

MONTHLY

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FINANCE • INDUSTRY • AGRICULTURE • TRADE

FOURTH FEDERAL RESERVE DISTRICT

Vol. 33—No. 10

Federal Reserve Bank of Cleveland

Cleveland 1, Ohio

## Ohio Cross Sections (I)

### Northwestern Ohio: Three Economic Areas

#### Including 22 Counties

**EDITOR'S NOTE:** This article is the first of a projected series of five which analyze Ohio's economic activity in terms of a concept of "state economic areas". This geographical grouping has recently been devised by the Bureau of Census to fill the wide gap between the county and the state as statistical units in discussing economic developments.

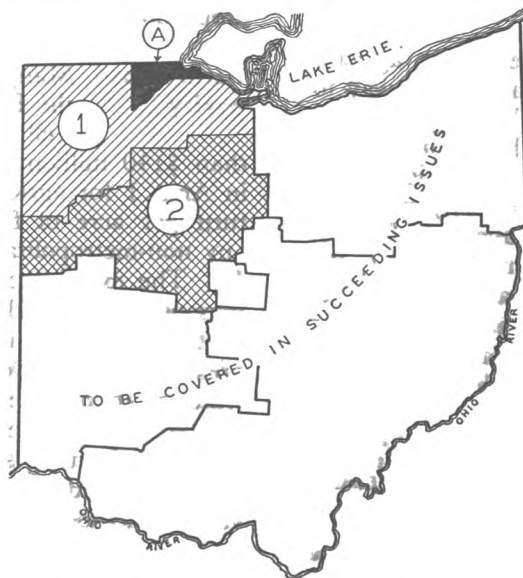
Ohio's 88 counties are grouped into 21 economic areas, each of which is relatively homogeneous as to industrialization, type of agriculture, levels of income, etc.

The present article deals with three economic areas (comprising 22 counties) in northwestern Ohio. Succeeding articles will cover in turn the various economic areas of

southwestern Ohio; northeastern Ohio; and central and southeastern Ohio. A fifth and final article of the series will summarize for the state.

For each area, a selection of the most recent information available is brought to bear on the population, manufacturing, agriculture, trade and finance of the area, including comparisons with other areas of the state.

For more details on the area concept, and sources of information, see Appendix on page 7. A complete list of Ohio's 21 economic areas, with counties included, appears as Table II on page 9. Detail maps of the three northwestern areas treated in this first article adjoin the text.

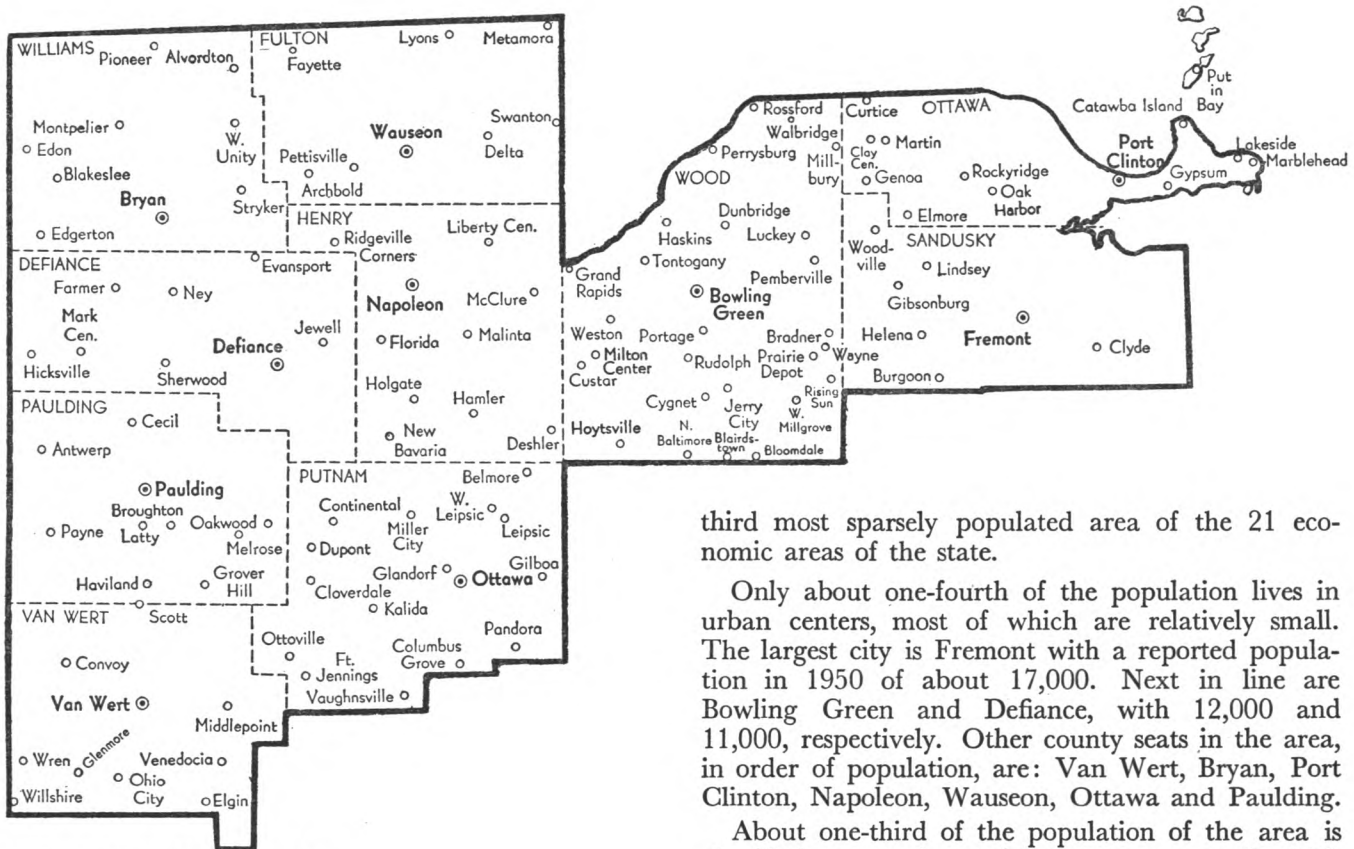


. . . this map shows the location of the three economic areas of northwestern Ohio analyzed in this issue.

## Area 1.

**BRYAN-to-FREMONT Area<sup>(1)</sup>**

(10 counties)



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Area 1 stands out as one of the richest agricultural areas in the state. It is the eastern gateway to the nation's great "corn belt". Farming and the processing of foodstuffs are the backbone of the economy, with almost 40% of the population living on farms and gaining a livelihood directly from the land, as contrasted with the Ohio average of about 15%. Only one other area in Ohio (Area 7, the Chillicothe-Hillsboro area) has a larger percent of its population living on farms than has Area 1. The density of population of Area 1 is only 71 persons per square mile (see Table I) which makes it the

third most sparsely populated area of the 21 economic areas of the state.

Only about one-fourth of the population lives in urban centers, most of which are relatively small. The largest city is Fremont with a reported population in 1950 of about 17,000. Next in line are Bowling Green and Defiance, with 12,000 and 11,000, respectively. Other county seats in the area, in order of population, are: Van Wert, Bryan, Port Clinton, Napoleon, Wauseon, Ottawa and Paulding.

About one-third of the population of the area is classified as rural non-farm, — an unusually high proportion.

**Farm Prosperity** Many economic indicators attest to the fact that Area 1 is prosperous as well as agrarian. In 1949,<sup>(2)</sup> more than \$140 million in cash was received by farmers in Area 1 for agricultural products, making the return per acre of farm land \$55.54, the highest of any non-metropolitan area in the state. (See Table I.) The excellence of the soil is one of the major reasons for the high return per acre. Other important factors are the proximity to the large market areas of Toledo, Detroit, and Chicago, an adequate transportation system which permits ease of distribution, and the employment of up-to-date techniques in farming such as the rotation of crops, use of hybrid seed, counter-erosion techniques, and advanced methods of raising livestock.

(1) Boundaries of economic areas discussed in this series are as shown in *State Economic Areas*, by Donald J. Bogue, Bureau of the Census, U. S. Department of Commerce, 1951. Two modifications have been made; these apply, however, to areas to be treated in later articles. (See Appendix.)

An area designated by a numeral such as Area 1, is classified as "non-metropolitan", while "metropolitan areas" are denoted by letters, such as Area A, Toledo. In general, a metropolitan area has a central city of at least 50,000 population and meets certain other Census tests of population characteristics.

(2) 1949 data are used here for agricultural comparisons between areas, because that is the latest year for which certain detailed data are available. Changes since 1949 would probably affect the area comparisons very little, if at all.

**Crops** The land in most of the area is well suited to the growing of grain crops such as corn, wheat, oats and soybeans. Even though corn and wheat together comprise only about one-fourth of all cash income, more farm land is planted in these crops than in any other. Much of the grain is used as feed for dairy cows, hogs, poultry, and beef cattle; in large measure the grain shows up in cash income indirectly from the marketing of livestock and livestock products.

Corn and hogs together account for about 26% of the cash income from agricultural products of the area. (Based on 1949 data.) Dairying is also very important, and accounts for about 16% of agricultural income, approximately the same as the proportion represented by sale of hogs. (In each of two counties, Fulton and Sandusky, the sale of dairy products in 1949 brought in slightly more than 20% of the total cash income. Both of these counties are near the Toledo metropolitan area where dairy products find a ready market.) Other leading agricultural products as sources of income to the area are wheat, 14%, and poultry, 13%.

Sandusky and Ottawa counties along the Lake harvest large crops of peaches, apples, grapes and other fruit.

**County Differences** Although Area 1 has the highest cash income per acre of all non-metropolitan areas of the state, differences among the various counties are considerable, with income ranging from about \$37 per acre to about \$76 per acre. Fulton, Putnam, Henry, and Wood counties are largely responsible for supporting the high return for the whole area with each of them receiving more than \$60 per acre in cash income. Fulton county ranks first of all non-metropolitan counties in the state with approximately \$76 as the average income from the sale of agricultural products. (1949 data.) Paulding and Defiance counties, with less favorable soil, are relatively lowest in the area in agricultural income per acre. Of Paulding county's total agricultural income, approximately one-quarter comes from the sale of soybeans, while dairying makes up the largest share (about 20%) of Defiance's income from agricultural products.

**Industry in Area 1** The industrial side of Area 1 reflects in part the agricultural predominance of the area.<sup>(3)</sup> About one-fourth of all manufacturing establishments are concerned

with the processing of food products, with 11 establishments employing 100 or more workers. Among them are some of the largest canneries in the state, a high concentration of milk condensaries, and three of the four sugar-beet factories of Ohio.

Besides the manufacturing of food products, other major industries of the area are stone, clay and glass products; wood products; fabricated metals; and the electrical and non-electrical machinery industries. Many of the establishments are small. Only about 12% of the plants employ 100 or more workers. Sandusky, Wood, Defiance, and Ottawa lead other counties in the area both in number of establishments and in number of employees. Among other products made in the area are auto glass in Wood County (near Toledo) and auto accessories in Bryan and Fremont.

About 30,000 workers in the area were engaged in some type of manufacturing during 1950, or only about 10% of the population. In the latter respect Area 1 ranks 16th of the 21 economic areas of the state, as seen by Table I.

The value of manufacturing in relation to the *number of manufacturing workers employed*, however, is relatively high in this area. Approximately \$5600 was the value added per worker in manufacturing industries during 1947 which was comparable to the value added per worker in Toledo; it exceeded the value added per worker in Akron, Dayton, Canton, and Youngstown (all highly industrialized metropolitan areas) and ranked 7th among the state's 21 economic areas in this respect.

The high score in value of manufacturing per worker suggests a mixture of industries which have a relatively large investment in equipment in relation to employees hired, or relatively high efficiency, or both. Processing of food and feed products, which is prominent within the area, involves characteristically a large investment per employee. Examples are sugar-beet plants, and establishments making soy-bean products and livestock feeds.

Average weekly earnings of manufacturing workers in Area 1 ranked 13th among Ohio's 21 areas, or about \$65 per week in 1950.

**Trade** Since the economy of Area 1 is largely centered around agriculture, and with most of its population living in rural areas, retail and wholesale trade does not play a large role in the economic activity of the community. In 1948, according to the Census of retail trade, sales of retail outlets amounted to about \$835 per capita, or 14th of the 21 economic areas studied. Proximity to the Toledo, Detroit and Cleveland trading centers probably accounts in part for the relatively low per-capita sales of stores located in the area.

(3) Although transportation facilities are not separately described in these studies, it should be noted here that Area I has unusual transportation facilities (rail, water and highway)—perhaps somewhat out of proportion to the actual industrial development of this particular area. The projected East-West Turnpike will also pass through the area.

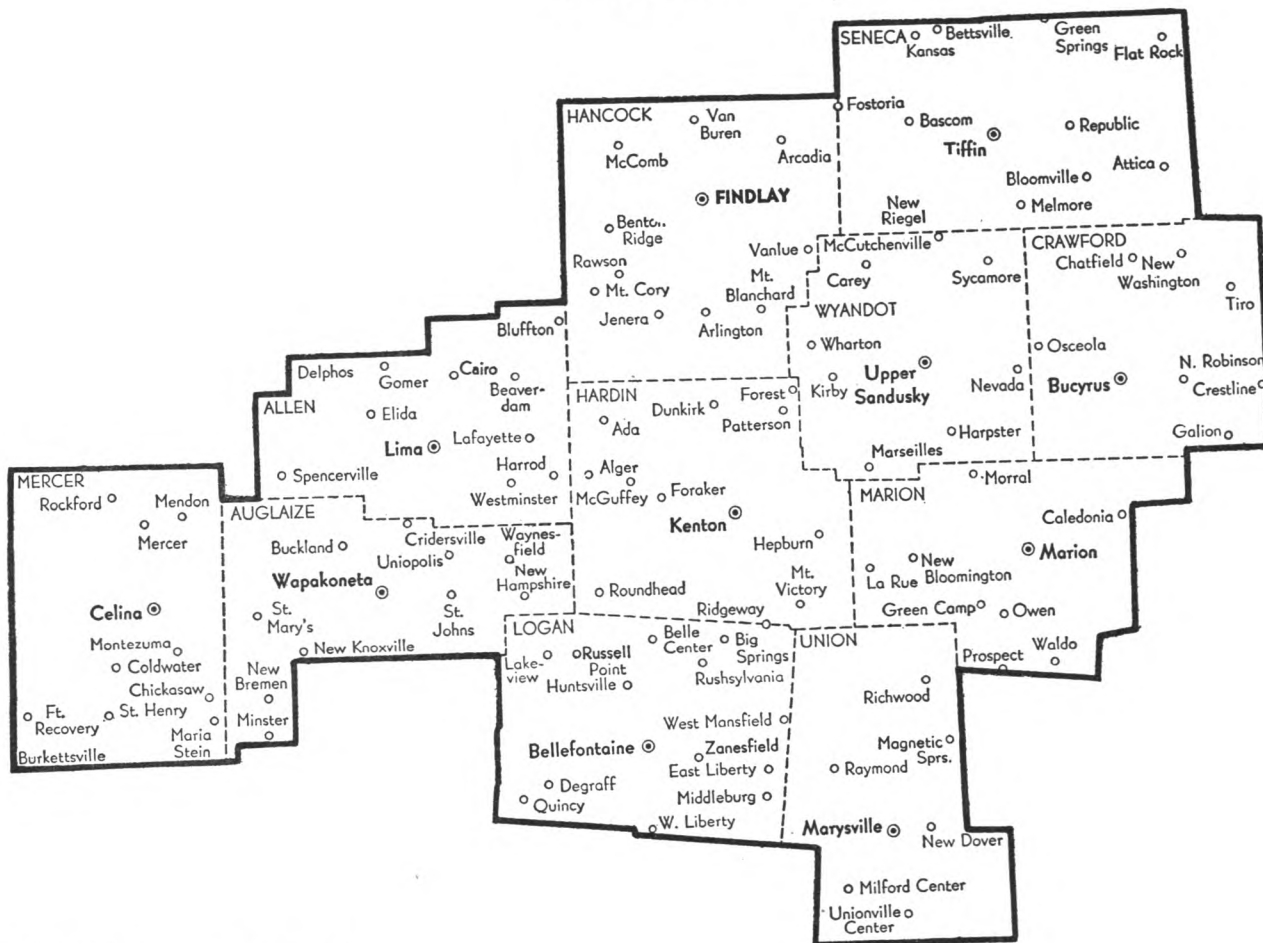
Furthermore, the maps shown here omit rivers. In Area 1, the Maumee River (largest river emptying into the Great Lakes) runs through four counties of the area.

**Finance** Commercial banks located in Area 1 had about \$91 million of demand deposits at the end of last year. In this respect, the area ranks 13th of Ohio's 21 economic areas.

Savings accounts (in the form of time deposits at

commercial banks *plus* withdrawable shares in savings and loan associations) amounted to \$152 million on the same date, the equivalent of \$502 per capita. In this respect the area ranks 11th out of the state's 21 economic areas.

## Area 2. LIMA-MARION Area (11 counties)



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Area 2 lies just south of Area 1 previously described. Like the latter, it lies mainly within the level corn belt and is characterized by highly prosperous agriculture. Area 2, however, has larger cities than Area 1, and industrial development is greater. The largest city is Lima,<sup>(4)</sup> with a popula-

tion of about 50,000 reported in 1950, followed by Marion with 34,000 and Findlay with 24,000. Other county seats in the area, in order of population, are: Tiffin, Bucyrus, Bellefontaine, Kenton, Wapakoneta, Celina, Upper Sandusky and Marysville.

When ranked according to population per square mile, Area 2 is 16th of the 21 economic areas of the state. It has an average density of population of about 88 persons per square mile. Nearly one-third of all the people live on farms, about one-half

(4) The Census Bureau now classifies Lima as a "standard metropolitan area" for certain statistical purposes. However, the population of Allen county (about 88,000) is below the minimum which is used as a test for listing a county separately as a metropolitan state economic area.

live in urban centers, and the remaining fifth live in rural areas but are not engaged in farming.

**Farm Income** In 1949 farmers of the area received approximately \$157 million from the sale of agricultural products which was more than 16% of the state total. Although that represented about \$2 less per acre than in Area 1, farmers in Area 2 received the third highest income per acre of the 8 non-metropolitan areas, and received \$10 more per acre than the average farmer in the state. The sale of hogs led all other income-producing farm commodities, with sales amounting to 26% of total cash income. Other leading income products were: dairy, 19% of total cash income; poultry, 11%; wheat, 11%; corn, 9%; soybeans, 5%; and beef cattle, 4%.

Counties with the highest monetary return per acre within Area 2 are Auglaize and Mercer with cash income per acre (of farm land) of \$63.08 and \$57.54, respectively, in 1949.

Farmers in Area 2 as a whole have the highest "level-of-living" of the 8 non-metropolitan areas of the state according to an index computed in 1945 by the U.S. Department of Agriculture. The index is based in large part on the number of farm families which have electricity, telephones, and automobiles. (The "level-of-living" index is not included in Table I, because data more recent than 1945 are not yet available.)

**Industry also Strong** Although Area 2 ranks only 12th highest of the state's 21 economic areas in percent of population employed in manufacturing, only one other *non-metropolitan* area (Area 4, the Sandusky-Mansfield area) has a larger percent of its population engaged in manufacturing. In 1950 about 11% of all persons living in Area 2 were employed in manufacturing establishments.

There are 607 manufacturing establishments in Area 2, according to the 1947 Census of Manufactures. These include 104 large establishments employing 100 or more workers in each plant. The

machinery industry employs the largest number of workers and makes up about one-third of all the larger establishments.

Among the important manufactures in the area are plants making turbines, road machinery and school busses, as well as an oil refinery, — all located in or near Lima; rubber products and machinery in Findlay; machinery and appliances around Marion and Bucyrus; porcelain ware, glass products and appliances in Tiffin; wire products and auto equipment in Fostoria; furniture and farm tools in Mercer county.

The average weekly wage in manufacturing establishments of Area 2, in 1950, was \$63.24, or 16th of the 21 economic areas of the state. Value of manufacturing according to the 1947 Census of Manufactures was \$258 million, or \$5,059 per manufacturing employee. In the latter respect, Area 2 ranked 13th of Ohio's 21 areas. (See Table I.)

**Trade** Retail stores in Area 2 sell more goods per person than stores in any other non-metropolitan area of the state. In 1948 retail sales averaged \$933 per capita, the highest volume of sales per person in the eight farming areas and 9th highest when ranked with all 21 economic areas in Ohio. Average retail sales per capita are higher than in the metropolitan areas of Hamilton-Middletown, Youngstown, and Lorain.

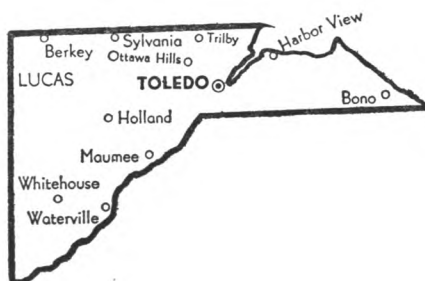
**Finance** In respect to bank deposits and savings also, Area 2 ranks higher than most economic areas of the state including several of the metropolitan areas. Thus, with \$169 million in demand deposits of commercial banks located within its borders (as of the end of last year) the area ranks 6th among Ohio's 21 economic areas.

Savings accounts (time deposits at commercial banks *plus* withdrawable shares in savings and loan associations) amounted to \$252 million on the same date, or \$582 per capita. In this respect the area ranks 5th of Ohio's 21 economic areas, — an unusually high ranking for a predominantly non-metropolitan area.

## Area A.

### TOLEDO

(Lucas County)



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Economic activity in Lucas county is dominated by the industrial pace of Toledo, although considerable farming is done in the western and southern portions of the county. The favorable location of Toledo at the mouth of the Maumee River as it empties into the Maumee Bay and Lake Erie is a principal economic asset. The city's population, according to the 1950 Census, is about 304,000 or fourth in the state.

**Toledo** Toledo port facilities, which have always as a been of strategic importance, have been enlarged since World War II and now admit Port ocean-going vessels. In total tonnage of Great Lakes shipping, Toledo ranks first in the state; more soft coal is shipped than from any other port of the world, and shipments of iron ore, lumber and grain also rank high. The city is an important rail and truck center, with terminals linking with the port facilities.

**Manufacturing** Of the total Lucas county population about 17% are employed in manufacturing, — a proportion which is higher than the Ohio or U. S. average, but lower than most other metropolitan counties of the state. (See Table I.) Total dollar value added by manufacturing, according to the 1947 Census of Manufactures, was \$390 million, or more than 6% of the value added by manufacturing in the state of Ohio.

Lucas county ranks 6th of 21 economic areas of the state, when the value added by manufacturing is related to the number of employees. That is, the combination of labor, capital, and management results in approximately \$5600 as the value added by manufacturing per manufacturing worker.

The average weekly wage of all manufacturing workers in Lucas county was \$75.83 in 1950, ranking second among the state's 21 economic areas, just a few cents below the average weekly earnings

of workers in the Hamilton-Middletown metropolitan area which ranked first. A high concentration of heavy industry in Toledo is one of the major factors contributing to this result.

**Leading Industries** Manufacture of auto parts (as well as some auto assembly), oil refining, and glass making are considered Toledo's leading industries. Numerous other industries, tending to be in the hard-goods lines rather than soft goods, include shipbuilding as well as production of machine tools, scales, appliances, plastics, coated textiles, paints, and food products.

The county includes 627 manufacturing establishments as reported by the 1947 Census of Manufactures. Of these, 100 establishments employ more than 100 workers each. The largest concentration of establishments employing more than 100 workers is classified as machinery, with 16 in the non-electrical machinery category and 6 in the electrical machinery industry. (These data are exclusive of several large plants located in adjoining Wood county, which are part of the Toledo industrial complex.)

**Top Rank in Trade** Lucas county leads all other areas in Ohio in average dollar sales of retail trade per person. In 1948, retail trade was valued at \$443 million, which amounted to \$1120 per capita, as shown in Table I. Factors which may help to explain this showing are the following: First, the drawing power of Toledo's trading area is not limited to Lucas county but covers a much wider range, including smaller centers in Area 1. Second is the fact that average weekly earnings in Toledo are high.

As a consequence of its strong trading position, more than 8% of the population of Toledo is employed in either wholesale or retail trade. Only Cincinnati and Columbus have a higher percentage

of population employed in trade, among Ohio's metropolitan areas.

**Truck Crops and Greenhouses** There are approximately 2000 farms in Lucas county, mostly of small acreage but high returns per acre.

From the sale of agricultural products, Lucas county farmers received the second highest dollar return per acre of the 21 economic areas of the state in 1949, or an average of \$84.36 per acre of cropland. Almost one-fourth of total cash income originates from the sale of produce from truck farms, while greenhouse products account for about 16% of cash farm income, hogs

and wheat 9% each, and poultry and corn 8% each.

**Finance** Commercial banks located in Toledo or Lucas county reported \$260 million of demand deposits at the end of last year. In this respect the area ranks 4th of the state's 21 economic areas, — comparable with Toledo's position as the fourth largest city of the state.

Savings accounts (in the form of time deposits at commercial banks *plus* withdrawable shares in savings and loan associations) amounted to \$206 million on the same date or \$521 per capita. In this respect the area ranks 9th among Ohio's 21 economic areas.

(Tables I and II appear on following pages)

## APPENDIX

*General Sources.* Grouping of counties into economic areas is drawn from *State Economic Areas*, by Donald J. Bogue, Bureau of the Census, U. S. Department of Commerce, 1951. (Exceptions in the case of two areas are explained below.)

Data on individual counties are from latest available official sources. Combination of county data to compute area totals and ranks was done by this Bank.

Characterization of areas in the text has been checked in each case by local consultants, whose advice is gratefully acknowledged.

*Modification of Census Areas.* The Census volume entitled *State Economic Areas*, cited above, includes Clark county (containing the city of Springfield) within non-metropolitan Area 3, along with 11 other counties. The same volume likewise includes Lorain county (containing the cities of Lorain and Elyria) within non-metropolitan Area 4, along with 7 other counties.

The results of the 1950 Census of Population, however, were not completely available at the time the Census delineation of state economic areas was made. As a result of the 1950 Census of Population it appears that Clark county and Lorain county, respectively, now meet the tests for determining metropolitan state economic areas. They are so treated in this series of articles, and non-metropolitan Areas 3 and 4 are correspondingly reduced.

The designations "M" and "N" for metropolitan Clark and Lorain counties, respectively, have been used here, pending publication by the Census Bureau of revised classifications of state economic areas.

*Names of Economic Areas.* In the case of metropolitan areas, the names used in this series of articles are the standard names used in *State Economic Area* and approved by the Federal Interagency Committee. (e.g. "Cleveland" for Cuyahoga and Lake counties.)

In the case of non-metropolitan areas, however, standard names have not yet been designated. (*State Economic Areas* refers to each non-metropolitan area merely by its number and by a listing of all counties included.) To facilitate recognition of the areas described in these articles, provisional names have been devised; they are based in most cases on the two largest cities contained within the particular area. (An exception is Area 1 where the names of the two largest cities would give a mistaken impression of the geographical location of the area; hence the use of "Bryan-to-Fremont" to designate Area 1.) Inclusion of detail maps accompanying the text should make clear the entire compass of the respective areas.

Official names of the non-metropolitan areas are now being prepared by the Census Bureau, with the aid of local consultants.

**Table I**  
**BASIC ECONOMIC FACTS FOR THREE ECONOMIC AREAS OF NORTHWESTERN OHIO**

	Metropolitan	Non-Metropolitan		Ohio	U.S.
	Area A TOLEDO (1 county)	Area 1 BRYAN, etc. (10 counties)	Area 2 LIMA, etc. (11 counties)		
<b>POPULATION</b>					
1. Population, 1950.....thous.	963	303	434	7,947	150,697
2. Land area.....Square miles	343	4,256	4,924	41,122	2,977,128
3. Population per square mile, 1950.....	1,153	71	88	193	51
Rank among Ohio's 21 economic areas.....	3rd	19th	16th	.....	.....
<b>MANUFACTURING</b>					
4. % of population employed in manufacturing, 1950.....	16.9	9.6	11.2	15.0	9.9
Rank among Ohio's 21 economic areas.....	9th	16th	12th	.....	.....
5. No. of establishments employing 100 or more, 1947.....	100	60	104	1,946	24,542
6. Value of manufacturing, 1947.....mil. dol.	390.0	143.7	257.9	6,359	74,426
7. Value of manufacturing per mfg. employee, 1947....dol.	5,603	5,602	5,059	5,323	5,206
Rank among Ohio's 21 economic areas.....	6th	7th	13th	.....	.....
8. Average weekly earnings per mfg. worker, 1950.....dol.	75.83	64.84	63.24	69.56	.....
Rank among Ohio's 21 economic areas.....	2nd	13th	16th	.....	.....
<b>AGRICULTURE</b>					
9. Cash income from agriculture, 1949.....mil. dol.	11.2	142.3	156.8	954.4	28,127
10. Cash income from agriculture per acre, 1949.....dol.	84.36	55.54	53.07	43.52	24.64
Rank among Ohio's 8 non-metropolitan areas.....	.....	1st	3rd	.....	.....
<b>TRADE</b>					
11. Retail sales, 1948.....mil. dol.	442.9	252.6	404.4	7,373	130,520
12. Retail sales per capita, 1948.....dol.	1,120	835	933	928	866
Rank among Ohio's 21 economic areas.....	1st	14th	9th	.....	.....
<b>FINANCE</b>					
13. Demand deposits in commercial banks, Dec. 31, 1950 mil. dol.	260.1	91.3	169.2	4,234	90,999
Rank among Ohio's 21 economic areas.....	4th	13th	6th	.....	.....
14. Savings accounts (commercial banks and savings & loan assoc.) Dec. 31, 1950.....mil. dol.	206.3	151.9	252.3	4,539	68,970
15. Savings accounts per capita, Dec. 31, 1950.....dol.	521	502	582	571	458
Rank among Ohio's 21 economic areas.....	9th	11th	5th	.....	.....

Sources of Items Shown in Table I. Specific sources of items shown in Table I, together with explanations of certain items, are given below :

Item 1 and all per capita items: Census of Population, 1950

Item 2: Webster's Geographical Dictionary

Items 4 and 8: Ohio Bureau of Unemployment Compensation, 1950

Items 5, 6, and 7: Census of Manufactures, 1947; "value of manufacturing" refers to value added to product (i.e. excluding value of raw materials)

Items 9 and 10: Ohio State University and Ohio Agricultural Experiment Station; refers to gross cash income excluding government payments.

Items 11 and 12: Census of Business, 1948

Item 13: Federal Reserve System; refers to demand deposits of individuals, partnerships and corporations.

Items 14 and 15: Ohio Department of Commerce, Federal Home Loan Bank of Cincinnati, and Federal Reserve System; refers to time deposits at commercial banks plus deposits at Ohio's few mutual savings banks, plus value of withdrawable shares of savings and loan associations (both state and federal-chartered)



**Table II**  
**LIST OF OHIO'S 21 ECONOMIC AREAS**

Each area designated by a letter is a metropolitan area, while the numbered areas are "non-metropolitan".

**NORTHWESTERN OHIO**

- 1. Bryan-to-Fremont area**  
Counties included: Defiance, Fulton, Henry, Ottawa, Paulding, Putnam, Sandusky, Van Wert, Williams, Wood.
- 2. Lima-Marion area**  
Counties included: Allen, Auglaize, Crawford, Hancock, Hardin, Logan, Marion, Mercer, Seneca, Union, Wyandot.
- A. Toledo area**  
Lucas county

**SOUTHWESTERN OHIO**

- 3. Piqua-Delaware area**  
Counties included: Champaign, Clinton, Darke, Delaware, Fayette, Madison, Miami, Pickaway, Preble, Shelby, Warren.
- "M". Springfield area\***  
Clark county
- C. Dayton area**  
Montgomery and Greene counties
- D. Hamilton-Middletown area**  
Butler county
- K. Cincinnati area**  
Hamilton county

**NORTHEASTERN OHIO**

- 4. Sandusky-Mansfield area**  
Counties included: Ashland, Erie, Holmes, Huron, Medina, Richland, Wayne.

- 5. Ashtabula-East Liverpool area**  
Counties included: Ashtabula, Columbiana, Geauga, Portage.
- E. Cleveland area**  
Cuyahoga and Lake counties
- "N". Lorain-Elyria area\***  
Lorain county
- F. Akron area**  
Summit county
- G. Canton area**  
Stark county
- H. Youngstown area**  
Trumbull and Mahoning counties

**CENTRAL AND SOUTHEASTERN OHIO**

- B. Columbus area**  
Franklin county
- 6. Zanesville-Newark area**  
Counties included: Carroll, Coshocton, Fairfield, Guernsey, Harrison, Knox, Licking, Morrow, Muskingum, Perry, Tuscarawas.
- 7. Chillicothe-Hillsboro area**  
Counties included: Adams, Brown, Clermont, Highland, Ross.
- 8. Portsmouth-Marietta area**  
Counties included: Athens, Gallia, Hocking, Jackson, Meigs, Monroe, Morgan, Noble, Pike, Scioto, Vinton, Washington.
- J. Steubenville area**  
Belmont and Jefferson counties
- L. Ironton area**  
Lawrence county

\* Clark and Lorain counties have been added to the state "metropolitan areas" listed in Bogue, "State Economic Areas", *op.cit.* (See Appendix)

## SUMMARY OF NATIONAL BUSINESS CONDITIONS

By the Board of Governors of the Federal Reserve System

(Released for Publication October 1, 1951)

Industrial production continued somewhat below first-half levels in August and September, reflecting mainly reduced output in consumer goods industries. Consumer buying has been at somewhat higher levels than in early summer and distributors' inventories apparently have been reduced further. Prices generally showed little change after mid-August. Bank loans to business, mainly for defense and agricultural and other seasonal purposes, expanded over this period.

### Industrial production

The Board's index of industrial production in August was 218 per cent of the 1935-39 average, as compared with 213 in July and an average of 222 for the first half of the year. Preliminary indications point to little change in September.

Durable goods production increased but remained below the June rate. Activity in munitions and producers equipment industries generally expanded, despite work stoppages in an important machinery industry. Output of consumer durables showed little change from the reduced July rates. In the latter part of September steel mill operations were scheduled at 102 per cent of capacity as compared with a rate of 98.5 per cent in July and August. Output of copper and some other nonferrous metals was considerably reduced as a result of a labor dispute in late August and early September, and in mid-September aluminum production was curtailed somewhat owing to power shortages. Passenger car assembly for the third quarter was close to the authorized level of 1.2 million units.

Output of textiles, leather products, and paperboard in August showed smaller increases than usual for this season. Chemicals production rose further and output of most other nondurable goods continued in large volume.

Bituminous coal mining expanded in August and early September. Peak levels of output of crude petroleum and iron ore continued.

### Construction

Value of construction contracts awarded declined somewhat in August, reflecting decreases for most types of public construction. Private awards showed little change. The number of housing units started in August was 85,000, about the same as in July but almost two-fifths below August 1950. Value of work put in place on industrial construction projects continued to rise in August and was double year-ago levels.

### Employment

The labor market showed little change during August. Employment in nonagricultural establishments, after adjustment for seasonal factors, continued at the earlier high level of 46.6 million persons. The average work week in manufacturing industries remained at the moderately reduced July

level and average hourly earnings were maintained at peak rates. Unemployment declined somewhat in August to slightly less than 1.6 million persons, the lowest since October 1945.

### Distribution

Seasonally adjusted value of sales at department stores rose about 3 per cent in August to a level of 319 per cent of the 1935-39 average, but during the first three weeks of September sales showed a less than seasonal rise. Sales at most other retail outlets also increased slightly in August and in early September automobile sales were stimulated by prospects of price advances. Value of department store stocks, seasonally adjusted, declined in August to a point 10 per cent below the spring peak.

### Commodity prices

Wholesale commodity prices have generally shown little change since mid-August. Prices of textile materials have declined further, but during the past 10 days raw cotton prices have advanced as producers have restricted marketings at present prices. Among finished goods, prices of shoes, carpets, and sheets have been further reduced, while wholesale prices of new passenger cars were raised about 5 per cent in mid-September, following revision in Federal ceilings.

The consumers price index in August was unchanged from July. Slight declines in prices of foods and housefurnishings were offset by increases in rents and in prices of apparel and miscellaneous goods and services.

### Bank credit and the money supply

Bank credit rose moderately during August and the first half of September reflecting some seasonal borrowing by businesses. Loans to food manufacturers and commodity dealers to finance the distribution and processing of crops began in the August-early September period and loans to finance direct defense contracts and defense-supporting activities, particularly loans to metal manufacturers, expanded further.

Deposits and currency held by businesses and individuals increased considerably in August and early September. This reflected both expansion in bank loans and a continuing shift of deposits from Government to private accounts prior to the receipt of mid-September income tax payments.

### Security markets

Common stock prices in the second week of September reached the highest levels since April 1930 and then declined somewhat in the third week. Yields on U. S. Government securities and high-grade corporate bonds showed little change. Holders of the 3 per cent Treasury bonds called for payment September 15 and the 1¼ per cent notes which mature October 1 were offered an exchange into an 11-month 1⅞ per cent certificate of indebtedness.

FINANCIAL AND OTHER BUSINESS STATISTICS

Time Deposits\*  
at 54 Banks in 12 Fourth District Cities

(Compiled September 12, and released for publication September 13)

City and Number of Banks	Time Deposits Aug. 29, 1951	Average Weekly Change During:		
		August 1951	July 1951	August 1950
Cleveland (4).....	\$ 884,029,000	+\$ 650,000	+\$ 721,000	-\$ 1,483,000
Pittsburgh (9).....	497,765,000H	+ 694,000	+ 244,000	— 424,000
Cincinnati (7).....	175,966,000	+ 91,000	+ 58,000	— 230,000
Akron (3).....	100,566,000	+ 109,000	+ 50,000	— 183,000
Toledo (4).....	110,407,000H	+ 246,000	+ 331,000r	— 158,000
Columbus (3).....	87,468,000H	+ 47,000	+ 119,000	— 91,000
Youngstown (3).....	63,205,000	+ 99,000	+ 131,000	— 168,000
Dayton (3).....	46,708,000	+ 121,000	+ 128,000	— 32,000
Canton (5).....	43,813,000	+ 270,000	+ 80,000	— 65,000
Erie (3).....	42,022,000H	+ 81,000	+ 104,000	— 1,000
Wheeling (5).....	26,476,000	+ 4,000	+ 34,000	— 28,000
Lexington (5).....	10,977,000	— 32,000	+ 30,000	— 54,000
<b>TOTAL—12 Cities.</b>	<b>\$2,089,402,000H</b>	<b>+\$2,372,000</b>	<b>+\$1,914,000r</b>	<b>-\$2,917,000</b>

H—Denotes new all-time high.  
r—Revised.

Time deposits at reporting banks in 12 Fourth District cities established a new all-time high of \$2,089,402,000 at the end of August with an average weekly rate of increase of \$2,372,000 during the month. This was a record postwar rate of expansion for August, and marked the fifth consecutive month of expansion. Moreover, it is the first time since 1947 that time deposits have risen without interruption throughout the spring and summer months.

The inflow of savings in August this year contrasts sharply with net withdrawals at a rate of \$2,917,000 per week in the same month of 1950, associated with the first Korean wave of scare-buying.

Every city except Wheeling and Lexington reported gains in time deposits, in contrast to declines in all cities in August last year. The rate of decline at Wheeling was nominal, \$4,000 per week, and at Lexington a reduction of savings deposits was reported in August in each of the previous three years also.

Pittsburgh, Toledo, Columbus, and Erie again registered new all-time highs. In all these cities the immediate post-Korean buying surge appeared to have relatively little effect in retarding time deposits.

The marked recovery of savings deposits at Cleveland banks following a general downturn since early 1949, continued with a rate of increase of \$650,000 per week. As a result, time deposits at reporting Cleveland banks at the end of August were higher than on the corresponding date of 1949 for the first time in eighteen months.

Adjusted Weekly Index  
of Department Store Sales\*

Fourth District

(Weeks ending on dates shown, 1935-39 average = 100)

1950r		1951		1950r		1951	
Jan. 7.....	278	Jan. 6.....	425	July 1.....	327	July 7.....	314
14.....	310	13.....	412	8.....	322	14.....	330
21.....	320	20.....	443	15.....	354	21.....	325
28.....	308	27.....	398	22.....	388	28.....	315
				29.....	418		
Feb. 4.....	293	Feb. 3.....	287	Aug. 5.....	374	Aug. 4.....	314
11.....	308	10.....	359	12.....	344	11.....	309
18.....	279	17.....	354	19.....	330	18.....	310
25.....	255	24.....	365	26.....	323	25.....	315
Mar. 4.....	258	Mar. 3.....	302	Sept. 2.....	295	Sept. 1.....	290
11.....	279	10.....	293	8.....	315	8.....	315
18.....	264	17.....	266	9.....	324	15.....	313
25.....	263	24.....	251	16.....	345	22.....	319
		31.....	293	23.....	318	29.....	356
				30.....	335		
Apr. 1.....	285						
8.....	279	Apr. 7.....	297	Oct. 7.....	297	Oct. 6.....	.....
15.....	262	14.....	311	14.....	307	13.....	.....
22.....	283	21.....	323	21.....	287	20.....	.....
29.....	334	28.....	358	28.....	298	27.....	.....
May 6.....	299	May 5.....	336	Nov. 4.....	280	Nov. 3.....	.....
13.....	296	12.....	312	11.....	281	10.....	.....
20.....	299	19.....	313	18.....	288	17.....	.....
27.....	295	26.....	312	25.....	221	24.....	.....
June 3.....	295	June 2.....	309	Dec. 2.....	195	Dec. 1.....	.....
10.....	314	9.....	311	9.....	328	8.....	.....
17.....	309	16.....	304	16.....	334	15.....	.....
24.....	306	23.....	312	23.....	314	22.....	.....
		30.....	325	30.....	342	29.....	.....

\* Adjusted for seasonal variation and number of trading days. Based on sample of weekly reporting stores which differs slightly from sample reporting monthly.

Bank Debits\*—August 1951  
in 31 Fourth District Cities

(In thousands of dollars  
Compiled September 19, and released for publication September 20)

No. of Reporting Banks	August 1951	% Change from Year Ago	% Change	
			3 Months Ended Aug. 1951	from Year Ago
<b>181 ALL 31 CENTERS.....</b>	<b>\$9,342,840</b>	<b>+10.9%</b>	<b>\$38,646,025</b>	<b>+58.4%</b>
<b>10 LARGEST CENTERS:</b>				
5 Akron.....	Ohio 344,677	+22.2%	\$1,113,078	+36.3%
5 Canton.....	Ohio 144,395	+14.7	447,250	+18.7
14 Cincinnati.....	Ohio 1,116,053	+ 7.5	3,475,173	+14.7
10 Cleveland.....	Ohio 2,385,743	+17.3	7,495,006	+22.4
7 Columbus.....	Ohio 652,265	- 4.3	1,850,984	+ 0.2
4 Dayton.....	Ohio 292,375	+ 9.7	905,224	+15.3
6 Toledo.....	Ohio 452,851	+ 8.8	1,366,434H	+14.6
4 Youngstown.....	Ohio 210,684	+15.5	633,006	+18.0
5 Erie.....	Penna. 116,738	+12.3	355,303H	+16.1
44 Pittsburgh.....	Penna. 2,807,784	+10.1	8,571,953	+18.5
<b>104 TOTAL.....</b>	<b>\$8,523,565</b>	<b>+10.9%</b>	<b>\$26,213,411</b>	<b>+17.8%</b>
<b>21 OTHER CENTERS:</b>				
9 Covington-Newport.....	Ky. \$ 46,230	- 2.9%	\$ 139,633H	+ 1.5%
6 Lexington.....	Ky. 70,911	+ 4.8	195,453	+ 5.9
3 Elyria.....	Ohio 27,924	+21.3	83,172H	+23.0
3 Hamilton.....	Ohio 52,746H	+14.6	156,380H	+20.2
2 Lima.....	Ohio 61,060	+11.8	183,734H	+17.9
5 Lorain.....	Ohio 22,608H	+17.7	66,551H	+19.1
4 Mansfield.....	Ohio 51,774	+ 6.5	161,890	+ 9.0
2 Middletown.....	Ohio 56,510H	+33.8	160,703H	+32.4
3 Portsmouth.....	Ohio 23,657	+ 3.0	72,390	+ 8.7
3 Springfield.....	Ohio 57,627H	+13.1	165,727	+13.7
4 Steubenville.....	Ohio 28,200	+11.3	83,852H	+10.9
2 Warren.....	Ohio 53,434	+19.8	160,373	+22.5
3 Zanesville.....	Ohio 32,088	+ 3.4	95,841	+ 7.1
3 Butler.....	Penna. 38,874	+12.8	114,212	+11.9
1 Franklin.....	Penna. 8,574	+ 6.9	24,375	+ 4.3
2 Greensburg.....	Penna. 26,219	+ 3.2	78,931H	+ 9.2
4 Kittanning.....	Penna. 12,326	+16.2	37,338	+18.8
3 Meadville.....	Penna. 15,514	+ 0.7	46,644	+ 3.8
4 Oil City.....	Penna. 19,808	+ 0.8	61,568	+ 0.9
5 Sharon.....	Penna. 36,598	+15.4	109,164H	+19.4
6 Wheeling.....	W. Va. 76,599	+ 3.9	234,483	+11.0
<b>77 TOTAL.....</b>	<b>\$ 819,275</b>	<b>+10.3%</b>	<b>\$ 2,432,614</b>	<b>+13.2%</b>

\*—Debits to all deposit accounts except interbank balances.  
H—Denotes all-time high.

Debits to deposit accounts (except interbank) in 31 Fourth District cities during August totaled \$9,342,840,000 virtually the same as in July, whereas seasonally the August figure is usually slightly smaller than the July total. The failure of debits to show a decline in August may be attributable in part to Treasury withdrawals from Tax and Loan accounts at commercial banks.

In comparison with August last year, debits showed an increase of 10.9%, the smallest margin in more than a year, reflecting the levelling off of debits activity during the spring and summer in contrast to the rapid expansion in the same period of 1950.

TEN LARGEST CENTERS

Debits at the large centers in August fell slightly below the July level but still established a record for the month, 10.9% above the year-ago figure. However, half of the cities registered increases over the July volume.

Akron continued to lead in year-to-year comparisons with a margin of 22.2%, but for the first time since February, Akron debits for the past three months combined failed to register a new all-time high. Cleveland and Youngstown also scored increases of more than 15% over August 1950.

At Pittsburgh banks, the year-to-year increment dipped to 10.1%, below the average for the ten large cities, but in comparison with August 1948, Pittsburgh ranked second with an increase of 45%.

TWENTY-ONE SMALLER CENTERS

Debits at the smaller centers in August exceeded the July volume, in contrast to the usual seasonal movement and to the decline at the large centers. All but two of the smaller centers, Lima and Portsmouth, reported higher debits totals in August than in the previous month; while in the rapid upsurge of business activity in the summer of 1950, four of the smaller centers registered July-August declines. The resulting year-to-year increment, 10.3%, was slightly higher than in July.

Four of the smaller centers, Hamilton, Lorain, Middletown and Springfield registered new all-time highs in August. Middletown again registered the widest margin over the comparable period of last year, 32.4%, for June, July and August combined, followed by Elyria, Warren and Hamilton, all with gains of more than 20%.

Indexes of Department Store Sales and Stocks

Daily Average for 1935-1939 = 100

	Adjusted for Seasonal Variation			Without Seasonal Adjustment		
	Aug. 1951	July 1951	Aug. 1950	Aug. 1951	July 1951	Aug. 1950
	<b>SALES:</b>					
Akron (6).....	339	341	348	288	286	296
Canton (5).....	391	375	385	344	315	339
Cincinnati (8).....	326	326	370	271	251	307
Cleveland (11).....	287	274	300	252	222	264
Columbus (5).....	360	358	382	303	286	321
Erie (4).....	388	371	373	322	289	310
Pittsburgh (8).....	286	276	322	243	199	274
Springfield (3).....	310	294	331	257	238	275
Toledo (6).....	312	307	317	262	237	267
Wheeling (8).....	274	258	286	208	196	229
Youngstown (3).....	365	371	350	317	282	305
District (98).....	312	309	334	271	241	290
<b>STOCKS:</b>						
District.....	323	349	265	341	348	280

# Sizing Up an Investment in Research

by CLYDE WILLIAMS, Director, Battelle Memorial Institute



"All research must partake as much of economic horse sense as it partakes of scientific principles," Charles F. Kettering once said. Applied to industrial research, where the know-how of the engineer must work hand-in-glove with that of the economist, economic horse sense is known as engineering economics. One of its most important uses is as a management tool for evaluating investment in sound research programs. Its adoption by

alert management is a significant development in the method of doing industrial research.

Industry and government are currently investing at an annual rate of \$2 billion. Discounting for inflation, this is more than two and one-half times the research expenditures of 1940. With this generally higher rate of spending, more companies have become more conscious of the need for deliberate, systematic analysis of their research and development programs.

Before spending money on developing a new process, or on the expansion of an existing operation, it is good business to obtain an intelligent estimate of the probable size and nature of the market for such items. This includes intensive analysis of competition, present and potential uses for the items, preferences of the industrial consumer or the ultimate consumer, whichever the case may be, and the volume and location of consumer markets. To enable wise selection of materials for a new product or process, special attention must also be paid to the present and probable future supply, demand and cost of raw materials, and semimanufactures.

For scientific market analysis on the industrial level, special talents are needed. Only teams of engineering economists trained to make accurate economic appraisal of various industrial problems can do an adequate job. Backing up these teams, there must be technologists experienced in many industries, from the mining of raw materials to the marketing of finished products.

An engineering economics staff with diverse industrial experience is prepared to take on a wide variety of economic studies. These are tailored to fit the needs of each particular job. Perhaps a company has developed a variety of new chemicals and wishes advice on probable uses and markets for these products at certain prices. Another company wants to broaden its activities to cover manufacture of glass, or processing of tungsten, nickel, cobalt, or titanium. An investment firm or bank wishes advice on the probable effect of new technical developments on certain companies. A geographical region wants a report made of its mineral resources and how they can be used to help attract new industries.

The value of engineering economic studies may perhaps best be seen by a quick look at typical examples of such

work which Battelle has done in the past.

Bituminous Coal Research, Inc., the research organization for the entire bituminous coal industry, was seeking guidance in planning their research program aimed at increased coal usage. Battelle was asked to make an extensive survey and analysis of the technical and economic factors that control the manufacture of fuel gases from coal. The study concluded generally that fuel gases, produced at coal mines by the cheapest known methods and piped to consuming centers, could not compete with natural gas piped four to six times as far. This situation, it was also found, would probably prevail for many years to come. Possibilities were reported brightest, however, for one type of fuel gas known as producer gas. Prospects for its increased usage were seen when produced locally at the plant by more modern labor-saving equipment. As a result, a cooperative research program on improvement of producer gas equipment was undertaken by BCR and other interested organizations.

In another case, a group of large copper companies asked Battelle to make an intensive economic study of possible new uses for copper. Results of the study suggested the use of copper compounds as trace elements in fertilizer, and as ingredients in marine anti-fouling paint for ship bottoms. Subsequent research and development of these two new uses for copper helped materially in diversifying and expanding copper markets prior to the current shortage.

Engineering economic studies become particularly important if a company wants to get into new or related product lines in which it is not experienced. In this case, an unusual need exists for economic analysis by the organization which maintains an extensive pool of talents and equipment to service all industries.

In the present international situation, where the supply of many raw materials is dependent on political factors, engineering economics takes on special significance. Under such circumstances, it is vital for industry and government to keep a continuous check on the availability of raw materials and on substitutes that may be used if normal sources are cut off.

Often the development of a new product or process, or the expansion of existing operations, brings with it problems of industrial logistics. "How can these materials be brought to our plant, processed, and distributed as finished products to the largest market in a way that will ensure maximum profits?" Each phase of solving this type of logistics problem involves cost studies as well as technical know-how. Alternative solutions must be weighed before a decision can be made that will stand up under strongly competitive conditions.

A fundamental purpose of engineering economic studies is to guide the development of sound industrial research programs. In evaluating raw material supplies, industrial plant locations, markets for new products and processes, the engineering economist is hunting for answers that are economically practical. His findings are vital to smooth flowing production of goods. The research that counts in modern business is directed by men who know costs and markets as well as technology.

Editor's Note—While the views expressed on this page are not necessarily those of this bank, the *Monthly Business Review* is pleased to make this space available for the discussion of significant developments in industrial research.