kalamazoo County contains the greatest concentration of bedding plants growers in the State and probably the Mid-West. The local output of this region compares favorably to other producing areas, both in and out of Michigan. This foremost position may not
obtain indefinitely, but it should provide the impetus necessary to carry the local industry well into the immediate future. A large business has been established and its reputation is widely known.

Yet another advantage springs from the lesson learned by the demise of celery cultivation. Kalamazoo producers have had one bonanza stolen from them because of their inability to adapt and to unite. Most of the present-day growers are not about to let that happen again. One does not find the fierce "cut-throat" competition in today's industry that existed in the celery era. In fact, the growers are very open with each other, discussing common problems and growing procedures. The Kalamazoo Valley Plant Growers Co-operative, Incorporated is a good example of the new attitude found in the local bedding plants industry.

The progressive attitude of today's grower will be one of his greatest assets in the future. The producers are eager to experiment with new seeds and plant varieties. The rapidly increasing demand for begonias was initiated by the adoption of them in local greenhouses. The universal utilization of eight-pack trays, so popular with consumers, demonstrates the willing acceptance of innovation among today's growers. The local bedding plants producer is anxious to please the consumer and he
is profiting from it. Another indication of the grower's progressive attitude is the employment of flat filling machines and experiments with automated watering devices.

Concomitant with this progressive attitude is the active assistance of the State Co-operative Agricultural Extension Service and other State agencies. Of course, all producing areas within Michigan profit from these services, yet local growers have been quick in seeking aid in soil analysis, disease eradication, and recently in environmental control within their greenhouses. The results of consumer research is being presented to local growers. An annual "Tour Day" of local greenhouses demonstrates the co-operative attitude among growers as well as with the Extension Service. This also provides a forum for discussing production problems. Another indication of state-wide interest in the bedding plants industry was demonstrated by the initiation of the First National Bedding Plants Conference in September of 1968. Michigan State University will again host the conference this year. It is significant to note that Kalamazoo was well represented at the first conference.

Thus, although this area was exceptionally favored in its initial development, its prime current advantages are: (1) an excellent location in regards to the Chicago market, (2) a progressive attitude toward the local
industry and its markets, (3) the willing assistance of State Agricultural agencies, especially the Extension Service, and (4) a large county-wide scale of operations.

Local Disadvantages

The Kalamazoo area shares disadvantages with all producers in the Northeastern United States. Climate dictates the utilization of greenhouses and artificial heat to grow bedding plants for early sale. Wages throughout this portion of the nation are high relative to agricultural wages in other regions due to competition for labor by industry. As long as all producing areas experience these same problems these disadvantages may be discounted.

However, the local area does have a disproportionate share of weather problems. Winter is characterized by heavy snowfall which can damage the greenhouses. Fortunately these normally occur prior to the growing season so maturing plants are unaffected. The high incidence of cloud cover in this area has two harmful effects. First, the habit\(^4\) or appearance of the plant is directly related to the receipt of light and/or insolation. Secondly,

\(^4\)Habit refers to the characteristic form of plant growth. Too little light produces a tall, thin habit.
local market, especially that of Chicago, suffer declining sales in apparent correlation to inclement weather.

Urban encroachment presents another local disadvantage which will become more important in the future. As was mentioned previously, production costs will increase if urbanization and its attendant higher land values invade the present areas of bedding plants production.

Kalamazoo's most serious disadvantage, relative to other producing regions, is as abstract as are its greatest advantages. Despite the signal achievements of the Kalamazoo Valley Co-operative the area's largest producers have refused to join. They feel that the advantages to their operations would be slight compared to the contribution they would be required to make to the organization. The Co-op is supported on a per flat basis, thus the larger producers would be paying more. Furthermore, they are afraid that they might be called upon to turn over their accounts to the organization at some future date. These are valid reasons for a reluctance to join, yet one suspects that the principal reason is quite simply, what does a larger grower stand to gain immediately in dollars and cents? Small producers can purchase supplies through the organization, thus saving money. They can also join together in shipping a truckload or two of plants which they could not do on their own.
The larger grower stands to gain little immediately and is seemingly unconcerned over future events. Why should he be worried? He is large enough, has enough capital, and has easy access to financing should the future demand extensive changes. The largest establishments are the last to collapse in troubled times.

Some of this attitude on the part of the large grower is understandable if not excusable. However, it is indeed lamentable that there does not exist more cooperation among all the Kalamazoo growers. There is so much that could be undertaken by a large organization which would enhance the entire industry. Implementing market research, consumer education, and advertising are just a few things that could be done to expand sales even more. The State would even defray up to one-half of the advertisement cost if Michigan is mentioned in the ad. Aggressive marketing to other regions of the United States could more easily be initiated by a larger organization. Further experimentation in packaging and shipping could also benefit Kalamazoo's growers.

The amount of disadvantage Kalamazoo derives from this lack of community-wide cooperation depends on organization efforts in competing areas. If all other growing regions remain in a fragmented state with only independent producers, Kalamazoo will not suffer. However, if other
production areas can unite they will effectively damage Kalamazoo's position in the national market. One finds many examples of this situation in the nation's cut flower industry. Industry-wide promotion groups such as Roses Incorporated and regional associations such as Denver Carnations have had a tremendous impact on small, local production areas.

Organization of some kind will be essential to future production. If the present Co-op cannot obtain the participation of this area's largest growers, then its structure should be altered to be more universally acceptable, or a second organization should be formed. The future of this industry may well hinge upon the creation of some promotion-marketing orientated organization. Sooner or later other production areas will challenge Kalamazoo's position in the Southern market and perhaps even the Chicago area. An organized effort could more easily deal with this situation than many growers exercising independent action. If nothing else, the experience of "King Celery" should have taught all local growers the necessity of community-wide co-operation.

In conclusion, it may be said that the local bedding plants industry is not hindered by significant disadvantages. The continuation of this blissful situation depends as much on local events as upon the developments and evolution of competing regions.
BIBLIOGRAPHY

Books and Articles


**Correspondence**

Carlson, William H. Assistant Professor of Horticulture, Michigan State University

Hinz, Vernon. Kalamazoo County Agricultural Agent.

Zehner, Mary. Consumer Marketing Specialist, Department of Agricultural Economics, Michigan State Univ.
Newspapers

Kalamazoo Gazette. November 15, 1932
March 16, 1937
April 22, 1951
July 18, 1953
September 29, 1954
July 6, 1955
October 19, 1955
May 1, 1957.
March 23, 1960
August 28, 1961
December 30, 1962
August 22, 1963.

Unpublished materials


Interviews

**Comstock Area Growers**

- Boven, Richard
- Boven, Thomas F.
- Cramer, Dean
- Klooster, Clarence
- Ouding, Robert
- Schaap, John
- Smith, Richard
- Tunier, Edward
- Vanden Bos, Andrew M.
- Wenke, John

**North Westnedge Growers**

- Den Hartigh, John
- Gernaat, Garrett
- Longjohn, Arthur J.
- Meinena, Arthur A.

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