

NEW ENGLAND BUSINESS REVIEW

JANUARY
1966

1965 — The Best Yet . . . annual review of New England business.

The year was one of high achievements and many new records.

Sales Still Rising

New England nondurable goods producers expect sales to increase 7 percent in the first quarter of 1966.

Electronics on the Move

In recent years the industry has substantially shifted location within the region. This article examines the shifts and their causes.

NOW

NEW ENGLAND BUSINESS REVIEW

1965—The Best Yet

Annual Review of New England Business

A YEAR AGO, in a similar annual review of New England business, we labeled 1964 as another good year — the fourth in a row. Now as 12 months have elapsed and we take a backward glance over 1965, it is difficult to avoid giving it a comparable label — the fifth in a row, even the best yet.

Available data which directly measure New England's aggregate economic performance, such as employment, income spending, bank deposits and credit, almost without exception show very satisfying growth patterns for 1965. Where direct regional measurements are not available, comparable gains can often be reliably inferred from trends in nationwide statistics. The year's achievements surpassed commonly held expectations. Many new records were attained.

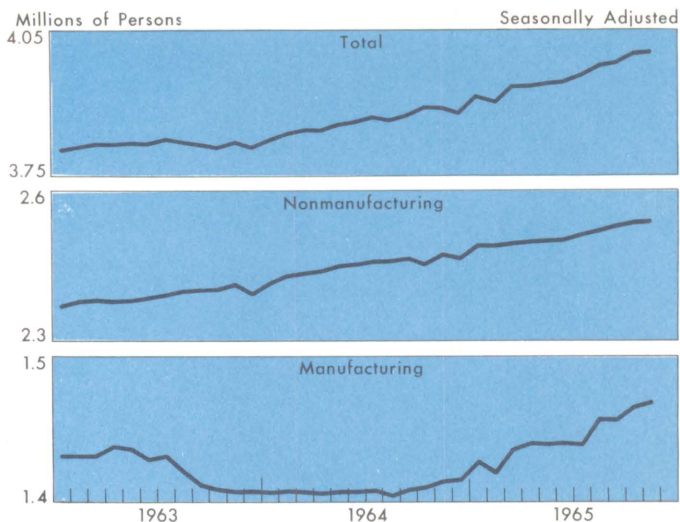
How to account for this rather fine performance? Just the momentum of a cyclical

advance, now in its fifth year, accounted for much of it. Relatively easy availability of credit and reduced tax burdens afforded continuing and new stimuli. Unforeseen escalation in the Vietnam effort superimposed enlarged military requirements upon an economy which was already hard pressed to meet demands for civilian goods and services. The net effect of these factors was to build up confidence and expectations so that they in turn gave added impetus to the expanding economy.

As the year drew to a close there remained scattered spots of relative weakness in individual communities and industries. But they were the exceptions. Apprehensions were not so much that they might spread and cool off the economy as that expansionary forces might become so intense as to overheat it. The expanding economy was drawing heavily on its resources. Some types of labor and materials were in short supply. Utilization rates of productive facilities were pressing more closely against capacities. The unusually high rate of credit expansion was not fully meeting demands for funds. In such an environment, prudence counseled a careful guarding against inflation.

The New England Business Review is produced in the Research Department. Harold F. Price was primarily responsible for the article, "1965—The Best Yet . . . annual review of New England business" and Edwin F. Estle for "Sales Still Rising" and "Electronics on the Move."

NONAGRICULTURAL EMPLOYMENT New England



Employment provides a good starting point for the analysis of New England's 1965 performance. From it is derived the manpower for production of goods and services. To it accrues purchasing power to take goods and services from the markets and provide for comfortable living. New England's non-farm employment in 1965 rose above 4 million for the first time. Its net expansion of 103,700 during the first 11 months of the year was more than double that for the corresponding period of 1964. In consequence, its 12-months' growth rate widened from 1.6 percent as of December 1964 to 3.1 percent as of November 1965.

New England's manufacturing employment, although still numbering less than in some post-war years, picked up remarkably. Its net expansion of 56,000 during the first 11 months of 1965 contrasts with one of only 9,800 during the comparable 1964 period. Its 12-months' growth rate rose to 3.8 percent as of November, at which time only the chemical group among all manufacturing industries failed to employ more than a year earlier. In general, growth rates continued to be greater in durable goods industries than in those producing nondurable goods.

Expansion in nonmanufacturing employment was steadier and more moderate, with a 12-months' net growth of 2.7 percent as of November. Only the transportation and public utility industry group at that time had fewer workers than a year ago.

Expanding employment found its counterpart in sharply declining unemployment, to

the extent that an increasing number of job openings became difficult to fill. The seasonally adjusted unemployment rate for the six states declined from 4.8 percent in January to 4.1 percent in November, and dropped to only 2.3 percent for New Hampshire. Those drawing unemployment compensation benefits in the six states averaged about a quarter fewer in 1965 than in 1964, and at one time reached the lowest total since 1956.

The region's manufacturing employment statistics also afford means for deducing trends in its manufacturing production and the purchasing power of its consumers.

This Bank's *production* index for New England manufacturing, rising from a seasonally adjusted value of 126 for December 1964 to one of 136 for this November (1957-59 = 100), is premised mainly on a related increase in production worker man-hours. The current annual rate of increase in this index of 8.1

percent compares with a 7.9 percent increase in the national index of manufacturing production. General confirmation of an upward trend in New England manufacturing during 1965 is afforded by monthly polls of purchasing agents wherein about three-eighths regularly noted increasing production and more than one-half noted no essential change.

A comparably favorable trend in new *orders* received by manufacturers buttressed this expansion in their production rates. Averaged over the year, 39 percent of this same group of purchasing agents found order flows expanding, 48 percent found no essential change, and only 12 noted contracting flows. Expanding order flows also constituted a stimulating influence on business investments in inventories and fixed capital.

Net *inventory* changes as observed by purchasing agents were on the side of accumulation during most of the year. Reports of expanding supplies of raw materials well outnumbered those of contracting supplies during the first three quarters but were in approximate balance in the final quarter. Work in process inventories appeared to be expanding substantially throughout the year. Net changes in stocks of finished products, however, were more frequently in the direction of contraction, indicative probably of users' and consumers' demands for these goods.

Capital expenditure programs for new plant and equipment were greatly enlarged by New England manufacturers as the quickening pace of business activity made fuller use of existing facilities. Surveys conducted by this Bank indicated such expenditures in 1965 would set a new record and would surpass the

1964 total by 18 percent. Outlays for new plant would constitute about a fifth of that total.

Statistics of new *construction* contracts, as compiled and published by F. W. Dodge Company, confirm this expanding trend in planned outlays for new plants. Total contracts for all types of construction in New England during the first 11 months of 1965 were about 5 percent greater in dollar amount than those for the same 1964 period. About two-fifths of these contracts were for various types of nonresidential buildings, and they totalled 3 percent greater than a year earlier. But within the latter category, contracts for educational, science, health, religious and public buildings were all lagging behind the 1964 pace. This meant that growth in contracts for nonresidential building emanated from the important manufacturing and commercial sectors. Their aggregate contracts seemed to be up more than one-third from a year ago.

New England contract experience was also favorable for nonbuilding construction, which includes public works and utility projects. Cumulative contracts during the first 11 months of 1965 for such work measured 11 percent greater than those of a year earlier.

For residential building construction, New England's contracts in the latest period totaled 4 percent above those for the first 11 months of 1964. This should be a satisfying performance, but it contrasts markedly with the 19 percent gain in contracts for the year 1964 over 1963. The housing boom appears to have diminished in intensity, particularly in plans for multi-unit apartment building.

General improvement in the tone of business

was also conducive to more frequent starts of new enterprises and fewer failures among existing firms. New *incorporations* in the six states during the first 10 months of 1965 numbered 1 percent more than those of the similar 1964 period. Comparing the 11-month periods of the 2 years, recorded New England *business failures* showed declines of 8 percent in number and 25 percent in liabilities.

Personal incomes were substantially enhanced by the expanding activity. November employment data disclose that average weekly earnings of factory workers were up from a year earlier by amounts ranging from about \$3.50 to \$5.50 in the six states. And, as has already been noted, 3.8 percent more workers are sharing in the higher rates. Aggregating incomes to all individuals from all sources, *Business Week* estimates that New Englanders received about \$34.3 billion during 1965. This was an impressive 8.1 percent increase over a year earlier which was available to spend or save.

Total *retail sales* in New England, based on 9 months' data, were estimated to be running 8 percent ahead of the 1964 pace. More up-to-date statistics from a regularly reporting sample of the region's department stores indicate a relative gain in their sales of 4 percent through November. Sales at these stores exceeded those of a year ago in every month if allowance is made for the shifting date of Easter, and on an adjusted index basis reached a record 139 in October (1957-59 = 100). Practically all departments enjoyed better sales performance than in 1964, but the best relative gains were achieved in such merchandise as silverware and jewelry, luggage and handbags, radio, television, and record-playing equipment.

Instalment sales continued to increase slowly relative to total sales. Accounts receivable also continued to expand, but without any essential impairment to collection ratios.

Sales of new automobiles in New England, as measured by registrations at the six state capitals, clearly made a fourth substantial annual gain in 1965. The 10 percent gain relative to 1964 which had been achieved through October presumably understates the percentage gain for the full year, because of the scarcity of available cars in late 1964. Furthermore, comparative registrations obviously understate dollar sales gains, as dealers report considerable up-grading of models and purchasing of optional equipment and accessories by customers.

New England's important vacation business in 1965 did not receive so wide a scope of statistical measurement as in many other recent years. However, in the eyes of non-statistical observation, it clearly experienced a very good year — aided in no small part by the unusually dry summer weather which was such an annoyance to other facets of New England living. Available data indicate that enrollments at privately operated summer camps for boys and girls were 2 percent greater than in 1964, while at agency operated camps there was a relative gain of 3 percent for July sessions but no real change for August sessions. Attendance records at miscellaneous centers of tourist interest, such as museums, campgrounds, historic sites, amusement parks and theatres, yielded an average increase of 8 percent for the 1965 summer season over that of 1964.

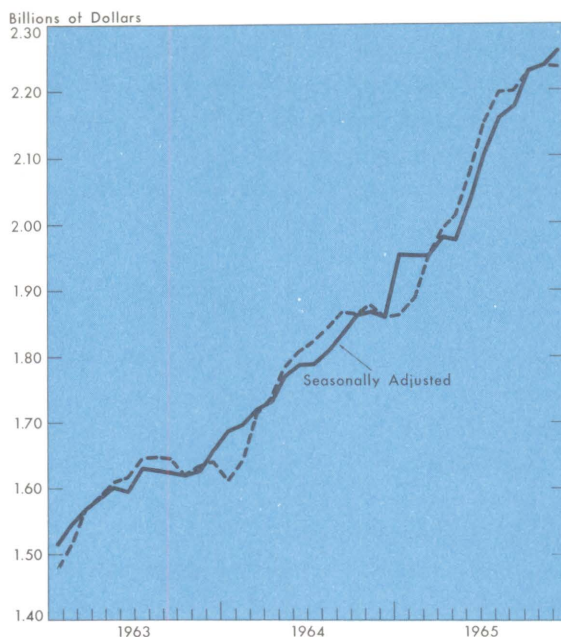
Rising *prices* were more apparent to con-

sumer and business spenders in 1965 than in other recent years, and led to growing awareness of inflationary threats. The rise, however, was neither steady nor evenly distributed. During the year the Massachusetts retail price index rose by 1.3 percent. As of November the national consumer price index, with its wider coverage, showed an annual rate of increase of 1.7 percent. The wholesale commodity price index which, after a period of relative stability since 1958, shot up over 3 percent in 1965 but with much of the rise concentrated in prices of farm products, foods, and certain raw industrial materials.

The *banking and credit* environment for business in 1965 provided increasing supplies of available funds with eventually higher interest rates. Policy at the national level was mindful throughout the year of the deficit balance in international payments and adopted new programs, both voluntary and mandatory, to cut the outflow of funds. For most of the year it also aimed to facilitate continuing expansion in the domestic economy. As the quickening pace of that expansion, however, pressed more tightly against resources of labor, materials, productive capacities, and credit, steps were taken to avoid promotion of inflationary excesses.

Credit demand intensified in 1965. In New England's First Federal Reserve District the volume of outstanding loans (adjusted) at weekly reporting member banks increased by 16.6 percent. The comparable gain in 1964 was 9.9 percent. Twelve months' gains measured at quarterly intervals between those year-end dates widened regularly: 12.3 percent at the end of March, 13.7 percent at the end of June, and 15.9 percent at the end of September.

COMMERCIAL AND INDUSTRIAL LOANS District 1



During 1965 at this same group of banks, loans in the important commercial and industrial category expanded by 20.1 percent, real estate loans by 17.3 percent, and "other" loans (mostly of consumer credit nature) by 10.4 percent.

The problem was to find sources of funds to meet this burgeoning loan demand. The chief support for the expansion was from the issue of negotiable certificates of deposit and from increases in other time deposits. Total time and savings deposits grew by 25.7 percent. This growth was enhanced by competitive use of attractive interest rates. Demand deposits grew by only 3.6 percent. Reserves to support the deposits were supplied by Federal Reserve System operations.

Growing demand for credit provoked even

in the early part of the year some upward pressure on interest rates which were free to respond to market conditions. But credit demand intensified to the extent that Federal Reserve Banks felt impelled to raise discount rates in early December from 4 to $4\frac{1}{2}$ percent. This and other practically concurrent actions, taken in the face of a growing inflationary threat, were designed to keep credit funds available but somewhat more costly. Following the discount rate action commercial banks generally raised their rates on prime business loans to 5 percent, and comparable adjustments took place in interest rates or yields on other loans, money market instruments and securities.

Industry Performance

A pleasing aspect of New England's economic performance in 1965, and one which is unusual in the experience of recent years, is the near unanimity with which the favorable overall trend is echoed by individual industries.

The *nonelectrical machinery* industry is the largest employer in New England's manufacturing complex with 167,600 workers as of November, and that number had expanded by 4.2 percent from a year earlier. As a supplier of capital goods required for the expanding operations of other industries, it benefited substantially from the general economic advance. Producers of machine tools accumulated large backlogs of orders. Demand strengthened materially for newer types of textile machinery. And the industry saw fit to increase its own capital expenditures by a fifth from the previous year.

The *electrical machinery* industry's hesitancy of a year ago developed into steady and

strong recovery in 1965. A rapid increase in Government procurement activity supplemented the pick-up in demand for civilian products. Employment in New England plants widened its growth over a year earlier to 5.1 percent as of November, although growth was not evenly distributed among states.

The *transportation equipment* industry was New England's 1965 growth leader in manufacturing with its addition of 16,000 workers or 14 percent in the 12 months to November. With New England's structure within this industry strongly oriented towards the production of aircraft and its equipment as well as surface and submarine vessels, its orders and operations greatly increased with the escalation of military requirements in Vietnam. Largely in response to this rapid growth in activity the New England industry raised its capital expenditure program for 1965 by 58 percent over that for 1964.

Primary and fabricated metal products plants shared well in the expanded activity of durable goods industries. New England employment continued to recover from losses in earlier years, and by November was 4.6 percent greater than a year earlier. The extended threat of a steel-workers' strike accelerated operations at some plants. Foundry operations were busy. Military demands for hardware were large. Copper and brass mills built up substantial order backlogs.

New England *furniture* factories shared with the national industry in another of a series of busy years. Good order trends sustained operations in some plants at close to capacity, and adequate skilled labor was difficult to find. Improvement was detected in the region's manufacture of *instruments*

where employment which had been depressed at the start of the year increased to show a 6.2 percent annual rate of gain by November.

New England's *textile* industry has over recent decades lost much of its earlier glory, yet some of its indicators have recently pointed upward. Rising civilian demands for its products in 1965 were substantially supplemented by military needs for prosecution of the Vietnam effort. Work staffs, which had numbered less than a year earlier through July, reversed that relationship from August onward. Average weekly hours rather consistently exceeded year-ago levels. Spending plans by New England mills for new equipment in 1965 were boosted by two-thirds over those for 1964. One-price cotton legislation continued to help the competitive position of domestic producers of cotton goods, but the problems created by rising imports of woolen and synthetic fiber goods remained unsolved.

For the region's *apparel* industry the year was a generally good one, particularly for producers of men's and boys' wear. Overall, apparel production was estimated to be running from 6 to 9 percent greater than in 1964, with a retail sales gain in about the same range. Employment was also higher than a year ago, but by smaller percentage margins. Nearly every month witnessed some increase in apparel prices, though small. Order trends were good, but with cautious avoidance of large advance commitments.

The *shoe* industry benefited from 1965 pros-

perity, although its retail sales rose less rapidly than apparel or total retail sales. The 5 percent increased production at New England factories during the first 10 months of 1965 over a year ago bettered the national average gain of 2 percent and Massachusetts appeared to have regained its prime rank among shoe producing states. Employment was regularly somewhat higher than a year ago. Higher leather and labor costs led to the raising of factory prices for 1966 spring shoes by 3½ to 10 percent. Inexpensive imported footwear continues to bother some domestic producers.

Most of New England's *jewelry and silverware* producers found 1965 to be a prosperous year. Healthy gains in consumers' purchasing power enhanced the market for "luxury" goods and induced much upgrading for the industry's higher quality items. Other developments which benefited or will benefit the industry are the repeal of excise taxes and reduction in the usage of silver in coins. One problem was to find and keep enough trained labor at Rhode Island's jewelry factories.

The manufacture of *pulp and paper products* was one of New England's busiest industries in 1965. Order flows were heavy and capacity utilization rates were reported in the fall to average 92 percent. Capital expenditure plans were expanded by a third from 1964. The region's *rubber products* industry also had a good year, helped by an expanding volume of military orders. Employment and average work weeks were generally well up from a year ago.

Sales Still Rising

New England manufacturers expect their sales after adjustment for seasonal influences, in the first quarter of 1966 to advance 2 percent. This follows a 1 percent gain in their sales in the final quarter of 1965.

Durable goods manufacturers, with their seasonally adjusted dollar value of sales unchanged in 1965's final quarter, look for a modest 1 percent rise in the current quarter. Nondurable goods producers, on the other hand, expect sales in this year's first quarter to increase 7 percent. They also realized a 7 percent gain in their sales in last year's final quarter. This was close to the 8 percent rise they had anticipated at the start of the quarter.

Nine-tenths of the responding firms to the recent survey expect sales to be at least as good in the current quarter as in the previous quarter. Moreover, two-thirds of these firms look for sales to rise in this quarter.

These sales expectations are based on reports to the Federal Reserve Bank of Boston in early January from 75 of the larger manufacturers in the region. They indicated the actual change in last quarter's sales and their expectations for the current quarter. Collectively, they account for 9 percent of New England's total manufacturing employment and have annual sales of about \$2.5 billion.

Sales of electrical machinery and equipment, particularly electronic components, advanced sharply in the last quarter of 1965, up more than a fourth. Producers of electrical products expect this year's first quarter to show a further sizeable gain of one-fifth.

Producers of nonelectrical machinery also had a good fourth quarter, with sales advancing 14 percent. This was well above the 5 percent rise that had been anticipated at the end of the third quarter. Sales in the current quarter are expected to advance an additional 6 percent. Respondents indicate that some of this advance will be the result of recent price increases.

Manufacturers of transportation equipment, in contrast, experienced a 3 percent decline in fourth quarter sales, largely in sales of aircraft products. They anticipate a further downturn in sales of 1 percent in the current quarter.

All industries within the nondurable goods group except for chemicals look for sales to rise in this quarter. Sales of textile products, after declining 2 percent in the fourth quarter, are expected to rise 1 percent in the first quarter. Producers of woolen fabrics are particularly optimistic, expecting sales to rise almost a tenth.

Regional paper producers reported a 7

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percent advance in their sales in last year's final quarter. They now anticipate an added gain of 5 percent in the current quarter.

Shoe sales are expected to register a 2 percent gain in the current quarter, following a 1 percent rise last quarter.

Nationally, according to a U. S. Department of Commerce survey in November, manufacturers expected sales to rise 1

percent in both the fourth quarter of last year and the first quarter of this year. Durable goods producers looked for a 1 percent advance in the fourth quarter, to be followed by a 2 percent gain in the first quarter. The largest advances were expected in the machinery and transportation equipment industries. Nondurable goods manufacturers expected sales to show a 1 percent rise in both last year's final quarter and this year's first quarter.

QUARTERLY SALES SURVEY OF NEW ENGLAND MANUFACTURERS

Percent Change in Sales, Seasonally Adjusted

	Anticipated from 3rd Qtr. 1965 to 4th Qtr. 1965	Actual from 3rd Qtr. 1965 to 4th Qtr. 1965	Anticipated from 4th Qtr. 1965 to 1st Qtr. 1966
ALL MANUFACTURING.....	+6.0%	+1.1%	+2.2%
Durable Goods.....	+5.5	-0.3	+1.0
Nondurable Goods.....	+8.0	+7.3	+6.8

Source: Federal Reserve Bank of Boston survey.

Electronics on the Move

NEW ENGLAND's electronics industry, which is concerned with the movement of electrons, is itself on the move. In recent years its geographical location within the region has shifted substantially. Moreover, it has shown rapid growth — employment increased almost a third from 1959 to 1964.

This movement and growth is likely to continue over the years ahead. New applications for electronics will continue to be developed. Moreover, the new Cambridge-based NASA electronics center will stimulate the regional industry.

The industry includes a variety of separate and distinct subgroups each with different labor requirements and market needs. As a result, the future growth of the industry will vary from area to area within the region, depending upon skills, wage levels, access to markets, proximity to educational and cultural institutions, and other locational considerations.

This article examines the shifts which have already occurred. For instance, as the table on p. 12 indicates, in 1958 the Greater Boston

area accounted for half the region's employment in electronic components and accessories. By 1963 this proportion had declined to 38 percent. Over the same period Connecticut's share doubled to reach one-fourth of the regional total. New Hampshire and Rhode Island also increased their shares.

Shifts also took place in other subgroups between 1958 and 1963. The Boston area registered a decline in its share of the region's communication equipment employment while that in computers and scientific instruments increased substantially.

Area differences in proximity to markets, extent of scientific institutions, availability and cost of plant are all important to the location decision. Nevertheless, most locational shifts have occurred largely as a result of prevailing wage levels and employers' labor needs. For this reason, projections of industrial growth for a particular area depend on knowing the labor market requirements of the various subgroups in the electronics industry.

What is electronics?

Industry subgroups have little in common except the use of certain techniques to control electricity in gas, vacuum, liquid or solid state matter. Their end products are quite different, consisting of computers, aircraft engine instruments, electron tubes, radios, and radar, among others.

Moreover, the level of skills required to manufacture these products varies considerably. For example, more than half the em-

Some of the material in this article was based on a Research Report, "Influence of Labor Supply on Location of Electronics Firms," by Everett J. Burt, Professor of Economics at Boston University. The study was conducted with the aid of a grant from this Bank. Copies of the complete report are available on request from the Research Department.

ployees in New England's computer industry are salaried workers, that is, engineers, technicians, and administrative and clerical workers. In the production of electronic components such as transistors, on the other hand, only a fourth of the employees are salaried workers. Another difference is that women, because of their manual dexterity and availability at low cost, account for more than two-thirds of the production workers in the electronic component subgroup, but are only a fourth of that category in other industry sectors.

In comparison with other industries, however, all segments of the electronics industry require a considerable number of professional workers. For example, in 1960 one-fourth of all professional and technical workers in manufacturing were employed in the electrical machinery industry, which consists largely of electronics.

Geographic Concentration

The focus of the region's electronics industry is the Greater Boston Area. Because of its many educational and technical institutions, and its large number of people with similar interests, it is the New England mecca for scientific and professional workers. Altogether, they constitute 16 percent of the workforce in the Boston Area. As the map shows, this proportion is among the highest in the region. It is surpassed only by Pittsfield, Massachusetts, and Norwalk and Stamford in Connecticut. It is an eighth greater than the proportion in Hartford, Connecticut, and a third or more greater than in such highly industrialized areas as Providence, Rhode Island, or Worcester and Springfield-Holyoke in Massachusetts.

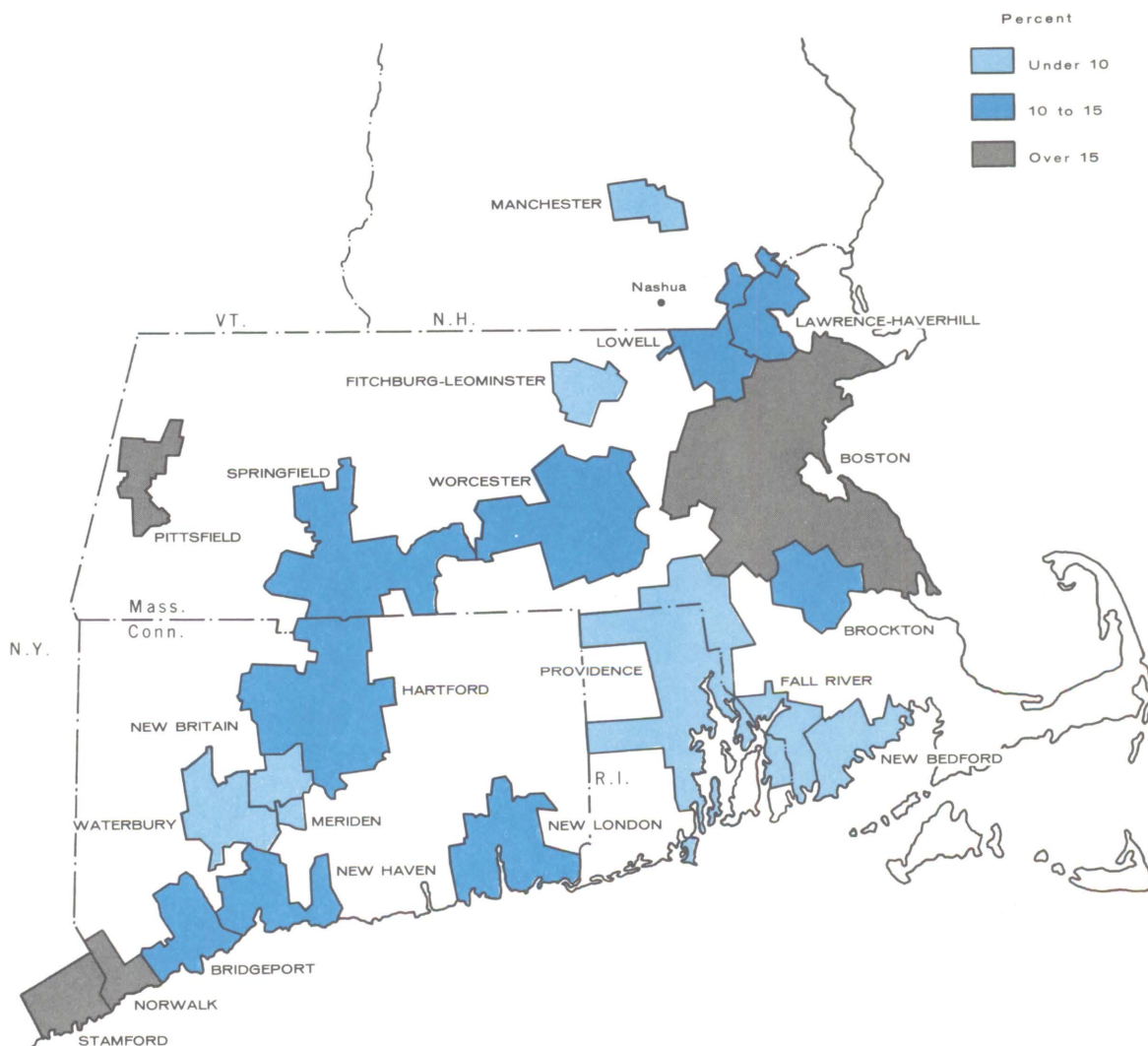
The remainder of the Massachusetts industry is mainly situated in the areas just beyond Greater Boston and east of Worcester County. In addition, there are two other major concen-

EMPLOYMENT IN NEW ENGLAND'S ELECTRONIC COMPONENTS INDUSTRY

AREA	Percent of Total	
	1958	1963
Connecticut	12.2%	24.8%
New Hampshire	8.2	10.7
Boston Standard Metropolitan Area	50.5	37.4
Massachusetts, other than Boston Area	28.0	22.9
Rhode Island	1.1	4.2
Total of Above	100.0	100.0

Source: U. S. Department of Commerce, 1963 *Census of Manufactures*.

PROPORTION OF MALE PROFESSIONAL AND TECHNICAL WORKERS IN NEW ENGLAND METROPOLITAN AREAS, 1960



trations of electronics activity in the region. In Hillsborough County, New Hampshire, around Nashua and Manchester, the production of communications equipment and electronic components has increased substantially in recent years. In the 5 years from 1958 to 1963, employment in electronic components alone increased 54 percent. The major attraction of a New Hampshire location for the electronics industry is the combination of needed professional workers and the relatively lower wage level of production workers. In the electronic component sector, for example, the average hourly wage of production workers in New Hampshire was about 15 percent below that of similar workers in Greater Boston in 1963. For professional-supervisory workers, the annual wage in New Hampshire's component industry was about the same as in Boston.

In recent years, the production of electronic components has become more standardized; more firms entering the industry have created overcapacity; foreign competition has intensified. These developments have caused prices of components to fall, resulting in narrower profit margins. Consequently, firms in this industry have sought to reduce costs by relocating in areas with lower wage rates. Since, as mentioned earlier, this subgroup relies less on professional workers than other sectors of the electronics industry, the major consideration is the supply of semi-skilled help, largely women, at a relatively lower wage. Locations in New Hampshire meet these criteria.

Another area of concentration is Fairfield and New Haven counties in Connecticut. Here again the subgroups are communication equipment and electronic components. Connecticut's employment in these two sectors — almost

entirely within these two counties — more than doubled between 1958 and 1963. These counties have a high proportion of professional-technical people, 14 percent of all workers, and are close to the New York market. In 1963 the average Connecticut wage for salaried workers in electronic components was 8 percent above that in Boston, while wages per manhour were virtually the same for production workers in Connecticut and Boston. In this instance, market and skill needs rather than labor cost seem to be the deciding factor in location.

Areas around Greater Boston

The Massachusetts area outside Greater Boston has increased its share of the region's electronics employment from 26 percent of the total in 1958 to 31 percent in 1963. Employment in that area grew by more than two-thirds over the period. Most of this gain occurred in localities surrounding Greater Boston and east of Worcester County, largely in the Fall River, New Bedford, and Lowell labor market areas. Wage levels in these areas are considerably below those within Greater Boston. For example, the average wage per manhour in the Massachusetts communications equipment industry outside Boston was 19 percent lower for production workers and 2 percent lower for salaried workers than the Greater Boston level in 1963.

Location in eastern Massachusetts but outside Greater Boston permits firms to maintain some access to the metropolitan community with its advantages, yet at the same time to lower their wage costs. In interviews conducted for this study, personnel managers of firms in this area pointed up some special advantages of these locations for employees. For example,

downtown commuting was avoided and easy access to outdoor recreational facilities provided.

Some firms in this area indicated that they experienced difficulty in recruiting male production workers with specialized electronics skills. Some expressed interest in developing further supplies of electronics technicians through promotion of new technical training facilities.

A survey of electronics firms in eastern Massachusetts found that professional workers constituted only 8 percent of total employment in firms outside Greater Boston. Within Greater Boston, in contrast, professional workers averaged 18 percent of the electronics workforce. This indicated that firms do locate in labor market areas which conform to their labor supply requirements, that firms tend to locate outside Greater Boston only if their professional-technical worker requirements are relatively low.

Within Greater Boston

In general, the electronics industry is attached to Greater Boston because of its educational research complex. A number of new, and now important, electronic firms have been established in Boston as the outgrowth of research conducted at educational institutions in the area. As these firms have grown, some of their operations — those requiring relatively lower skills — have been transferred to plants outside Greater Boston to take advantage of lower wage levels.

For some industries, however, Greater Boston continues to be a magnet. Such firms as those manufacturing scientific and measuring instruments indicate their desire to remain close to research and educational institutions,

to have face-to-face contact with buyers, and to have ready access to specialized information.

Implications

Many different factors are relevant to locational decisions of electronics firms. Among these are labor supply, wage differentials, site costs, and proximity to markets. However, the labor force considerations are particularly important to these firms. Since the various subgroups of the industry have different labor requirements, firms tend to locate where their particular needs can be met. Thus, firms requiring primarily semiskilled workers have shifted to New Hampshire or Massachusetts areas outside of Greater Boston where wages are also lower.

An increase in demand for certain types of electronic components for which relatively few professional workers are needed would not, therefore, be likely to result in the growth of firms in locations such as Greater Boston with its high concentration of professional personnel. On the other hand, an increase in demand for certain types of electronics instruments and equipment which require the employment of professional personnel would benefit the areas where such workers are readily available. Thus, projections of demand for various electronics items and a knowledge of labor requirements aid the projections of industry growth for a particular area.

Moreover, industrial development of an area can be influenced by the type of training and education that is available. Areas providing professional and technical training facilities will be better able to attract firms that require a substantial number of workers with these skills.

Here's New England –

MANUFACTURING INDEXES (seasonally adjusted) 1957-59 = 100	NEW ENGLAND			UNITED STATES			
	pNov. '65	Oct. '65	Nov. '64	Nov. '65	Oct. '65	Nov. '64	
All Manufacturing	136	136	126	148	146	136	
Nonelectrical Machinery	150	149	136	167	166	148	
Electrical Machinery	152	150	139	168	165	147	
Transportation Equipment	176	175	142	156	154	129	
Textiles, Apparel, Leather	113	112	106	139	137	130	
Textiles	115	115	107	139	137	129	
Apparel	117	117	113	147	146	139	
Leather and Shoes	108	103	98	112	109	105	
Paper	132	131	124	145	142	134	
BANKING AND CREDIT	Percent Change From:			Percent Change From:			
	Nov. '65	Oct. '65	Nov. '64	Nov. '65	Oct. '65	Nov. '64	
	Commercial and Industrial Loans (\$ millions) (Weekly Reporting Member Banks)	2,236	0	+19	48,948	+ 2	+21
	Deposits (\$ millions) (Weekly Reporting Member Banks)	6,385	0	+12	157,569	0	+ 8
	Check Payments (\$ billions) (Selected Metropolitan Areas)*	206.9	+ 3	+23	3,178.9	+ 4	+16
Consumer Installment Credit Outstanding (index, seas. adj. 1957-59 = 100)	161.5	0	+ 8	195.3	+ 1	+14	
DEPARTMENT STORE SALES (index, seas. adj. 1957-59 = 100)	132	- 5	+ 3	n.a.	n.a.	n.a.	
EMPLOYMENT, PRICES, MAN-HOURS & EARNINGS							
Nonagricultural Employment (thousands)	4,028	0	+ 3	61,984	0	+ 4	
Insured Unemployment (thousands) (excl. R.R. and temporary programs)	74	+ 4	-28	1,043	+12	-20	
Consumer Prices (index, 1957-59 = 100)	111.8 (Mass.)	0	+ 1	110.6	0	+ 2	
Production-Worker Man-Hours (index, 1957-59 = 100)	101.9	+ 1	+ 5	113.5	0	+ 6	
Weekly Earnings in Manufacturing (\$)	100.00 (Mass.)	+ 1	+ 4	109.71	+ 1	+ 5	
OTHER INDICATORS							
Total Construction Contract Awards* (\$ thous.)	228,618	0	+10	4,084,822	- 4	+ 6	
Residential	97,458	+ 6	+ 9	1,782,963	- 5	+ 9	
Nonresidential	91,882	0	+ 8	1,459,792	- 4	+12	
Public Works and Utilities	39,278	-13	+20	844,067	- 3	- 7	
Electrical Energy Production (4 weeks ending Nov. 27th, 1965) (index, seas. adj. 1957-59 = 100)	157	+ 2	+ 8	165	+ 1	+ 8	
Business Failures (number)	58	-17	-15	1,033	- 1	+ 7	
New Business Incorporations (number)	812	+ 1	+ 2	15,130	- 5	+ 7	
*Seasonally adjusted annual rate.	p = preliminary			n.a. = not available			
**3-mos. moving averages — Sept., Oct., Nov.							