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Chapter Author: Louis H. Bean

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PART V

International Industrialization
and Per Capita Income

LOUIS H. BEAN
Bureau of the Budget

This paper summarizes the results of a bit of limited research into one of the major factors that makes for differences in per capita income between countries — the stage and pattern of industrialization. By stage of industrialization is meant the proportion of a country's working population engaged in the primary occupations—agriculture, forestry, and fishing; by pattern of industrialization, the relative importance of secondary occupations—manufacturing, mining, and construction, and of tertiary occupations—trade and services.

The material presented here is restricted to simple proportions of the labor force engaged in agriculture and no attempt is made to treat other factors making for differences in per capita income (such as capital, education, productivity of resources, distribution of income, proximity to markets, living and consumption habits). Two qualifying statements may therefore be called for at the start. From this selection of one factor, occupational distribution, it should not be inferred that we think other factors are not important or, in some cases, much more important; and when we point to the need for different occupational proportions in various areas without discussing the methods and social and economic problems that would be involved in such changes it should not be inferred that we underestimate the economic and social problems that would be involved in such changes merely because we do not discuss them in this paper.

A reduction in the agricultural proportion can of course take place as a result of (1) a reduction in the number engaged in farming; (2) an increase in the number engaged in other industries; (3) a relatively greater decline in the number engaged in farming than the decline in other industries or a relatively smaller increase than the increase in other industries. Any of these shifts would normally be accompanied by such technological aids and developments as would raise agricultural productivity, and lead to greater urban per capita income, which in turn would lead to greater agricultural income, which finally would augment rural demand for industrial products—all of which would tend to raise the general average per capita income.

The course of industrialization has been speeded up almost everywhere by the war and will certainly engage attention more and more after the war. If we get the kind of peace and international economic cooperation we are fighting for, the future

course of industrialization in various countries is quite likely to be molded more consciously than in the past. To that end much more basic data on national incomes by countries are needed, but even the data at hand, despite their known shortcomings, may be made to reveal certain broad features in the relation of industrialization to per capita incomes that should be useful guides to economic programs.

In this paper the different effects on per capita incomes that may be expected from expansion in primary, secondary, and tertiary industries are examined. With few exceptions, living standards may be expected to rise and world trade increase as the inhabitants of more and more agricultural countries go into secondary and tertiary occupations; also, with few exceptions, such as in our southern states, the greater the emphasis on trade and services, as compared with manufacturing, the greater the rise in per capita incomes. Adequate historical data by occupational groups might indicate how the industrialization process could and should be accelerated in industrially backward countries to accomplish in one decade what has usually taken several decades; and possibly how a highly industrialized area, faced with an import balance, might partly meet this situation after the war by retaining a larger share of its economy in agriculture and promoting a shift from lower-paid export manufacturing or mining to higher-paid production for home consumption requiring additional services and trade.

1 INDUSTRIALIZATION, THE UNIVERSAL NEED FOR OCCUPATIONAL ADJUSTMENTS OUT OF AGRICULTURE INTO OTHER INDUSTRIES AND SERVICES

The proportion of the labor force in agriculture has a particular bearing on the emerging United Nations' interest in an International Food and Agricultural Authority as an aid to raising the world's nutritional and general living standards. The chief means of expanding world food production will be through more efficient methods and technological advances. Hand in hand with these the proportion of the labor force in agricultural occupations must be reduced. The industrialization process has not yet played the role it should in raising living standards in most parts of the world.

In every region, whether highly agriculturalized southeastern Europe, China, India, Africa, Latin America, and southern United States, or the highly industrialized areas of western Europe and northeastern United States, per capita incomes are larger where the proportions of the labor force engaged in agriculture are lower; and, practically everywhere, economic programs providing for readjustment out of agriculture are called for. China, India, many sections of Latin America, Africa, eastern Europe, and southeastern United States are obviously over-agriculturalized, i.e., 60 to 85 percent of their inhabitants are engaged in producing food and other farm products.

The low per capita incomes of China and India, it may be expected, could be doubled by shifting no more than 15 percent of their labor force from food production to other pursuits (with more efficient use of human and natural resources); an additional shift of less than 10 percent would treble them. The low incomes of Rumania and Bulgaria could be doubled if less than 20 percent of the labor force were directed into non-agricultural pursuits. Even in a largely industrialized country such as the United States, of whose working population less than a fifth is now engaged in agriculture, there are over-agriculturalized areas. For example, Mississippi (60 percent of the labor force is in agriculture) and North Dakota (50 percent) could double their per capita incomes by programs that would shift 25 percent of their labor force out of farming into other activity.

About 800 million of the world's present population, 2.2 billion, are classed as gainfully occupied; of these, probably 500 million are engaged in agriculture. If, in the course of a reasonable period—say, the first two decades after the war—through appropriate regional programs including those to increase agricultural productivity, it were possible to alter the world's agricultural-industrial balance, so that 40 percent were engaged in farming, instead of over 60 percent as at present, the general gain in productivity and income and living standards would be enormous. If the United Nations took full advantage of the postwar opportunity to raise living standards throughout the world, over 150 million persons in the present world population could quit farming while the remaining 350 million increased their efficiency.

To determine the ideal balance between agriculture and industry, both economic and sociological factors must be considered, but as far as economic evidence is concerned, there does not seem to be any definite indication that the reduction in agricultural pursuits can go too far if countries can draw upon the agricultural products of other areas. England and New England are cases in point. England, where 6 percent are in agricultural pursuits, imports more than half of its food requirements. New England states, such as Massachusetts, Connecticut, and Rhode Island, where fewer than 3 percent are in agricultural pursuits, get practically all their food supplies from other states. It is possible that at some point too large concentration in non-agricultural, secondary, industries (such as fuel mining and textiles) tends to reduce per capita incomes and calls for a further readjustment toward tertiary pursuits. However, evidence from all over the world (except perhaps Australia and New Zealand, where productivity in primary industries is greater than in secondary and tertiary) shows that the lower the proportion in agriculture the higher the income (Chart 1 and Table 1).

The European groups for which it is possible to discern a relation between the agricultural proportion and income are:

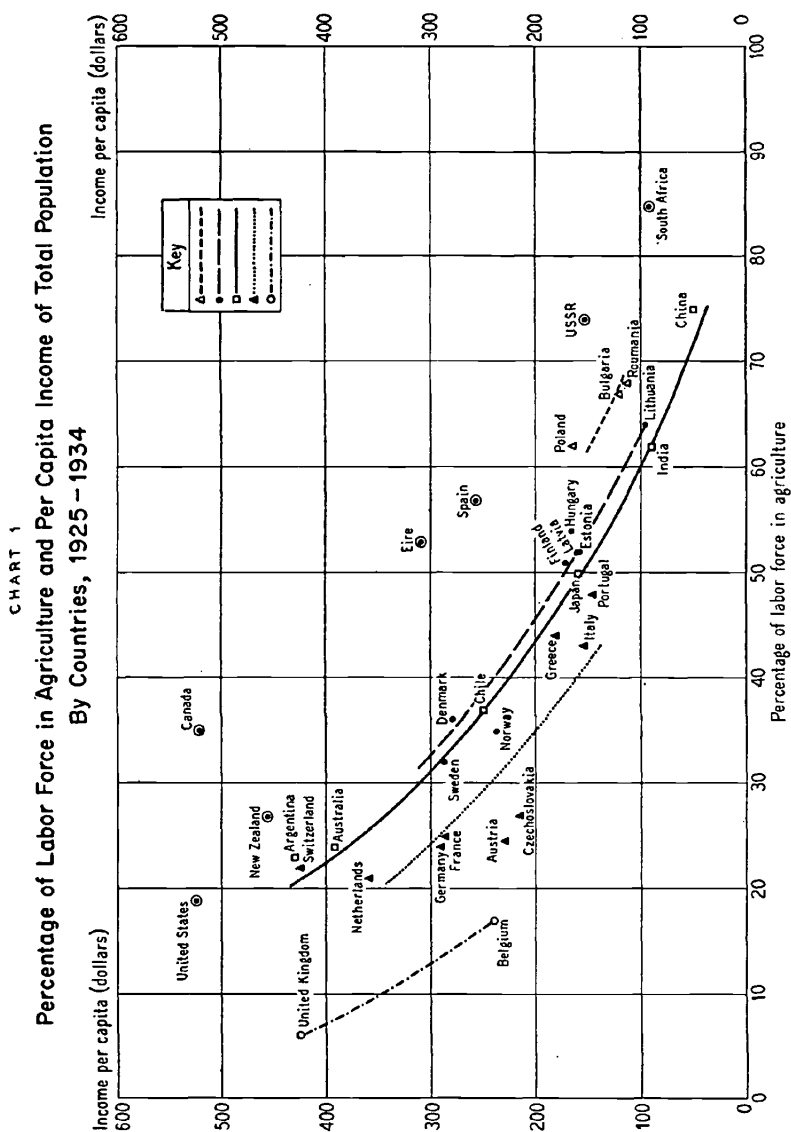
- 1 Denmark, Norway, Sweden, Finland, Estonia, Latvia, Lithuania
- 2 Netherlands, France, Germany, and Italy
- 3 United Kingdom and Belgium
- 4 Czechoslovakia and Austria
- 5 Poland, Hungary, Bulgaria, and Rumania

Several countries do not come within these geographical groups. The most obvious are Eire and Spain; Switzerland, belonging to Group 2 because of contiguity, appears to have a relatively high income. Greece, and possibly Portugal, may also be considered as belonging to Group 2. The income-agriculture relationships for these several groups seem to be essentially similar. It is of course likely that when more adequate data for certain countries become available, closer statistical relationships and different groupings may suggest themselves.

In eastern Europe—typified by Group 1, the Baltic states—per capita income in average prices of 1925-34 rises from about \$100 to \$200 when the proportion in agriculture is reduced from

65 to 45 percent; similarly, in western Europe—typified by Group 2—the income level rises from about \$150 per capita to \$300 when the proportion is reduced from 45 to 25 percent. A 20-point advance in the stage of industrialization is thus associated with a doubling of income per capita.

These regional groupings emphasize the basic differences in



the economies of European countries. At the same stage of industrialization, some countries may have a higher income level than others; for example, in western Europe (Group 2), 40 percent in agriculture is associated with a per capita income of about \$150; in northern and eastern Europe, of about \$240. This difference is undoubtedly to be explained by such factors as population

TABLE 1
National Income per Capita and Percentage of Labor Force
in Primary, Secondary, and Tertiary Occupations, by Countries
1925-1934

| | PER CAPITA INCOME | | PERCENTAGE OF LABOR FORCE IN | | |
|-----------------------|-------------------|---------------------|------------------------------|-----------|----------|
| | Labor force | Total population | Primary | Secondary | Tertiary |
| United States | \$1,381 | \$525 | 19 | 31 | 50 |
| Canada | 1,337 | 521 | 35 | 23 | 42 |
| New Zealand | 1,202 | 457 | 27 | 24 | 49 |
| United Kingdom | 1,089 | 425 | 6 | 44 | 50 |
| Switzerland | 1,018 | 424 | 22 | 45 | 33 |
| Argentina | 1,000 | 430 | 23 | 43 | 34 |
| Australia | 980 | 392 | 24 | 30 | 46 |
| Netherlands | 855 | 358 | 21 | 39 | 40 |
| Eire | 770 | 308 | 53 | 13 | 34 |
| France | 684 | 287 | 25 | 40 | 35 |
| Denmark | 680 | 279 | 36 | 27 | 37 |
| Sweden | 653 | 287 | 32 | 29 | 39 |
| Germany | 649 | 290 | 24 | 39 | 37 |
| Spain | 628 | 257 | 57 | 25 | 18 |
| Belgium | 600 | 240 | 17 | 48 | 35 |
| Chile | 550* | 248 | 37 | 28 | 34 |
| Norway | 539 | 237 | 35 | 27 | 38 |
| Austria | 511 | 230 | 24 | 39 | 37 |
| Czechoslovakia | 455 | 214 | 27 | 44 | 29 |
| Greece | 397 | 180 | 44 | 34 | 22 |
| Finland | 380 | 171 | 51 | 30 | 19 |
| Hungary | 359 | 165 | 54 | 25 | 21 |
| Japan | 353 | 159 | 50 | 20 | 30 |
| Poland | 352 | 165 | 62 | 18 | 20 |
| Portugal | 350 | 144 | 48 | | 52 |
| Latvia | 345 | 161 | 52 | 24 | 24 |
| Italy | 343 | 154 | 43 | 31 | 26 |
| Estonia | 341 | 160 | 52 | 24 | 24 |
| USSR | 320 | 152 | 74 | 15 | 11 |
| Union of South Africa | 276 | 91 | 85 | | 15 |
| Bulgaria | 259 | 119 | 67 | 18 | 15 |
| Rumania | 243 | 112 | 68 | 17 | 15 |
| Lithuania | 207 | 97 | 64 | 15 | 21 |
| India | 200 | 90 | 62 | 15 | 23 |
| China | 120 | 49 | 75 | 5 | 20 |

Colin Clark, *Conditions of Economic Progress*, pp. 41 and 179; *Economics of 1960*, p. 71 and Appendix.

* Estimated.

density, per acre productivity in agriculture, industrial productivity, and the relative volume of power, mechanical equipment, and other capital resources available to rural and urban populations.

In two contiguous countries in Latin America—Argentina and Chile—the same general relations between industrialization and living standards hold. A difference of 12 points in the agricultural proportion is associated with a per capita income in Argentina nearly \$200 greater than in Chile. If the United States, Canada, Chile, and Argentina are considered as forming a Western Hemisphere group, the relation would closely approximate the European, and Canada would stand out as having an exceptionally high income for its stage of industrialization, probably reflecting the effect of proximity to the United States economy.

If we compare roughly 'contiguous' areas in the Far East—Japan, India, and China—with Latin America, a fairly common pattern emerges that resembles the north central and southern European. It is tempting to observe that were it possible to industrialize China to the point where the agricultural proportion was 50 instead of 75 percent, its per capita income would rise from \$50 to about \$150, approximating Japan's.

Neither Australia and New Zealand nor South Africa fits into any of the foregoing groups. Russian per capita income too seems relatively high, though not in view of the progressively higher incomes for the same degree of industrialization as one goes from eastern to western Europe. For example, a per capita income of \$200 is associated with 35 percent in agriculture in western Europe, with about 45 percent in Central Europe, and with about 55-60 percent in eastern Europe.

These general results for regional groupings of contiguous countries seem reasonable in the light of similar analyses for the United States. Though less than one-fifth of the total labor force is engaged in agriculture (as of 1939), more than half of the states have higher proportions. As in Europe, there are several regional groupings (see Chart 2 and Table 2). One comprises certain north-western states — Minnesota, North and South Dakota, Iowa, Nebraska, Nevada, Wyoming, Montana, and Idaho. In North and South Dakota practically one-half of the labor force is in agriculture and per capita income is about \$330;

CHART 2
 Percentage of Labor Force in Agriculture and
 Per Capita Income of Total Population

By States, 1939

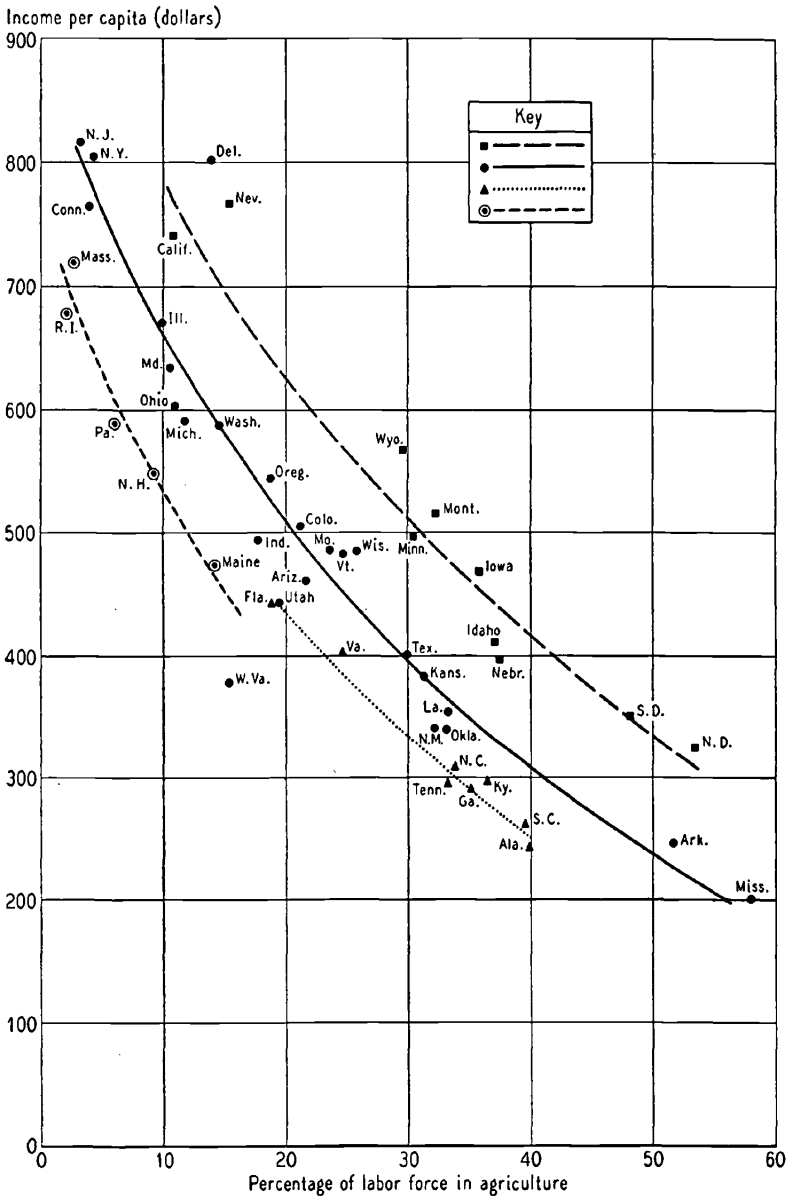


TABLE 2

National Income per Capita and Percentage of Labor Force
in Primary, Secondary, and Tertiary Occupations, by States, 1939

| | PER CAPITA INCOME | | PERCENTAGE OF LABOR FORCE | | |
|----------------|-----------------------------|----------------------------------|---------------------------|-----------|----------|
| | Labor force ^a | Total population ^b | Primary | Secondary | Tertiary |
| United States | \$1,337 | \$539 | 18.8 | 30.0 | 51.2 |
| Alabama | 670 | 242 | 39.9 | 24.0 | 36.1 |
| Arizona | 1,263 | 461 | 21.7 | 22.8 | 55.5 |
| Arkansas | 704 | 246 | 51.6 | 13.9 | 34.5 |
| California | 1,712 | 741 | 10.8 | 24.3 | 64.9 |
| Colorado | 1,338 | 505 | 21.2 | 20.8 | 58.0 |
| Connecticut | 1,689 | 764 | 4.0 | 48.5 | 47.5 |
| Delaware | 1,781 | 802 | 13.9 | 35.8 | 50.3 |
| Florida | 1,041 | 442 | 18.9 | 18.5 | 62.6 |
| Georgia | 735 | 290 | 35.1 | 22.7 | 42.2 |
| Idaho | 1,117 | 411 | 37.1 | 16.6 | 46.3 |
| Illinois | 1,572 | 671 | 9.9 | 34.4 | 55.7 |
| Indiana | 1,268 | 495 | 17.8 | 35.6 | 46.8 |
| Iowa | 1,237 | 468 | 35.8 | 16.3 | 47.9 |
| Kansas | 1,034 | 383 | 31.4 | 16.0 | 52.6 |
| Kentucky | 840 | 297 | 36.5 | 23.2 | 40.3 |
| Louisiana | 937 | 354 | 33.2 | 19.3 | 47.5 |
| Maine | 1,210 | 474 | 14.2 | 37.3 | 48.5 |
| Maryland | 1,401 | 634 | 10.5 | 32.4 | 57.1 |
| Massachusetts | 1,685 | 719 | 2.7 | 41.4 | 55.9 |
| Michigan | 1,437 | 591 | 11.8 | 43.3 | 44.9 |
| Minnesota | 1,251 | 497 | 30.4 | 17.3 | 52.3 |
| Mississippi | 539 | 201 | 58.0 | 12.8 | 29.2 |
| Missouri | 1,204 | 486 | 23.6 | 24.3 | 52.1 |
| Montana | 1,278 | 515 | 32.2 | 19.5 | 48.3 |
| Nebraska | 1,046 | 397 | 37.4 | 11.0 | 51.6 |
| Nevada | 1,742 | 767 | 15.4 | 27.0 | 57.6 |
| New Hampshire | 1,295 | 548 | 9.1 | 43.8 | 47.1 |
| New Jersey | 1,539 | 816 | 3.2 | 41.6 | 55.2 |
| New Mexico | 1,002 | 341 | 32.2 | 18.7 | 48.1 |
| New York | 1,895 | 804 | 4.3 | 32.4 | 63.3 |
| North Carolina | 817 | 308 | 33.8 | 31.0 | 35.2 |
| North Dakota | 888 | 325 | 53.4 | 5.0 | 41.6 |
| Ohio | 1,502 | 603 | 11.0 | 39.1 | 49.9 |
| Oklahoma | 990 | 340 | 33.1 | 17.1 | 49.8 |
| Oregon | 1,294 | 544 | 18.8 | 27.0 | 54.2 |
| Pennsylvania | 1,460 | 589 | 6.0 | 44.6 | 49.4 |
| Rhode Island | 1,492 | 678 | 2.1 | 50.8 | 47.1 |
| South Carolina | 673 | 261 | 39.6 | 26.4 | 34.0 |
| South Dakota | 949 | 351 | 48.1 | 8.9 | 43.0 |
| Tennessee | 794 | 295 | 33.2 | 24.3 | 42.5 |
| Texas | 1,040 | 401 | 29.9 | 18.0 | 52.1 |
| Utah | 1,337 | 443 | 19.4 | 23.2 | 57.4 |
| Vermont | 1,226 | 483 | 24.7 | 27.7 | 47.6 |
| Virginia | 966 | 402 | 24.6 | 27.9 | 47.5 |
| Washington | 1,413 | 588 | 14.6 | 28.7 | 56.7 |
| West Virginia | 1,123 | 378 | 15.3 | 43.4 | 41.3 |
| Wisconsin | 1,234 | 485 | 25.9 | 29.4 | 44.7 |
| Wyoming | 1,406 | 567 | 29.6 | 17.4 | 53.0 |

^a Income per gainfully occupied was computed by dividing total income (Department of Commerce) by total gainful workers, including those engaged in emergency work relief.

^b *Survey of Current Business*, June 1943, Department of Commerce.

^c Computed from Census figures.

in Montana and Wyoming about 30 percent is in agriculture and per capita income is about \$540.

Similar groupings of contiguous states may be made for the Pacific Coast; for the Cornbelt; for eastern states—New York, Vermont, New Jersey, and Connecticut; and for New England states — Maine, New Hampshire, Massachusetts, and Rhode Island; and for southeast and southern states running west to Utah. In every group smaller proportions in agriculture are associated with larger average per capita incomes.

Here, as in Europe, there are regional differences in types of industry, population density, industrial training, power and mechanical facilities, other capital resources, and productivity per acre and per man, so that for the same proportion in agriculture, per capita incomes may be larger in one state than in another. For example, Montana and Louisiana have the same agricultural proportion, 32 percent, yet their per capita incomes are, respectively, \$515 and \$350. The point of this analysis, however, is not the reasons for these regional differences but rather the common relations between per capita income and the degree of industrialization within each regional group. They appear to be virtually identical in South America, the Pacific area, eastern and southern Europe, and in eastern and southern United States. For most of the regional groups of states in the United States as well as for groups of other countries, the difference between the agricultural proportion of 40 percent and one of 20 is associated with an increase in per capita income of \$200.

Three other pieces of corroborative evidence seem worth mentioning. One is in the National Resources Planning Board report (June 1943) on Regional Planning for the Arkansas Valley. The plan drawn up by agricultural and industrial engineers provides for reducing the agricultural population in the Arkansas Valley Area from 3.25 million to a little over 2 million and increasing the nonagricultural from 4.1 to 6 million. The agricultural proportion would be reduced from 47 to 26 percent, 21 points. The expected industrial expansion and agricultural reorganization for greater productivity would bring the per capita income of the entire area up to an average of about \$590 (1939 prices), an increase of \$245 from the 1939 average, \$345. In other words, it is expected that regional planning for the

better use of human, land, and other resources, and increased efficiency through mechanization would raise the income level, and thereby the living standards of the area, something like 75 percent. This is not far out of line with the analysis in Chart 2. A reduction of 21 points in the percentage engaged in agriculture for an area having a \$345 per capita income and 47 percent engaged in agriculture is associated with a rise in income of about \$215, or 60 percent.

A second corroborative item may be gleaned from the record of United States experience. Between 1820 and 1840 the percentage of the United States labor force engaged in agricultural pursuits declined from 74 to 68, only 0.3 percent per year; between 1840 and 1860, not much more—from 68 to 59, or 0.45 percent per year. Since then, the average rate of decline has been rapid, 5.0 percent per decade. By 1940, only 17.6 percent of the labor force was engaged in farming.

Both the long- and the short-term variations in this rate of decline since the Civil War seem to be related to the state of industrial activity. In the decades characterized by industrial prosperity—those ending with 1870, 1890, 1910, and 1930—it was 6.1 points; in the decades characterized by prolonged industrial depression, 4.1 points. Industrial depression retards and prosperity stimulates the long-term shift from agriculture to other industries.

During longer periods, such as the forty years from 1860 to 1900, a decline in the agricultural proportion of 21 points was associated with a doubling of per capita industrial output (as measured by Warren M. Persons' index¹). This corresponds approximately to the relationships for countries in Chart 1 and for states in Chart 2.

The third corroborative item has to do with the more rapid rate of industrialization in Russia between 1928 and 1939 than between 1913 and 1928 (Table 3). The agricultural population constituted about 81 percent of the total in 1913, 80 percent in 1928, and only 50 percent in 1939. The effect of this rapid rate of industrialization, most of which took place during the 1930's, may be seen in the marked growth in national income per capita (Table 4). In 1928 per capita income (and presumably per capita

¹ *Forecasting Business Cycles* (John Wiley, 1931), p. 180.

TABLE 3
Social Composition of the Population, USSR
(percentage of the total)

| | 1913 | 1928 | 1934 | 1937* | 1939 |
|---------------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|
| Workers & office employees | 16.7 | 17.3 | 28.1 | 34.7 | 49.73 |
| Members of kolhozes & artisans & craftsmen members of cooperatives | | 2.9 | 45.9 | 55.5 | 46.90 |
| Individually operating peasants (excl. kulaks) & artisans & craftsmen not members of cooperatives | 65.1 | 72.9 | 22.5 | 5.6 | 2.60 |
| 'Bourgeoisie' (landlords, etc.) | 15.9 | 4.5 | 0.1 | | 0.04 |
| Others (students, school children, pensioners, army, etc.) | 2.3 | 2.4 | 3.4 | 4.2 | 0.73 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

Population includes members of family; taken from Aaron Yugow, *Russia's Economic Front for War and Peace*.

* The proportions may be in error because of the unreliability of the 1937 census of population.

output) was only a little larger than in 1913 but by 1940 it had risen to about 4.5 times that of 1928 (Chart 3). The relation between this rise in national income per capita and the reduction in the agricultural proportion of the population is such that a 20 point reduction—from, say, about 70 to 50 percent—seems to have been accompanied by a doubling of per capita income.

TABLE 4
National Income Per Capita and Percentage of Population in
Agriculture, USSR, 1913-1940 (1926-27 rubles)

| | 1913 | 1928 | 1929 | 1932 | 1937 | 1940 |
|------------------------------------------|------|-------|-------|----------|-------|----------|
| National income per capita (1928 = 100)* | 93.2 | 100.0 | 113.2 | 170.2 | 349.3 | 452.2 |
| % in agriculture ^b | 81 | 80 | | 68(1934) | 61 | 50(1939) |

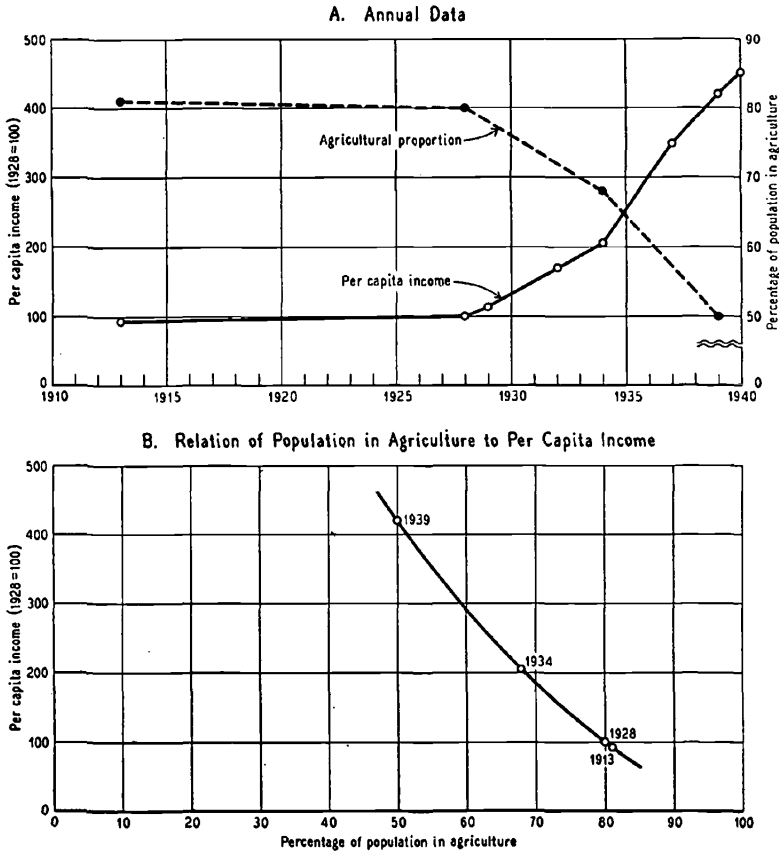
* Aaron Yugow, *Russia's Economic Front for War and Peace*.

^b Derived from Table 3.

2 PATTERNS OF INDUSTRIALIZATION AND PER CAPITA INCOME

The different levels of income tentatively indicated in the United States illustration for a given stage of industrialization call for closer analysis. As already suggested, differences in productivity and size of operations in both agriculture and industry may be responsible for the lower per capita incomes in our southern than in our northern states. Colin Clark, for example, gives approximately \$1,100 (1925-34 prices) as the net per capita output of the agricultural working population in the West North Cen-

CHART 3
 Percentage of Population in Agriculture and Per Capita Income
 USSR, 1913-1940



Note: Per capita income for 1934 and 1939 interpolated.

tral, Mountain, and Pacific states; in the West South Central states it is about 64 percent less. For 30 percent in primary production, the per capita income from all industries in Wyoming and Montana is about \$600, and for Mississippi and Louisiana, about \$350. A second cause of differences in per capita income for a given percentage in primary industries may be the concentration of one or more industries whose earnings or productivity are either unusually high or low. For example, relatively high per capita incomes in Nevada, Wyoming, and Montana are due, among other things, to the high value of mineral production per

capita; and the relatively low per capita income in West Virginia, to the relatively low value of coal output per capita. Similarly, the low per capita incomes in the United Kingdom and Belgium, relative to the incomes of other west European countries for a given percentage in primary industries, are also associated with the heavy concentration of coal mining.

Another outstanding instance of abnormally high income for a given percentage in primary industries is Delaware, where a disproportionate share of income from finance is concentrated. The year or period under consideration is also a factor. If we were dealing with 1929, the effect of the speculative boom would be manifest in relatively high per capita incomes in such states as New York, Illinois, and California, where most speculative activity centers. If we were dealing with 1919, several of the agricultural states would have abnormally high incomes owing to the inflation in agricultural prices.

The dominating influence of a key area sometimes spreads into contiguous smaller states. For example, per capita incomes in Connecticut, Rhode Island, New Jersey, and Vermont seem large even in view of their high degree of industrialization. The reason may be the spread of the effect of the large per capita earnings and opportunities in the dominant area, New York.

Another factor may be the relative proportions of the working force in secondary and in tertiary pursuits. The higher per capita incomes in countries having larger proportions of their labor force in transportation, commerce, finance, and other services have been emphasized by Clark. I want, here, to point out certain differences in the influence of concentration in secondary and tertiary industries in the several regions of the United States and in other countries.

For the United States as a whole, the pattern of industrialization is made up, by and large, of a relatively small proportion in primary industries, a larger proportion in secondary, and the largest in tertiary pursuits. Per capita income has run from low to high in this same order for many years, and the order is likely to continue for some time, with a narrowing of the gap between secondary and tertiary income. It is this relatively smaller income per capita in primary industries that is responsible for the lower incomes in the states having larger proportions of the labor force

in primary industries. For the same reason, we would expect to find generally that states with the same proportion in primary industries, and a larger proportion in tertiary industries than in secondary would have higher incomes.

Close examination of the data for the various states bears this out. Five regionally selected examples of different patterns of industrialization are shown in Table 5, arranged in the order of the proportions in primary industries, with the differences between the tertiary and secondary proportions. In Example 1 concentration is relatively high in both secondary and tertiary industries. In Examples 2 and 3 the distributions of occupations are more nearly like that in the United States as a whole. In Example 4 the labor force is distributed nearly equally in each of the three groups. In Example 5 the concentration is greatest in primary and tertiary, least in secondary.

TABLE 5
Patterns of Industrialization in the United States
and Income Per Capita of Population

| | PERCENTAGE OF LABOR FORCE IN | | | | PER CAPITA INCOME (\$) |
|------------------|------------------------------|-----------|----------|-----------------------------|---------------------------------|
| | Primary | Secondary | Tertiary | Tertiary minus secondary | |
| <i>Example 1</i> | | | | | |
| New Jersey | 3 | 42 | 55 | +13 | 816 |
| Connecticut | 4 | 48 | 48 | 0 | 764 |
| <i>Example 2</i> | | | | | |
| Illinois | 10 | 34 | 56 | +22 | 671 |
| Michigan | 12 | 43 | 45 | + 2 | 591 |
| <i>Example 3</i> | | | | | |
| California | 11 | 24 | 65 | +41 | 741 |
| Washington | 14 | 29 | 57 | +28 | 588 |
| <i>Example 4</i> | | | | | |
| North Carolina | 34 | 31 | 35 | + 4 | 308 |
| Georgia | 35 | 23 | 42 | +19 | 290 |
| <i>Example 5</i> | | | | | |
| Arkansas | 52 | 14 | 34 | +20 | 246 |
| Mississippi | 58 | 13 | 29 | +16 | 201 |

Source: Table 2.

If we take these five examples as units, the outstanding fact is that the greater the concentration in primary industries the lower the per capita income. Example 3, with the two Pacific states, California and Washington, is an exception. But if we

compare the patterns for the two states in each example, the state having the greater concentration in tertiary industries has the larger per capita income. Example 4, with the two southern states, North Carolina and Georgia, is the exception here. These examples suggest also the possibility that influences of concentration in both secondary and tertiary industries may vary regionally.

In the relations noted so far between the agricultural proportion and per capita income, it has been assumed that a decrease or increase in the former is accompanied by an equal shift into secondary and tertiary occupations. To determine whether there is any additional income advantage in shifting a larger proportion into one or the other, we examined the additional effect on income that may be associated with present differences between the secondary and tertiary proportions. For a given proportion in agriculture, incomes tend to be larger where the tertiary proportion substantially exceeds the secondary, the excess varying regionally.

Based as they are on the income for only one year, 1939, these results are tentative. To obviate sporadic situations, if any, it might be desirable to experiment with income for more than one year. Different groupings of states might yield somewhat different results; as also might treating the secondary and tertiary proportions separately in the statistical analysis.

In this experimental analysis, we grouped the states as follows:

- 1 Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Maryland, Pennsylvania, Delaware, West Virginia
- 2 Virginia, Kentucky, North Carolina, South Carolina, Georgia, Florida, Alabama, Tennessee
- 3 a) Mississippi, Arkansas, Kansas, Missouri, Illinois, Indiana, Ohio
b) Michigan, Wisconsin, Minnesota, Iowa
- 4 Louisiana, Oklahoma, Texas, New Mexico, Arizona, Colorado, Nebraska, Utah, California, Washington, Oregon
- 5 Nevada, Idaho, Montana, North Dakota, South Dakota, Wyoming

For each area, we ascertained (a) the net relation of the primary proportion to per capita income on the condition that

the rest of the working force is divided equally between secondary and tertiary occupations, and (b) the net additional effect of different proportions as between secondary and tertiary occupations indicated by the excess of the proportion in tertiary over that in secondary. The essential features of the results (Chart 4) may be seen by noting how a decrease in the primary proportion from 25 to 15 percent, with equal portions in secondary and tertiary pursuits, affects income, and the additional change in income due to a 10-point excess of tertiary over secondary occupations, that is, if the reduction in primary industries is made up by an increase in tertiary. A 10-point increase in industrial progress in the East and South (regions 1, 2, 3) apparently tends to add \$100 to \$150 (1939 prices) per capita, and in the western states substantially more. Furthermore, if industrial progress is so great as to shift a larger proportion into tertiary industries than into secondary, there is a tendency for an additional increase in the average per capita income, except in the South. These regional differences show up whether expressed as absolute dollar increases or as percentages of the regional income levels.

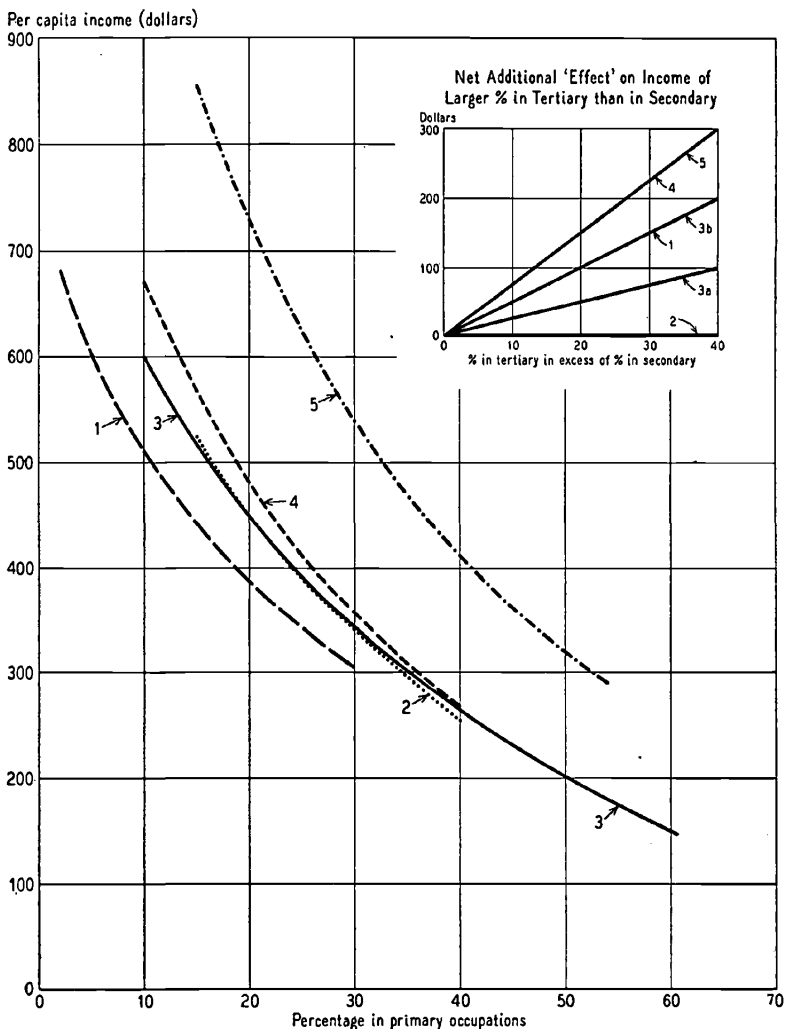
To pursue this type of study further, we would have to delve into the actual earnings or productivity of the various occupational groups, by states. Much could be done to make such data available in comparable and systematic form, and there is every reason to expect that they would turn out to be 'pay dirt'.

This line of investigation is likely to prove fruitful in areas outside the United States also. The information for other countries is less detailed than that for the United States. However, we do have data to show that in most countries of heavy concentration in primary and secondary industries maximum incomes are likely to be attained by decreasing occupational concentration in agricultural pursuits and increasing it relatively more in tertiary. For example, in the countries of north-western Continental Europe—The Netherlands, France, Germany, Czechoslovakia, Austria, Denmark, Sweden, and Norway—an average per capita income of about \$300, associated with 25 percent in primary occupations (and the balance equally divided between secondary and tertiary), would be increased about \$100, or 33 percent, if the agricultural propor-

CHART 4

Relation of Percentage of Labor Force Engaged in Primary, Secondary, and Tertiary Occupations and Per Capita Income United States, 1939

1. Maine, N.H., Vt., Mass., Conn., R.I., N.Y., N.J., Md., Pa., Del., and W.Va.
2. Va., Ky., N.C., S.C., Ga., Fla., Ala., and Tenn.
3. (a) Miss., Ark., Kans., Mo., Ill., Ind., and Ohio
(b) Mich., Wis., Minn., and Iowa
4. La., Okla., Tex., N.M., Ariz., Colo., Nebr., Utah, Calif., Wash., and Oreg.
5. Nev., Idaho, Mont., N.D., S.D., and Wyo.



tion were reduced to 15 percent and the balance divided equally between secondary and tertiary occupations; but if the entire shift from primary were directed into tertiary occupations there would be an additional increase in per capita incomes of \$40-50. This is about what our analysis of eastern and southern United States shows.

In this analysis for western Europe, the depressive effect on income of over-concentration in fuel mining, already observed in West Virginia, is striking. Relatively low per capita incomes in both Belgium and the United Kingdom seem to be associated with the relatively large proportion of their labor force in coal mining, an industry that should probably be classed as primary, for it has an effect on the general level of income more nearly like that of agriculture than general manufacturing and construction.

If we compare the per capita incomes of countries in regions not necessarily contiguous—the United States, Canada, Australia, New Zealand, the United Kingdom, and Europe as a whole—it is also clear that, aside from the differences in the proportion in primary industries, the countries having higher per capita incomes are those that have a relatively larger proportion of their labor force in tertiary than in secondary industries. This is particularly true of the United States, Canada, Australia, New Zealand, Ireland, and in less degree, the United Kingdom.

While the illustrations for the United States and other countries indicate, in general, a higher per capita income in areas where a larger proportion of the working population is engaged in tertiary occupations, it cannot be argued that a shift out of agriculture should everywhere be directed into tertiary occupations alone. The tertiary occupations depend in no small degree upon a large scale specialized or manufacturing economy. As Colin Clark pointed out in *Conditions of Economic Progress*, a balanced economy progresses to the highest income level in three steps: first, the intensification of primary production; second, the expansion of manufacturing industries; third, the opening of tertiary pursuits to service the rest of the economy. If agricultural countries, such as China and India, follow the experience of the United States from 1850 to 1900, large-scale

growth would tend to be concentrated in secondary establishments first, shifting later to tertiary occupations. However, the lag between secondary and tertiary development could undoubtedly be considerably shortened.

3 LIMITS TO INDUSTRIALIZATION

The foregoing evidence of a universal tendency toward higher per capita incomes where smaller proportions of working populations are engaged in agricultural pursuits, raises the question, how far can the reduction in the agricultural proportion go? As we have seen, it can go to practically zero in any area that can depend on outside sources for food and other farm products. Indeed, every large urban industrial center is an illustration of this obvious fact. How far can the industrialization process go in a country that wants to be relatively self-sufficient in farm products or that does not have the advantage of nearness to agricultural production, as do the New England and other states? It would seem that England might be self-sufficient in food if 12 to 15 percent of its working population were employed in farming, instead of 6 percent. While this is a rough calculation, it is corroborated by the current and prospective experience in the United States, where only 18 percent of the working population is engaged in agriculture and the net agricultural export balance is small. In view of the long-time trend in agricultural efficiency, it is quite likely that in the 1950's 12 to 15 percent of the total working population will suffice to produce the farm products required for full employment.

From these two bits of evidence it may be tentatively inferred that with modern production methods, scientific use of soils, mechanization, higher productivity from more productive plants and animals, the normal limit of industrialization might be to have one-seventh or one-eighth of the working population in farming.

This limit, however, is probably too distant an objective for countries that are still 70-80 percent agricultural. On the other hand, some of the countries or states that have industrialized to a proportion below 12-15 percent in agriculture may have reached diminishing social as well as economic returns, especially where concentration in single extractive or manufacturing

industries has been too great. On the principle of the 'golden mean' it may be that highly agriculturalized countries should set their industrialization goals at about 40 percent of their working population in agriculture.

4 CONCLUSIONS

From the selected material presented here it is obvious that if a United Nations effort were made to bring about an improvement in living standards, leading to a better balance between agricultural and industrial occupations, the main effort should be focused in certain areas and consideration given to particular secondary industries that yield abnormally low earnings. If, over a period of years, policies that tended to bring the agricultural proportion of industrially backward countries down to 40 percent were pursued, the regions involved would be eastern and southern Europe, much of Africa, much of Latin America, and India and China. Taking present population, most of the occupational shifts would be in China (about 70 million), India (about 27 million), USSR (about 13 million), Poland (about 2 million), Japan (about 2 million), and Latin America (about 2 million).

The aggregate number that economic programs would shift out of farming is large, for over 60 percent of the world's labor force is engaged in agriculture. Lowering this proportion 20 points—bringing the world's agricultural proportion down to 40-45 percent in the course of the first decade after the war—would mean an aggregate shift of 150-175 million agricultural laborers, if the total world population did not grow. However, current records of population trends indicate that by 1955 the world's population, instead of being 2.2 billion (as of 1940), could increase to 2.5 billion, or roughly 16 percent in 15 years (Table 6).

At the present ratio between working and total population, about 40 percent, it is conceivable that by 1955 140 million people would be added to the labor force, chiefly in the highly agriculturalized areas of Asia, Africa, Latin America, and eastern Europe. That is, by 1955 the world's agricultural labor force may be about 50 million larger than it was in 1940.

The vast possibilities of a United Nations industrialization

TABLE 6
World Population Estimates, 1940 and 1955

| | POPULATION IN MILLIONS | | % CHANGES 1940-55 |
|---------------------|---------------------------|-------|----------------------|
| | 1940 | 1955 | |
| America | 275 | 336 | 12 |
| Europe, excl. USSR | 400 | 419 | 5 |
| USSR | 171 | 216 | 26 |
| Asia, excl. USSR | 1,184 | 1,376 | 16 |
| Australia & Oceania | 11 | 13 | 25 |
| Africa | 159 | 185 | 16 |
| Total | 2,200 | 2,545 | 16 |

Frank W. Notestein, *Population: The Long View*, in Theodore W. Schultz, Editor, *Food in World Affairs, Part II, Population* (University of Chicago Press, 1945).

effort can be indicated by noting what would happen to per capita and total incomes if we assumed some arbitrary goal. Suppose our over-agriculturalized states shaped their rehabilitation and economic programs toward having only 30 percent in agriculture. The 1939 per capita income of the 19 states that exceed this percentage is \$330. The assumed goal would mean an average income of \$390, an increase of 18 percent. If the shift were directed entirely into tertiary industries, the increase would be more nearly 25 percent.

For the rest of the world, particularly for the under-industrialized and heavily populated areas, the possible economic gain is far greater. Suppose that the economies of all European and Asiatic countries having more than 40 percent in agriculture were rehabilitated, developed, and occupationally readjusted down to that proportion and those of the Western Hemisphere countries down to 30 percent. In the 20 countries concerned, the average per capita income (1925-34) was about \$70. The marked degree of industrialization suggested could raise per capita income about 170 percent, to \$190; and if in selected areas the shift could be directed entirely into tertiary industries, the increase could be as much as 200 percent. As the population of these countries is 1.25 billion, such an increase in per capita incomes would add nearly \$150 billion to the world's income, estimated to have been about \$250 billion in 1925-34. This increase would be shared chiefly by China, India, and Russia. World income would, in fact, be even greater, for

population would increase fully 10 percent if the hypothetical adjustments were effected during one decade.

These rough computations should suffice to emphasize these conclusions: (1) opportunities for raising living standards exist everywhere, at home and abroad; (2) industrialization, with considerable improvement in efficiency, can do a great deal more than it has for people who are tied to the land, enabling them to produce food and other agricultural raw materials for themselves and for other countries; (3) the progress of industrialization is of course largely up to the countries concerned, but it could be greatly speeded up by international cooperation in capital and managerial assistance; and (4) the large gains in income that would accrue to the under-industrialized countries and the accompanying increase in demand for goods and services of other countries, would, under almost any stable international circumstances, spread out to benefit all countries.

