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## The Anatomy of Prices, 1890-1940

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Most of the goods produced in a modern economic system enter into exchange. Goods produced by one group are sold to other groups, for further production or for consumption. The economic system includes a great number of such producing groups; the exchange of goods among them constitutes, in the United States, a vast volume of internal trade.

The terms of exchange, by which physical units of goods and services produced are traded for physical units of goods to be consumed and services to be utilized, are not those of simple barter, with physical goods set against physical goods. These terms are measured by the prices received for goods sold in relation to the prices paid for goods purchased. Since, for any producing group, each category may include a diversity of goods, terms of exchange are further clouded, and the physical realities so obvious in a barter system are hidden behind a screen of varied price relations. Yet it is these physical realities that determine the relative well-being of economic producers.

Over time the terms of exchange among economic groups are subject to variations, which are reflected in alterations in the unit prices received for goods produced and services rendered and in the prices paid for goods and services purchased. Of course, price shifts by themselves do not completely define alterations in terms of exchange. The effort and time needed to produce a given good may change; there may be variation in the efficiency of a good as an instrument of production or in its usefulness in consumption (e.g., the contribution of an automobile tire in miles of service). But when variations in price-derived terms of exchange are not offset by such changes in real costs or in utility, these variations reflect true alterations in economic status. Back of such variations may lie modifications of supply conditions, changes in consumption habits, or major swings in monetary values to which there are lagging adaptations by different producing and consuming groups. Under these circumstances the real terms of exchange among groups will be altered.

Such alterations may be recurrent in character, associated with cyclical swings in general business, or they may reflect enduring shifts in economic relations. Cyclical alterations in the terms of exchange constitute one of the most important aspects of the rhythm of business activity; for cyclical changes in production and in employment are related both causally and consequentially to changes in the ratios between the physical quantities of goods bought and sold by various economic groups. Non-recurring changes in exchange relations may be brought about by cataclysmic movements or by slowly acting secular forces. They accompany basic alterations in the use of productive resources and in the character of the goods desired by consumers at large.

When we take a short-term view of economic changes it is difficult to dissociate temporary cyclical shifts in domestic exchange relations from the enduring modifications that reflect evolutionary changes in the economy. The purpose of this *Bulletin* is to trace certain persisting alterations in the terms on which given producing groups exchange their products for other goods and services. Knowledge of underlying tendencies thus modifying the anatomy of prices will enable us more intelligently to interpret cyclical movements and to appraise the contemporary price situation. From existing price records such secular changes cannot be traced with complete accuracy for any group, for recorded price quotations do not cover all exchange transactions. We note below some qualifications to be borne in mind in the interpretation of present results.

The scheme of presentation is designed to reveal some of the long-term alterations in price relations and in physical terms of exchange in the United States over the last half century. Where possible, annual measurements have been averaged for selected business cycles, the averages running from the trough of one cycle to the trough of the next. For example, we may compare the relative prices of raw and manufactured goods in the 1933-38 cycle, employing averages dur-

ing the 1912-14 cycle as base. In other cases, we compare prices in years that mark approximately the same phases of different cycles. The year 1937, most of which was characterized by cyclical expansion, may fairly be compared with 1919; or 1933, a year of cyclical depression, may be set against 1914.<sup>1</sup>

#### I GENERAL CONSPECTUS OF CHANGES IN THE PRICE STRUCTURE, 1891-94 TO 1933-38

Fundamental changes in the American economy during the last fifty years—changes in the character and quality of goods produced and consumed, in techniques of production and in production costs, in household budgets and their allocation—are barriers to the accurate measurement of shifting exchange relations. Broad and enduring movements may be defined with acceptable precision, however. Price trends in the various markets represented in Table 1 reveal certain underlying tendencies and some of the major structural changes that have characterized the industrial development of this country since the early '90's.

The advances in the five elements in Section A were remarkably uniform during the two decades preceding the World War. From the cycle of 1891-94 to that of 1912-14 they were within a narrow range—from 32 per cent in wholesale prices to 42 per cent in hourly earnings of manufacturing labor. During the next quarter century widely divergent movements occurred. Increases ranged from 13 per cent in wholesale prices to 157 per cent in hourly earnings in manufacturing industries. Between these extremes lie the advances in living costs, construction costs, and per capita earnings of manufacturing labor. Comprehensive data relating to other major elements of the economy would of course add details to this general picture. These details would undoubtedly confirm the impression of fairly uniform movements prior to 1914, of widely divergent changes thereafter. The measurements cited summarize bare observations; they do not reveal the factors behind the shifts noted, or the consequences. But the evidence of an extraordinary reversal of pre-War tendencies and of accompanying alterations in the structure of prices is impressive.

It is possible to examine in detail one of the elements cited in Section A of Table 1. Price movements occurring among various classes of commodities, at wholesale, are defined by the index numbers in Section B.

<sup>1</sup> In thus selecting certain years as bases or reference points, we do not assume that the price or income relations prevailing at these times were normal, desirable, stable, or better in any way than those prevailing at other times. They are used here because of their convenience for reference purposes, in defining terms of exchange and secular alterations in trading relations. No normative significance attaches to these base periods.

TABLE 1. Structural Changes as revealed by Price Trends, 1891-94 to 1933-38

#### A PRICE TRENDS IN VARIOUS MARKETS

	1891- 1894	1912- 1914	1912- 1914	1933- 1938
Wholesale prices (BLS)	100	132	100	113
Cost of living, industrial workers	100	136	100	142
Construction costs	100	137	100	170
Per capita earnings, mfg. labor	100	134	100	183
Hourly earnings, mfg. industries	100	142	100	257

#### B PRICE TRENDS OF CLASSES OF COMMODITIES AT WHOLESALE \*

Raw materials	100	139	100	108
Mfd. goods	100	114	100	129
Consumers' goods	100	117	100	130
Raw	100	122	100	116
Processed	100	117	100	132
Producers' goods	100	122	100	117
Raw	100	143	100	106
Processed	100	110	100	127
Intended for human consumption	100	123	100	95
Capital equipment and construction	100	122	100	139
Raw American farm products	100	134	100	100
All other products	100	118	100	127

SOURCES: Cost of living, industrial workers: 1891-1914, P. H. Douglas, *Real Wages in the United States, 1890-1926*; 1914-38, U. S. Department of Labor, Bureau of Labor Statistics. Construction costs: 1891-1914, J. R. Riggleman; 1914-38, American Appraisal Company. Per capita earnings, manufacturing labor: 1891-1924, P. H. Douglas, *ibid*; 1924-38, Department of Labor. Hourly earnings, manufacturing industries: 1891-1924, P. H. Douglas, *ibid*; 1924-33, National Industrial Conference Board; 1933-38, Department of Labor.

\* The group index numbers in Section B are comparable among themselves, but are not directly comparable with the Bureau of Labor Statistics index of wholesale prices in Section A. The methods of computation are not the same for the wholesale price measurements in Sections A and B. The National Bureau index of wholesale prices, of which the groups in Section B are elements, is 120 for 1912-14 (on the 1891-94 base), 122 for 1933-38 (on the 1912-14 base).

The first two entries represent a division of all commodities into raw materials and manufactured goods. The two decades preceding the World War were marked by advances in prices among both classes of goods, but raw materials rose at a substantially higher rate. Relatively, the per unit worth of materials advanced, that of fabricated goods declined. The quarter century following 1914 reversed these trends; raw materials showed only an 8 per cent price rise from 1912-14 to 1933-38, while processed goods rose 29 per cent. The cost of the services of agents of fabrication, which had been declining, relatively, prior to 1914, advanced after 1914.

We next classify all commodities as producers' goods (i.e., goods, either raw or processed, that are not in shape for final consumption) or consumers' goods (goods, either raw or processed, that are ready for human consumption or use, without further fabrication). There was no pronounced divergence in the price movements of these classes of goods from 1891-94 to 1912-14; the net effect of the changes of this period was some enhancing of the relative value of producers' goods, some cheapening of consumers' goods. In the following quarter century a wider but reverse shift occurred. Consumers' goods rose in price, relatively, and producers' goods declined. The evidence indicates an advance in relative price at the terminal stage of the productive-distributive process, a relative cheapening at the producers' goods stage. (Quality changes may have served in some degree to offset these price shifts.) Raw and processed consumers' goods and similar classes of producers' goods reflect the price shifts already noted for these categories. The reversal in the price trends of raw and manufactured goods that coincides roughly with the outbreak of war in 1914 was particularly sharp among producers' goods.

We learn more of the underlying nature of these price movements if we break producers' goods into (a) goods intended, after fabrication, for direct use by consumers (e.g., raw cotton, for use in clothing) and (b) goods intended for use in capital equipment and construction (all forms of construction are here lumped). These two groups moved together from 1891-94 to 1912-14, but diverged sharply after 1914. Capital equipment and construction materials rose 39 per cent in price from 1912-14 to 1933-38, while producers' goods intended for human consumption fell 5 per cent. Although final consumers' goods advanced in relative price during the post-War decades, the prices of such goods at the earlier stages of the productive process declined, relatively. It was the heavier materials going into construction, and intended for instrumental use in capital equipment, that pushed up prices for the general class of producers' goods during the last quarter century.<sup>2</sup>

<sup>2</sup> The 'capital equipment and construction' category includes, in the main, goods entering into such equipment or employed in construction, rather than finished machines or structures. Quotations on complete machines and finished structures are not subject, usually, to standardized notation, over time. However, the basic elements of capital goods and industrial structures are included in the index cited above.

Confirmatory evidence concerning price changes in this field is provided by quoted prices and mill yields on important steel products. Thus the *Iron Age* composite price of eight representative finished steel products shows an advance from 1912-14 to 1933-38 of 40 per cent. The U. S. Steel Corporation

Finally, all raw products of American farms are thrown into one class, all other goods (including processed farm products) into another. Farm products rose, relatively, prior to 1914. From 1912-14 to 1933-38 raw farm products showed no net price change, while the average prices of all other commodities advanced 27 per cent. Here is the third major shift to be noted.

These comparisons reveal certain striking reversals of trend within the general system of wholesale prices. Manufactured goods, which had been cheapened relatively to raw materials from the early 1890's to 1912-14, rose in real worth thereafter. Goods in shape for final consumption, which had in the period prior to 1912-14 fallen in per unit value, relatively to producers' goods, advanced after 1914. Raw agricultural products advanced in relative worth per unit prior to 1912-14, lost substantially thereafter. These movements call for closer investigation.

## II TRADING RELATIONS OF PRIMARY PRODUCERS

We now consider the varying fortunes of three major producing groups. Our first concern is with primary producers. In Table 2 we treat producers of raw ma-

TABLE 2. Terms of Exchange between Primary Products and Other Goods, 1891-94 to 1933-38

*Number of physical units received by primary producers in exchange for a constant physical quantity of raw materials*

	1891- 1894	1912- 1914	1912- 1914	1924- 1927	1933- 1938
Raw materials exchanged for:					
Mfd. goods, at wholesale	100	122	100	93	84
Consumers' goods, at wholesale	100	119	100	90	83
Consumers' goods, processed, at wholesale	100	119	100	91	82

terials of all types as a single class. The entries measure shifts in the trading relations of this group with three other producing groups, in wholesale markets. The record for the two decades prior to the World War is the familiar one of rising values of raw materials, cheapening of manufactured goods in general and of consumers' goods in particular. For a constant number of physical units the primary producer received

index of composite mill net yield, based on amounts received, per ton, after freight, by U. S. Steel Corporation subsidiaries, on a representative constant assortment of all principal products, increased 48 per cent over the same period. (This figure is derived from the index appearing in the *U. S. Steel Corporation T. N. E. C. Papers*, II, 94, published by the U. S. Steel Corporation, 1940.) The general level of wholesale prices (Bureau of Labor Statistics index) advanced 13 per cent in this period.

in 1912-14 from 19 to 22 per cent more of other goods, in volume, than in 1891-94. The next quarter century brought a reversal. The primary producer received in 1933-38 from 16 to 18 per cent less in physical terms than he had received in 1912-14, in exchange for a constant quantity of raw materials. (That this was a persistent tendency, not merely a reflection of special conditions in 1933-38, is indicated by the measurements for the cycle 1924-27.) This shift in the relative values of primary goods and of semi-processed and finished goods is one of the fundamental facts of recent economic history.

We shall learn more about this movement if we trace the changes affecting important classes of primary producers. The price movements of raw mineral products for the period preceding the World War parallel those of all raw materials. There was a sustained and considerable advance in the average unit value of raw minerals, relatively to manufactured goods and consumers' goods. During the quarter century following, however, there was no such net decline in the relative worth of raw mineral products as there was for the general group of raw materials. To be sure, there was a drop of some 5 per cent to the middle '20's, but during the cycle 1933-38 raw mineral products exchanged for the several classes of goods noted in Table 3 on approximately the same terms as in 1912-14.

TABLE 3. Terms of Exchange between Raw Mineral Products and Other Goods, 1891-94 to 1933-38

*Number of physical units received by raw mineral producers in exchange for a constant physical quantity of raw minerals*

	1891-1894	1912-1914	1912-1914	1924-1927	1933-1938
Raw mineral products exchanged for:					
Mfd. goods, at wholesale	100	117	100	97	101
Consumers' goods, at wholesale	100	114	100	94	100
Consumers' goods, processed, at wholesale	100	114	100	95	98

This evidence indicates general identity of fortunes for raw mineral products and raw farm products (the other major class of raw materials) in the years prior to 1912-14, and divergence thereafter. The actual trading relations of farmers are shown in Table 4. Farm producers enjoyed a substantial gain in the relative worth of their products during the two decades prior to the World War, and suffered a devastating decline after the War. There have been ups and downs in the intervening years, but since 1914 the quantity of physical goods that the farmer could secure in exchange for a constant physical amount of his own products declined more than 20 per cent.

TABLE 4. Terms of Exchange between Raw Farm Products and Other Goods, 1891-94 to 1933-38

*Number of physical units received by farmers in exchange for a constant physical quantity of raw farm products*

	1891-1894	1912-1914	1912-1914	1924-1927	1933-1938
Raw American farm products exchanged for:					
All other goods, at wholesale *	100	114	100	89	78
Consumers' goods, processed, at wholesale	100	115	100	87	75

\* I.e., non-agricultural raw materials plus semi-finished and finished goods of all types.

Farmers do not, in general, buy in wholesale markets, nor do the prices at which their products are quoted on the commodity exchanges correspond precisely with the prices they actually receive. Broad movements in the actual buying and selling prices of economic groups are, of course, reflected in wholesale prices, but we should like measurements, more direct than those given above, of the terms on which producing groups actually exchange their products. For recent years there are available records of prices actually received by farmers and of the prices they pay, at retail, for the goods they buy. Ratios based on these prices are given in Table 5; they tell much the same story as do wholesale prices. Since 1912-14, when the trading position of farmers was at a peak after a long period of steady gain,

TABLE 5. Trading Relations of Farmers, 1912-14 to 1933-38

*Number of physical units received by farmers in exchange for a constant physical quantity of raw farm products*

	1912-1914	1924-1927	1933-1938
Raw American farm products, at the farm, exchanged for:			
Goods used by farmers for living and production	100	94	81
Goods used by farmers for living (family maintenance)	100	91	82

there has been a net loss of almost 20 per cent in the physical volume of goods for which a stated quantity of farm products could be exchanged.<sup>3</sup>

<sup>3</sup> This statement takes no account of changes in the productivity of labor in the production of farm products and of the goods for which such products are exchanged, or of possible changes in the serviceability of the goods entering into such exchanges. Productivity advances in agriculture have doubtless been greater since 1914 than during the preceding quarter century, but it is probable that they have lagged behind the productivity gains of industry. As compared with an advance of 50 per cent in manufacturing productivity between 1914 and 1929, estimates of productivity in agriculture indicate gains of approximately 20 per cent from 1913-15 to 1928-30. Quality changes have been less important among agricultural than among industrial products.

## III TRADING RELATIONS OF FABRICATORS

Relations between primary and secondary producers may be expected to change with the development of an economy, as extractive margins are pushed out, productive techniques in manufacturing industries improve, and the character of national production changes. We pass now to a survey of the changing fortunes of fabricators.

Changes in the worth of a fixed quantity of manufactured goods, in exchange for raw materials, are indicated by the entries in the first line of Table 6. The story is, of course, the reverse of that of primary producers. Prior to the World War the terms of exchange moved against manufacturers, thereafter they moved favorably to manufacturers. A loss of 18 per cent, between 1891-94 and 1912-14, in the quantity of raw materials received in exchange for a fixed quantity of manufactured goods was succeeded by a gain of 20 per cent between 1912-14 and 1933-38.

The remaining entries in Table 6 define shifts in the terms of exchange between manufactured goods of various types and corresponding classes of raw and semi-finished goods. These are all of the same type. Each entry relates to the hypothetical exchange of manufactured products of a particular kind for a corresponding group of raw materials (or raw and semi-processed goods). There is not perfect comparability of all the raw and manufactured groups set against one another, but the measurements utilized may be accepted as fairly representative of the groups in question.<sup>4</sup>

In all eight categories (each including raw and processed goods of a common type) the relative worth of manufactured goods declined from 1891-94 to 1912-14. A constant quantity of manufactured farm products exchanged for 100 units of raw farm products in 1891-94, but for only 88 units in 1912-14. For mineral products the ratio fell to 77, i.e., the purveyor of raw minerals could in 1912-14 obtain for 77 units the quantity of manufactured mineral products for which he gave 100 units in 1891-94. For manufactured consum-

<sup>4</sup>The comparison must not be taken to mean that identical products in raw and processed form make up each pair of entries. We come closest to a direct comparison of similar classes of goods in raw and processed form when we set manufactured consumers' goods against producers' goods intended for human consumption, but even here the groups are not marked by item-by-item comparability.

We should note, of course, that comparison of the prices of raw materials and manufactured goods does not involve independent economic goods. The price of a manufactured product includes the cost of the raw materials entering into it. But the comparison is significant, for actual market operations involve just such interchanges as are here represented. In later sections we avoid the overlapping of raw material costs and prices of fabricated goods by dealing with 'value added per unit' in manufacture, as well as with the final selling prices of manufactured goods.

TABLE 6. Terms of Exchange between Various Classes of Manufactured Goods and Corresponding Classes of Raw and Semi-Processed Goods, 1891-94 to 1933-38

*Number of physical units received by various classes of manufacturing producers in exchange for constant physical quantities of their own products*

	1891-1894	1912-1914	1912-1914	1924-1927	1933-1938
Mfd. goods, general, exchanged for raw materials, at wholesale	100	82	100	107	120
Mfd. products of American farms exchanged for raw products of American farms	100	88	100	115	133
Mfd. commodities not originating on American farms exchanged for raw materials not originating on American farms	100	77	100	103	105
Mfd. crops from American farms exchanged for raw crops from American farms	100	88	100	110	134
Mfd. animal products from American farms exchanged for raw animal products from American farms	100	91	100	118	132
Mfd. mineral products exchanged for raw mineral products	100	77	100	105	105
Mfd. producers' goods exchanged for raw producers' goods	100	77	100	109	119
Mfd. consumers' goods exchanged for producers' goods destined for human consumption	100	95	100	120	139

ers' goods, as a broad class, the index fell from 100 in 1891-94 to 95 in 1912-14.

Quite different is the record of changes from 1912-14 to 1933-38. With no exceptions manufactured goods increased in worth, relatively to corresponding classes of raw materials.<sup>5</sup> A constant quantity of manufactured goods made from farm products would exchange for 100 units of raw farm products in 1912-14, for 133 units of raw farm products in 1933-38. The lowest figure for 1933-38 is 105, for mineral products, and for non-farm products in general. The greatest change occurred in the relations between processed consumers' goods and producers' goods intended for human consumption. A fixed quantity of manufactured consumers' goods of this type would exchange in 1912-14 for 100 units of producers' goods of the same type; in 1933-38 the same quantity of processed consumers' goods would exchange for 139 units of producers' goods. We are dealing here, of course, with a class of

<sup>5</sup>Timber products would probably constitute an exception, were adequate data available for raw and semi-processed forest products (including lumber) and for various finished products made of wood. Lumber prices have advanced sharply since 1914.

goods marked by major improvements in quality over the last quarter century, and by corresponding increases in the degree of fabrication to which the raw materials that go into them are subjected. Some part of the advance in the exchange value of finished goods of this type must be attributed to such quality changes.<sup>6</sup>

The more detailed evidence of Table 6 indicates that the advance in fabricational costs, with a corresponding increase in the exchange values of finished goods relative to raw and semi-finished goods, was general throughout the system of wholesale prices, and that, with few exceptions, the advance from 1912-14 to 1933-38 was more than sufficient to offset the relative declines of the preceding twenty years.

Direct comparison of the prices of manufactured goods and of raw materials may be supplemented by study of the actual compensation of agents of fabrication. The price of the manufactured good includes, of course, the cost of the materials that have gone into it. From Census records we derive measures of the realized selling prices of manufactured goods (as distinct from the quoted prices that enter into usual index numbers), and of 'value added per unit of manufactured product'. The latter is, in effect, the price paid for the services of fabrication, per unit of manufactured product. It may in turn be divided into labor costs and other costs, per unit of finished product. Measurements for selected years are given in Table 7. (The years selected are years of relative prosperity; effects of cyclical movements are thus minimized.)

Over the twenty years from 1899 to 1919, while the average selling price of manufactured goods (at the factory) was rising 149 per cent, material costs per unit advanced 164 per cent, and fabricational costs proper 119 per cent. (The inflated values of 1919 affect these entries, of course. However, the figures for 1909 give evidence of the same type of movement.) These records confirm the conclusions based on quoted prices, indicating a relative cheapening of manufactured products, a relative advance in the exchange value (per unit) of raw materials. From 1919 to 1937 material costs per

<sup>6</sup> Following are examples of the kinds of goods included in the two classes here compared. An examination of the list will suggest some of the reasons for the changes in relative values noted in the text.

*Producers' goods intended  
for human consumption*

wheat  
livestock  
cotton and wool  
pig iron  
copper

*Consumers' goods processed*

bread  
meats  
clothing  
tools  
sewing machines

TABLE 7. Changes in Realized Prices, Fabricational Costs and Productivity, Manufacturing Industries of the United States, 1899-1937<sup>1</sup>

All prices and costs are per unit of manufactured product

	1899	1909	1919	1919	1937
Realized price	100	120	249	100	60
Material costs	100	126	264	100	58
Fabricational costs	100	108	219	100	66
Labor costs	100	105	224	100	71
Other fabricational costs	100	112	215	100	62
Output per man or per man hour <sup>2</sup>	100	119	136	100	177

<sup>1</sup> These index numbers, based on Census data, were first derived in *Economic Tendencies in the United States*, 1932, Ch. III, V, VIII, and Ap. IV. For a description of these measurements and of the techniques employed, see *Economic Tendencies*, pp. 88-121.

<sup>2</sup> Output per man from 1899 to 1929, output per man hour from 1929 to 1937. In deriving output per man hour per capita production was divided by a series measuring average hours worked per week. This is based on records of the National Industrial Conference Board of actual hours per week in 1929-33 and similar records of the U. S. Bureau of Labor Statistics for 1933-7. The Conference Board series is adjusted to the BLS series on the basis of the average for 1933-37.

unit of manufactured goods declined 42 per cent, fabricational costs 34 per cent. Here is the same reversal noted in other records. After 1919 fabricational costs reversed the declining tendency of the preceding decades and advanced, relatively to material costs and to the selling prices of manufactured goods.<sup>7</sup> If we think of these movements in terms of physical exchanges, we may say that in 1899 agents of fabrication received, in exchange for their services in producing 100 units of manufactured goods, materials entering into 100 such units. In 1919, for the same contribution on their part, they would have received materials entering into only 83 units of manufactured goods. In 1937 agents of fabrication received materials entering into 114 manufactured units, as against 100 received in 1919 in exchange for the same volume of services. These figures are to be interpreted in the light of an advance in productivity of approximately 36 per cent between 1899 and 1919, of 77 per cent between 1919 and 1937.

<sup>7</sup> Changes in unit prices, costs, and productivity during years of cyclical depression tell the same general story.

	1904	1914	1914	1933	1904	1933
Realized price	100	116	100	95	100	110
Material costs	100	121	100	83	100	100
Fabricational costs	100	106	100	120	100	127
Labor costs	100	109	100	116	100	126
Other fabricational costs	100	104	100	123	100	128
Output per man, 1904-29, output per man hour, 1929-33	100	117	100	173	100	202

## IV MANUFACTURING LABOR

The trading relations of manufacturing employees with other producing and consuming groups may be measured in terms of commodities produced and sold or of time expended in production. These comparisons, like all such comparisons, are affected by changes in industrial productivity (measured with reference to number of workers employed or man hours worked) and in the quality of goods produced and consumed. No thoroughly satisfactory measures of variations in terms of exchange affecting labor are obtainable, but broad shifts may be traced with reasonable accuracy.

We first consider manufacturing labor as a producer of goods, treating the labor cost per unit of goods (i.e., wages paid per unit of goods produced) as the monetary reward. The entries in Table 7 indicate that unit labor costs advanced only 5 per cent from 1899 to 1909 while average selling price per unit was rising 20 per cent, and advanced 124 per cent from 1899 to 1919 while unit selling prices were rising 149 per cent. Before 1919 unit labor costs in manufacturing declined, relatively. From 1919 to 1937 unit selling prices declined 40 per cent, labor costs only 29 per cent. From 1914 to 1933, unit selling prices declined 5 per cent, and labor cost per unit advanced 16 per cent. Here is another aspect of the striking shift in relative price movements that occurred with the World War. Labor costs were among those elements of the price system that reversed a prolonged period of decline, starting an advance that has persisted, with some fluctuations, for over two decades.

Some of the characteristics of these movements may be brought out by tracing alterations in the terms of physical exchange. We assume that a constant quantity of goods produced by manufacturing labor<sup>8</sup> is exchanged for physical goods of various types (Table 8).

During the first two decades of this century the quantities of physical goods of various kinds, for which a fixed quantity of the physical products of manufacturing labor would exchange, declined from 5 to 27 per cent. During the eighteen years from 1919 to 1937 these movements were in general reversed. A constant amount of the physical products of manufacturing labor would exchange in 1937 for 19 per cent more finished manufactured goods, 25 per cent more of the raw materials going into manufactured goods, 26 per cent more of farm products. This means, of course, that

<sup>8</sup> Our measurements relate to the contribution of labor to a constant physical quantity of manufactured goods, as this contribution is measured by dollar payments to labor. The physical goods purchasable with these monetary rewards constitute the physical returns against which the supposedly unchanging physical contribution is set.

TABLE 8. Trading Relations of Manufacturing Labor, 1899-1937  
Output and its Physical Counterparts

*Number of physical units received by manufacturing labor in exchange for its contribution to a constant physical quantity of manufactured goods*

	1899	1909	1919	1919	1937
Contribution of manufacturing labor to a constant quantity of manufactured goods, exchanged for:					
Mfd. goods *	100	87	90	100	119
Raw materials entering into mfd. goods *	100	83	85	100	125
Raw farm products, at wholesale	100	75	73	100	126
Commodities in cost of living index	100	89	95	100	86

\* The measurements for these goods are derived from the *Census of Manufactures*. Measurements for manufactured goods and raw materials in preceding tables are derived from quoted prices in wholesale markets.

the prices of goods of these several types had risen less than had the labor cost of producing a unit of manufactured goods. Of one important category of commodities the reverse was true: for commodities entering into the cost of living of industrial labor, exchange relations had moved against manufacturing labor, with a 14 per cent decline.<sup>9</sup>

In the above comparisons we treat the unit of manufactured goods (or, rather, the service for which labor is paid in its production) as the unit of physical contribution. This is desirable for some purposes. But productivity in manufacturing industries has changed greatly over the period of our record. Equipment and organization have been improved, industrial skill has

<sup>9</sup> If we compare years of general business depression, we have the following record. The story is much the same, with a loss in the trading relations of manufacturing labor prior to 1914, substantial gains thereafter, except for commodities in the cost of living index.

*Number of physical units received by manufacturing labor in exchange for its contribution to a constant physical quantity of manufactured goods*

	1904	1914	1914	1921	1933
Contribution of manufacturing labor to a constant quantity of manufactured goods, exchanged for:					
Mfd. goods	100	94	100	121	122
Raw materials entering into mfd. goods	100	91	100	125	139
Raw farm products, at wholesale	100	95	100	160	154
Commodities in cost of living index	100	91	100	109	89



advanced.<sup>10</sup> A given amount of working time corresponded to a much greater output in 1937 than in 1899. In Table 9 we supplement the above comparisons by others in which the unit of reference, on the contribution side, is an hour of labor.

TABLE 9. Trading Relations of Manufacturing Labor, 1899-1937  
Labor Time and its Physical Counterparts

Number of physical units received by manufacturing labor in exchange for a constant amount of labor time

	1899	1909	1919	1919	1937
A constant amount of labor time * exchanged for:					
Mfd. goods	100	103	123	100	219
Raw materials entering into mfd. goods	100	98	116	100	228
Raw farm products, at wholesale	100	88	100	100	232
Commodities in cost of living index	100	104	131	100	157

\* The index of hourly earnings employed in these calculations is based on: U. S. Bureau of Labor Statistics records for 1933-37; National Industrial Conference Board records for 1927-33 (adjusted to the BLS series on the basis of the average for 1933-37); P. H. Douglas' records, 1899-1927, spliced to NICB series in 1927 (see P. H. Douglas, *Real Wages in the United States, 1890-1926*, Houghton Mifflin, 1930; P. H. Douglas and F. T. Jennison, *The Movement of Money and Real Earnings in the United States, 1926-28*, Studies in Business Administration, Vol. 1, No. 3, University of Chicago, June 1930).

From 1899 to 1909 hourly wage rates in manufacturing industries rose, and although the gains were modest, there was a definite improvement in the terms on which labor time could be exchanged for commodities in general. The quantity of physical goods and services represented in the cost of living index for which an hour of labor time could be exchanged increased 4 per cent. For farm products at wholesale, prices rose more rapidly than wage rates, and the exchange ratio declined. War time advances in wage rates carried the terms of exchange sharply up, to the advantage of manufacturing labor. The value of labor time measured in terms of commodities in the cost of living index (the most significant for our present purpose) advanced 31 per cent during the two decades from 1899 to 1919. The next eighteen years brought even greater gains. They more than doubled the quantity of manufactured goods, raw

<sup>10</sup> No attempt is here made to examine the factors responsible for the observed changes in industrial productivity. Improvements in business organization, advances in technical knowledge and in industrial skills, and pressure toward increased mechanization growing out of wage increases all play their parts, which have varied in relative importance from time to time. It is probable that substantial advances in wage rates have in recent years provided a strong stimulus to mechanization in some industries.

materials entering into manufactured goods and raw farm products (at wholesale) commanded by a fixed amount of labor time. These categories of goods are important to one interested in exchange relations in the economy at large, but they do not represent direct exchanges open to labor. The one comparison that does represent such a direct exchange is that with the cost of living index. From 1919 to 1937 this ratio moved to the advantage of labor. A given number of hours of manufacturing labor would in 1919 exchange for 100 units of commodities entering into the cost of living index; the same amount of labor time would in 1937 exchange for 157 such commodity units.<sup>11</sup>

#### V INCIDENCE OF PRODUCTIVITY GAINS

Among the more important of the factors that affect relations among producing and consuming groups are changes in productivity.<sup>12</sup> A comparison of price quo-

<sup>11</sup> Comparison of years marked by cyclical depression shows the same general trend since the early years of the century.

Number of physical units received by manufacturing labor in exchange for a constant amount of labor time

	1904	1914	1914	1921	1933
A constant amount of labor time exchanged for:					
Mfd. goods	100	112	100	137	209
Raw materials entering into mfd. goods	100	107	100	142	240
Raw farm products, at wholesale	100	113	100	181	261
Commodities in cost of living index	100	108	100	123	152

<sup>12</sup> The term *productivity* is perhaps open to misinterpretation. For purposes of comparison it is useful to express changes in the aggregate output of manufacturing industries in ratio to changes in certain standard quantities. Thus the standard of reference might be number of manufacturing establishments, horsepower used in production, number of dollars invested in capital equipment, number of men employed or of man hours worked. Such ratios may be thought of as measures of productivity. However, we should not assume that exclusive responsibility for observed changes in aggregate output attaches to the factor represented by any particular standard of reference. Changes in production are resultants of the interplay of organizational, managerial, equipment, and labor factors, operating jointly in the productive unit.

Even for a single establishment the productivity measurement is an average, reflecting the combined resultant of the application of diverse skills, utilizing various tools, to widely different types of materials. In default of detailed information about the effectiveness of effort applied to specific tasks under controlled conditions, such an average has its value, but it suffers from all the defects of averages in general. This limitation is more marked, of course, when the average is for an entire industry, or for the heterogeneous activities that constitute manufacturing enterprise as a whole. Such an average provides but a crude measure of the play of the thousands of specific factors that affect the fruitfulness of productive effort in fabricational processes.

tations tells nothing concerning alterations in the efficiency of human effort in the extraction of raw materials, the growing of farm products, the manufacture and transportation of goods. It is not possible to take account of such changes in all areas of activity, but for manufacturing industries we have measurements sufficiently accurate to throw light on the broad movements of recent years, though inadequate for refined comparison. Utilizing these productivity measurements we are able more effectively to interpret certain of the alterations in trading relations noted above.

Table 10 traces changes with reference to the fortunes of producers. It shows increments in output per worker (or per man hour worked), and corresponding changes in the real returns of manufacturing producers. (We take account below of consuming groups.) Changes in the real returns of these producers are estimated by dividing the aggregate monetary returns, of the groups named, by the number of wage earners employed (or man hours worked) and deflating the quotients by appropriate indexes of the prices of goods for which the money returns of these groups were expended.<sup>13</sup> The period covered extends from 1899 to 1937. For the present purpose we use 1914 as one of the years of comparison, although it was a year of depression and the other years included were years of relative prosperity. The year 1914 was, however, something of a turning point in industrial trends; the influence of secular factors is greater, for the movements we here deal with, than is that of cyclical forces.

During the fifteen years prior to 1914 productivity increased approximately 30 per cent. No corresponding rewards accrued to the producing groups. The real rewards, per manufacturing worker, advanced less

<sup>13</sup> The deflator, for wage earners, is the index of cost of living for industrial workers. For the ownership and management group (a mixed class of salaried workers, shareholders, bondholders, government, as tax collector, and other miscellaneous claimants) the deflator is an index secured by averaging index numbers of living costs (with a weight of 2), wholesale prices (weight of 2) and the prices of finished capital goods (weight of 1). The two indexes are combined in securing the measurements for all agents of fabrication, with weights based on the importance of each group. These deflators are to be considered only as rough approximations to the desired measurements.

Deflator for:	1899	1914	1914	1929	1929	1937
All agents of fabrication.	100.0	131.9	100.0	163.5	100.0	87.7
Wage earners	100.0	136.3	100.0	170.1	100.0	84.7
Ownership, management, and other claimants	100.0	128.5	100.0	158.3	100.0	89.5

TABLE 10. Changes in Productivity and in the Fortunes of Manufacturing Producers, 1899-1937<sup>1</sup>

	1899-1914	1914-1929	1929-1937
Change in output per worker or per man hour worked <sup>2</sup>	+29.6	+49.7	+24.1
Changes in real returns per worker employed or per man hour worked of:			
All agents of fabrication, mfg. plants	+2.8	+51.9	+17.8
Wage earners	+0.7	+31.3	+34.9
Ownership, management, and other claimants <sup>3</sup>	+4.5	+67.5	+8.2

<sup>1</sup> This table and Table 11 are extensions, with slight revisions, of tables given in *Prices in Recession and Recovery*, National Bureau of Economic Research, 1936, pp. 443, 447. That volume contains a fuller discussion of the concepts on which this analysis is based and of the limitations attaching to the various measurements.

<sup>2</sup> For 1899-1914 and 1914-29 the figures are on the basis 'per worker employed', for 1929-37 on the man hour basis. Records of hours of employment are from the National Industrial Conference Board for 1929-33, from the U. S. Bureau of Labor Statistics for 1933-37 (the NICB series is adjusted to the BLS series on the basis of the average for 1933-37).

<sup>3</sup> The residual sum accruing to 'ownership, management, and other claimants' covers a heterogeneous group of charges and services. It includes all elements of 'value added by manufacture', other than wages. Overhead costs of all sorts—interest, rent, taxes, executive salaries—are included, as well as profits.

than 1 per cent for the wage earning groups,<sup>14</sup> 4.5 per cent for ownership, management, and other claimants. The rewards of advancing productivity did not accrue, except in minor degree, to agents of fabrication. The figures in the second column indicate a remarkable shift during the fifteen years from 1914 to 1929. Productivity advanced almost 50 per cent with a concurrent increase of 52 per cent in the real returns of agents of fabrication. Producing groups in manufacturing industries reaped rewards, in increased real income, exceeding the apparent gain in productivity. These gains were unequally divided between the two divisions. The real returns of wage earners, per worker employed, advanced 31 per cent, those of ownership, management, and other claimants 67 per cent.

From 1929 to 1937 productivity (here measured in terms of output per man hour) increased 24 per cent. The real returns of all fabricational agents, per

<sup>14</sup> The worker, not the man hour worked, is the unit of measurement for this period. No accurate data on hours worked are available for pre-War years. On the basis of such figures as we have, we may estimate that productivity per man hour advanced some 35-39 per cent from 1899 to 1914, and that the real rewards of manufacturing labor, per man hour worked, advanced approximately 6-8 per cent.

man hour worked, increased 18 per cent, as compared with 3 per cent from 1899 to 1914. The great increase accrued to manufacturing wage earners, with a gain of 35 per cent in real income per man hour worked. The advance, per man hour worked, was approximately 8 per cent for the claimants making up the other group—ownership, management, and the state as tax collector.<sup>15</sup>

We turn to the other side of the shield in attempting to trace changes in the real cost, to consumers, of the services of manufacturing industries. Here, again, we must utilize index numbers that only approximate the degree of accuracy we should like to achieve. The entries in the first line of Table 11 measure (approximately) changes in the productive effort required to manufacture one unit of goods. Against this standard we set measurements of the changing real costs of fabrication and services, per unit of product, to various classes of buyers of goods intended for human consumption.<sup>16</sup>

<sup>15</sup> Changes in the cost of government (federal, state, municipal) affect these measurements, to the extent that direct and indirect tax payments enter into reported manufacturing records. It is certain that increases in these costs in recent years have contributed to the increase in the residual costs (including profits) here identified with 'ownership, management, and other claimants'. There is need of research directed toward the more exact determination of the influence of changing governmental costs on costs and selling prices in manufacturing industries.

<sup>16</sup> The money cost, to buyers, of the contribution of fabricators to one unit of manufactured goods is given by  $VA/Q$ , that is, total value added in manufacture divided by number of physical units produced. (In the present instance only goods intended for human consumption are included.) In measuring the real cost to farmers the money cost of fabrication, per unit, is 'deflated' by an index of the prices received by farmers for their products. In measuring the real cost to wage earners the money cost of fabrication, per unit, is 'deflated' by an index of hourly rates of pay. The market values of the services of salaried workers are measured in terms of average annual income. Average wholesale prices of non-agricultural raw materials furnish the standard used for primary producers other than farmers. In each case changes in the money cost are reduced to changes in 'real' cost by means of an index measuring changes in the money price of the goods or services sold by the consuming group in question.

Here, as in dealing with the fortunes of producing groups, we are working with approximations to the actual values desired. The measurements of changes in the realized returns of fabricators may not measure precisely changes in the per unit cost of fabrication, as paid by the several consuming groups. Distributional margins may vary. Again, we only approximate changes in the actual effort expended by various consuming groups in obtaining the funds with which manufactured goods are to be purchased. Productivity in farming, for example, may vary with time. But for the purpose of estimating the general nature of broad movements, these approximations are useful.

TABLE 11. Changes in Manufacturing Productivity and in the Cost of Fabrication to Consumers, 1899-1937

	1899- 1914	1914- 1929	1929- 1937
	Percentage change		
Change in real per unit cost of fabrication in effort expended by producers *	-22.8	-33.2	-19.4
Change in real per unit cost of fabrication to buyers of goods intended for human consumption:			
Farmers	-20.9	+15.2	-3.5
Wage earners, general	-23.4	-27.1	-31.3
Salaried workers, mfg.	-11.8	-17.6	-4.5
Primary producers, non-agricultural	-0.1	+20.9	-14.6

\* See footnote 2 to Table 10 for the basis of the productivity measurements.

From 1899 to 1914 the real per unit cost of fabrication declined 23 per cent. Farmers and wage earners benefited correspondingly, as consumers of manufactured products. They enjoyed cost reductions equal (within narrow limits) to the decline in real production costs. Salaried workers in manufacturing industries gained also, but less; producers of non-agricultural raw materials did not share in the advance in industrial productivity.

The great drop in real manufacturing costs that accompanied the rising productivity of 1914-29 was reflected in substantially lower real costs to wage earners at large and to salaried workers in manufacturing industries. Primary producers, on the other hand, not only failed to benefit from the lowered costs in manufacturing, but found the terms of exchange moving against them. This is, of course, a reflection of the persistently low prices from which primary producers suffered after the 1920-21 decline.

The eight years from 1929 to 1937 brought further marked reductions in real production costs. The decline, approaching 19 per cent per unit of goods turned out, almost equaled that of the fifteen pre-War years. Wage earners again gained substantially as buyers of fabricational services. The real cost to them of a fixed volume of such services, in hours of work expended, dropped 31 per cent. The cost to farmers<sup>17</sup> and salaried workers declined slightly, to non-farm

<sup>17</sup> With respect to the status of farmers, the figures are subject to an important qualification. Productivity in farming doubtless increased materially between 1929 and 1937. In certain lines it perhaps equaled the gain in manufacturing productivity. The effect of such a gain in productivity would be to lower the real cost of producing farm products, and thus to improve the relative position of farmers. The figure 3.5, as a measure of the decline in real per unit cost of fabrication to farmers buying such goods, understates the true decline.

primary producers somewhat more. But among consuming groups wage earners alone gained by amounts commensurate with the great gain in productivity.

The survey of productivity changes in manufacturing industries and their incidence between 1899 and 1937 yields the following general conclusions:

The increase of 30 per cent in productivity from 1899 to 1914, and the accompanying decline of 23 per cent in the productive effort required to fabricate a unit of goods, benefited consuming groups. Agents of fabrication, as producers, received only a small portion of these gains.

The increase of 50 per cent in productivity from 1914 to 1929, and the concurrent decline of 33 per cent in productive effort required to fabricate a unit of goods, operated largely to the advantage of producing groups. A substantial portion of the total gain in productivity went to manufacturing wage earners, as producers, while ownership, management, and other claimants scored gains actually exceeding the advance in productivity. Wage earners and salaried workers, as consumers, also benefited, but consuming groups drawing incomes from the sale of primary products were confronted with advances in the real costs of the manufactured goods they purchased. (If account could be taken of the gain in productivity in agriculture and mining in these years the position of primary producers in 1929, relatively to 1914, would be more favorable than the figures indicate.)

The increase of 24 per cent in output per man hour from 1929 to 1937, and the reciprocal drop of 19 per cent in the productive effort required to fabricate a unit of goods, operated chiefly to the advantage of producers. Wage earners in general, as consumers, gained materially, since hourly rates of pay were substantially advanced, and primary producers other than farmers enjoyed lower costs. But cost reductions to other consuming groups were negligible.

One aspect of these various movements is strikingly

revealed by a comparison of productivity advances and increases in the aggregate output of manufacturing industries for 1899-1914 and 1914-37.

	Percentage Changes	
	1899-1914	1914-1937
Industrial productivity <sup>18</sup>	+30	+86
Total physical output	+76	+94

From 1899 to 1914 the potentialities of improved techniques were substantially realized. The increase in aggregate output was more than twice that in productivity. But the potentialities of the far more impressive technological gains during 1914-37 were not made effective in increased output,<sup>19</sup> in the same degree. The notable productivity gains in manufacturing industries were not accompanied by corresponding advances in the aggregate output of manufactured goods. The output of manufactured goods in 1937 could have been produced by a working force less than 10 per cent larger than that of 1914. The actual population available for productive employment was, of course, much larger.

<sup>18</sup> From 1899 to 1914, and from 1914 to 1929 productivity is measured on a per capita basis; from 1929 to 1937 on a man hour basis. Correction for shortening of the working week would increase somewhat the measurements for 1899-1914 and 1914-29.

<sup>19</sup> The comparisons are for the terminal years of the two periods; 1937 was marked by the highest output of any recent year.

Enhanced productive efficiency in manufacturing industries may, of course, release energy for the provision of services of other types, that is, services not embodied in manufactured goods. With rising living standards some transfer of consumer demand from the products of manufacturing industries to intangible services is to be expected. There has doubtless been some such shift of consumer demand since the World War, a shift probably more pronounced than that occurring during the preceding fifteen years. But the differences between the productivity and output records of the two periods, when interpreted with reference to available facts concerning unemployment and unsatisfied requirements of the population, can hardly be explained in terms of such a shift.

#### SUMMARY

The alterations in exchange relations traced in the preceding pages underlie all the economic movements of the last fifty years. We have, of course, dealt with but one aspect of the complex chain of events that make up economic history. Only incidentally have we touched on circumstances that lie behind the changes noted, and we have not taken direct account (except, in part, for efficiency in manufacturing industries) of the gains in productivity on the one hand and of the serviceability of products on the other that occurred concurrently with the shifts in the exchange

relations examined. If these concurrent changes could be accurately measured the general story would be modified somewhat, but it is unlikely that the record of the broad shifts of the period studied would be substantially altered. Evidence from the records of other countries, from income estimates and from other sources confirms the general conclusions drawn from the study of domestic price records.

The central feature of the changes observed is a notable increase in the costs of the productive-distributive operations that intervene between primary produc-

tion and ultimate use of finished goods. There are many facets to the situation—reduction in the real per unit worth of raw materials (with the reduction most pronounced for agricultural products), sharp advance in the real returns of agents of fabrication, a substantial rise in the real unit prices of finished goods bought for use as capital equipment or for direct consumption. (The reference here is to *relative*, not absolute, price changes.) Great gains in the productivity of effort expended in manufacturing help, in part, to explain how considerable increases in the returns to fabricators (per unit of labor time expended) could have occurred without more substantial alterations in the fortunes of primary producers and in the cost of goods to ultimate consumers. Important improvements in the quality of some classes of finished goods occurred concurrently with the price and cost changes we have traced. Where this is true, the real cost of a unit of service purchased by a final consumer is lower than the cost of a unit of physical product.<sup>20</sup>

<sup>20</sup> It is useful to distinguish two types of quality changes in goods bought by consumers. One type consists of changes that increase the service life of the good, or embody in it attributes that make unnecessary the purchase of another article formerly needed, e.g., the improvement of automobile tires, giving more miles of use; the combination of radios and phonographs in a single cabinet. When these are made without corresponding price increases, a portion of the consumer's income is released to buy other goods. The net effect is the same as though the price of the original article had been reduced. To the extent that such changes have occurred in consumers' goods, without parallel price increases, the consumer's position is more favorable than is indicated by a direct study of prices. Of a different type are quality changes that may increase the intensity of the consumer's enjoyment, so that more pleasure accrues to him per hour of use of the good, but without other increase in serviceability. Sheerer stockings (which may, indeed, be less durable than those they replace), better tone and increased range in a radio, dresses of better design and cut, more elaborate gadgets in an automobile (which may add to the pleasure of use without increasing its life or the efficiency of operation) exemplify such improvements. Quality changes of this type have no direct bearing on the price comparisons here made. Enjoyment of use may be enhanced, but the buyer's market position, his ability to buy other goods, is not affected by such changes, unless accompanied by price changes. Many of the improvements of recent years have unquestionably been of the second type. The quality of living may be enhanced by them, and such enhancement is altogether desirable. But the economic conse-

But the general picture, as of 1940, is that of an economy in which primary producers give more in physical goods than they gave in 1910 or in 1900 for a constant quantity of goods they require, in which fabricators give less in time and effort for a constant quantity of the goods they require, and in which costs to the mass of final consumers (other than those in certain favorably placed groups) have not been lowered to a degree commensurate with the great productivity gains of recent years.

These structural shifts reflect the play of a variety of forces, only a few of which have been suggested. War-time disturbances in the world economy, the drive for economic self-sufficiency, the wielding of strategic power by protected groups, differences in the degree to which primary and secondary producers may control their output, two major cyclical price declines neither of which was followed by an advance to the preceding level, the increased burden on manufacturing industries of the cost of government—these and other specific circumstances have left their imprint on price relations and on terms of exchange among producing groups. One is justified, I think, in suggesting that the forces here in play are related, in the main, to special circumstances and specific situations. There is no clear evidence that they are slowly acting evolutionary forces, or that our inability in recent years to realize the potentialities of technological gains is necessarily due to secular factors. This, and other of our present economic ills, may with some reason be related to the failure of the economy to effect prompt and complete adaptation to a series of major technical improvements and other disturbing modifications of organized economic life, domestic and international.

quences of such improvements are not the same as are those of improvements that free consumer funds for the purchase of other goods.

Quality changes in capital goods are primarily of the kind that increase productive efficiency. Material improvements of this type have occurred in recent years. Detailed examples are cited in *T. N. E. C. Papers*, I, 357-71, published by the U. S. Steel Corporation. It is difficult to reduce such improvements to quantitative terms, and to take adequate account of them in the interpretation of relative price movements. Some of the price discrepancies noted in the text would be reduced if full allowance could be made for quality changes in goods for use in capital equipment and construction.

#### NOTE ON RECENT PRICE MOVEMENTS

The general account of price changes given in this *Bulletin* extends only through 1938. For the interested reader who wishes to follow these movements to a more recent date, we trace them through May 1940 (Table 12).

Of the five major series in Section A of Table 12, wholesale prices and living costs changed but slightly

from 1933-38 (averaged) to May 1940. Construction costs, per capita earnings and average hourly earnings in manufacturing industries rose to higher levels, increasing the gap that separated them from the general series of prices and living costs. Nine months of war brought a 5 per cent rise in wholesale prices and in earnings of employed manufacturing labor.

TABLE 12. Structural Changes as Revealed by Price Trends, 1912-14 to May 1940

A PRICE TRENDS IN VARIOUS MARKETS						
	1912- 1914	1924- 1927	1933- 1938	Aug. 1939	Dec. 1939	May 1940
Wholesale prices, BLS	100	144	113	109	115	114
Cost of living, industrial workers	100	177	142	143	144	145
Construction costs	100	214	170	190	192	191
Per capita earnings, mfg. labor	100	226	183	207	222	217
Hourly earnings, mfg. industries	100	238	257	288	301	303
B PRICE TRENDS OF CLASSES OF COMMODITIES AT WHOLESALE						
Raw materials	100	147	108	100	111	109
Mfd. goods	100	158	129	126	133	131
Consumers' goods	100	163	130	123	129	128
Raw	100	164	116	103	116	113
Processed	100	162	132	127	132	132
Producers' goods	100	150	117	113	122	120
Raw	100	143	106	100	111	109
Processed	100	155	127	126	134	131
Intended for human consumption	100	135	95	85	98	95
Capital equipment and construction	100	166	139	147	153	152
Raw American farm products	100	141	100	86	97	97
All other products	100	158	127	125	133	130

For sources see Table 1

Among the elements of the wholesale price category (Section B) the gap between raw and processed goods did not change materially after 1938. Of producers' goods, the heavy materials entering into capital equipment and construction rose by some 10 per cent. Raw American farm products declined 14 per cent to August 1939, but had regained most of the lost ground by the spring of 1940. All the major differences existing in 1933-38 (in terms of relatives on the 1912-14 base) persisted into 1940.

### Comments on Bulletin 78

*C. Reinold Noyes, a Director elected after the manuscript for BULLETIN 78 had been read and passed upon by the Board of Directors of the National Bureau, has sent us the following comment:*

BULLETIN 78 deals with a subject that I have studied rather closely for the past twenty years. There is a good deal of basis for a criticism of the whole approach; but I want to take issue strongly with the economics of page 12. The supposition that the changing balance of payments on investment account had an encouraging influence on agricultural exports seems to me entirely unrealistic. Actually, the causative relation in that in-

stance must have been the reverse. From 1870, which, as I recall, was about the time when the annual increment of incoming investment funds ceased to be greater than the annual payment abroad on account of interest and amortization, until 1879, our agricultural exports not only enabled us to settle the increasingly unfavorable balance on investment account but gradually forced up exchange rates to the old parity and thus helped to make possible the resumption of specie payment in the latter year. This last fact proves that the active agency was the increase in exports and not the reverse. The pressure abroad to buy dollars in payment for grain and cotton must have been greater than the pressure to buy sterling in payment of interest, else the price of dollars in sterling would not have risen as it did. That the demand for grain was original, not induced, is proved by the fact that it was helping to raise the price of dollars in sterling and thus cancelling any inducement there might have been. Our grain sold abroad because we began then to have a sizable exportable surplus and had to offer it at a favorable price in sterling in order to sell it at all. The adverse balance of payments on investment account neither induced the growing of this surplus nor its sale abroad.

This, to my mind, erroneous viewpoint is repeated when the author states that in the eighteen nineties "agricultural exports gradually ceased to be the most economical means of balancing the deficit". As a matter of fact his own Table 3 shows that the value of agricultural exports in the decade of the 1900's approached double its value in the decade of the 1880's. And it is approximately true that the greater increase in manufactured exports between these two periods only served to cover the resulting increase in imports of industrial raw materials and the increased imports of manufactured goods. The deficit was still balanced by agricultural exports as late as the decade of the 1900's in the same sense that it had been in the 1870's.

These are just two samples of what appears to me wrong interpretation of the facts.

In addition my criticism of the whole approach is that I do not think an adequate statement of the agricultural aspect of this whole period and its movements can be made without bringing in the effect of protective tariffs here and abroad on a much greater scale than has been done by the writer. The mere finding of correlations, without adequate understanding of actual behavior and its causation, always leads to misinterpretations like these.

REPLY BY FREDERICK STRAUSS

AS MOST *Bulletins* of the National Bureau, the *Bulletin* on The Composition of Gross Farm Income since the Civil War could not possibly deal with the theoretical background of the various statements of factual evi-

dence. It was not possible, therefore, to treat in any detail the mechanics of the settlement of the balance of international payments with which my critic seems to be concerned.

The necessarily brief discussion pertaining to the relation between the changing balance of payments and the long-term fluctuations in agricultural exports did not by any means attempt to establish a one-sided causal relationship. It was explicitly stated, for instance, that "this increase in exports (during the first World War), combined with sharply rising prices, was an important factor in making possible the amortization of foreign debts and in altering radically the international credit position of the United States" (p. 12). This implies clearly that the relationship and causation is mutual. There can be no doubt that, as the critic mentions, "our grain sold abroad because we began then to have a sizable export surplus and had to offer it at favorable prices". The same thesis is advanced in the *Bulletin*, namely that "during this quarter century the tremendous expansion in production, particularly of cereals and meat products . . . put American farmers in a position to export at prices with which European agriculture could not compete" (p. 13). And it was also pointed out that the development of transportation, the industrialization of Europe, the rapid growth of population were important factors contributing to the expansion of American agricultural exports.

The role of the balance of payments during this period was characterized as follows: "Technically at least, the balance of payments facilitated farm exports throughout this period" (p. 13). Its role is more clearly discernible since the World War. Undoubtedly, the United States continued producing farm surpluses throughout most of the post-War period. As long as abundant purchasing power was made available to Europe through repayment of capital previously loaned to the United States and through loans to the extent of some ten billion dollars during the War and the early post-War years, these surpluses could be exported. With the cessation of loans and the ensuing foreign exchange difficulties in various European countries, however, exports sharply declined. The balance of payments ceased to act as a prop to the export trade.

It is true that the value of farm exports was higher in the decade of the 1900's than in the 1880's, and this was mentioned in the *Bulletin*. But it is also true that the debit items of the balance of payments resulting from debt service, immigrants' remittances and imports of commodities had increased at a much steeper rate. These largely greater debit items were increasingly met by non-agricultural exports. In other words, at that time the balance of payments still facilitated exports, but the changed structure of the American economy and the competitive advantages of other

countries in the production of cereals and animal products relatively favored non-agricultural exports as the means of settling the balance of payments.

I wonder whether our differences are not largely terminological, where they are not due to misunderstanding.

### The Government takes over Current Estimates of Consumer Instalment Credit and Capital Formation

SEVERAL years ago the Federal Government took over the task of making national income estimates for current years in accordance with methods developed by the National Bureau, and borrowed the services of Simon Kuznets to get the work organized. We take pleasure in announcing that the Government has now followed the precedent by undertaking similar extensions of two more series the National Bureau was instrumental in starting.

Our estimates of the volume of consumer instalment credit in 1929-38, prepared with the aid of the Department of Commerce, the Russell Sage Foundation, and numerous business corporations, are summarized in *Bulletin 79*, and will presently be published more fully in a monograph. Recognizing the importance that this type of activity has assumed in American business, the Credit Analysis Unit of the Division of Marketing Research in the Bureau of Foreign and Domestic Commerce has arranged to continue this series for future months and years. Duncan McC. Holthausen, one of the co-authors of *Bulletin 79*, has gone to Washington to participate in this project with Malcolm L. Merriam, Chief of the Credit Analysis Unit and another co-author of the *Bulletin*.

Second, the National Income Division of the Department of Commerce has organized a new unit to continue and expand the studies of capital formation and consumption begun by the National Bureau under a grant from the Social Science Research Council. Our basic publications in this field have been: *National Income and Capital Formation, 1919-1935*, by Simon Kuznets (100 pp., 1937); *Commodity Flow and Capital Formation, Volume One*, by Simon Kuznets (500 pp., 1938); *Capital Consumption and Adjustment*, by Solomon Fabricant (271 pp., 1938); *Bulletin 74, Commodity Flow and Capital Formation in the Recent Recovery and Decline*, by Simon Kuznets (1939). To this list there will soon be added the two volumes by Dr. Kuznets on national income, which are now nearly ready for circulation among the National Bureau's Directors, and estimates of commodity output in 1879-1939 by William H. Shaw, which are scheduled for publication as a *Bulletin* in the near future.

The National Income unit will undertake a thorough revision of all estimates back to 1929, will continue the figures currently, and will supplement them with estimates of the output of consumers' services so as to provide a picture of the entire national income in terms of commodities and services.

Although the National Bureau is taking no direct responsibility for the new project, it is cooperating with the Department of Commerce to the fullest possible extent. Not only has the work of Messrs. Kuznets and Fabricant been made available, but also William H. Shaw of the National Bureau will spend half his time at the Department. Mr. Shaw, who was associated with Mr. Kuznets in the preparation of *Commodity Flow and Capital Formation* and who is now carrying the commodity estimates back to 1879 at the National Bureau, is in charge of organizing and supervising the new study.

### Reviews

*Capital Consumption and Adjustment*, by Solomon Fabricant (271 pp., \$2.75)

*Journal of Political Economy*, April 1940:

"It is impossible to do justice to all the interesting sidelights and by-products in Mr. Fabricant's book. We may only mention his discussion of the maintenance-depreciation ratio in housing and elsewhere, his judicious use of data on capital consumption in agriculture, and his tentative survey of governmental assets, a subject which has recently attracted much attention. The results and methods outlined by Mr. Fabricant will remain among the essential elements in the rapidly advancing mapping of economic magnitudes—a task by performing which the National Bureau of Economic Research is so successfully contributing to making economics a science."

*Commodity Flow and Capital Formation, Volume One*, by Simon Kuznets (500 pp., \$5)

*Economic Journal*, June 1939:

"In his study of the national income of America Dr. Kuznets goes from strength to strength. In this volume he continues and amplifies his previous studies and in so doing has produced a book of great interest and considerable novelty. In it, all the arts of this branch of political arithmetic are combined with a degree of industry which is only possible to an investigator backed by a large institution like the National Bureau.

The work as a whole is prefaced by an excellent summary of its contents and concludes with an interesting survey of the main findings. For one who has had

no personal experience of measuring the constituents of the American national income it would be useless to attempt a detailed appraisal of the estimates. But it is only right to say the measurements seem logically conceived, adequately checked and interestingly and attractively presented. It is, perhaps, to be expected that in the future, as in the past, new material and the deeper probing of existing material will in many cases make possible better estimates with a consequent revision of those we have to-day. In the meantime, however, there can be no doubt that Dr. Kuznets and the National Bureau have made a great contribution to economics which will be valued by all who wish to divorce the science from mere empiricism or sterile theory."

*Journal of the American Statistical Association*, December 1939:

"Studies of business-cycle theory in recent years have dealt almost exclusively with the relation between fluctuations in capital outlays and national income. In this study Kuznets gives a careful statistical analysis of the development of capital formation and total production between 1919 and 1935. The close alignment between theory and statistical research makes Kuznets' investigation the outstanding statistical publication of the present.

... In addition to its scientific value, to the student of statistics, Kuznets' work is an excellent illustration of how an important contribution to science can be ingeniously developed from relatively limited sources."

*The Structure of Manufacturing Production: A Cross-Section View*, by Charles A. Bliss (234 pp., \$2.50)

*American Economic Review*, December 1939:

"The structural characteristics of the manufacturing process in the United States are analyzed for 1929, a year selected as having 'benchmark' significance. Although other sources of data are used, the findings are based largely upon information provided by the Census of Manufactures. A careful and judicious use of the census material typifies the report, and it is likely that any possible shortcomings of these data are minimized through their classification by broad industry groupings.

Even standing alone, as a 'still photograph', the present study permits a thorough and comprehensive understanding of the manufacturing structure. It gives precision to certain concepts and requires the modification of others. For example, consumers' goods accounted for 70 per cent of the 1929 production. This is a significant finding in view of the greater amplitude of fluctuations in production of capital goods, and



since consumer goods would probably account for an even greater percentage of production in years of lessened manufacturing activity. Mention may also be made of the finding that economic resources are allocated in a similar manner for production of the various types of goods studied. In general, the ratios for the various items do not vary widely, although the production of capital goods was found to require a relatively larger share of wages and a relatively small share of total overhead, other than salaries plus profits.

The report is not presented as a complete cross-section view of manufacturing industries. Attention to such factors as corporate ownership, plant localization, size of establishments, and labor relations has not been attempted. The absence of such considerations, which are not adapted to ready objective measurement, in no way detracts from the basic value of the report. It represents a significant contribution to the existing information about the use of productive resources in manufacturing and the interrelation of productive factors in manufacturing activity."

### Cooperative Research in Prices

THE National Bureau of Economic Research and the Conference on Price Research are cooperating in an advisory capacity in a comprehensive study of wholesale prices being conducted by a WPA unit under the sponsorship and supervision of the United States Bureau of Labor Statistics. The most important objectives of the study are:

1) To provide authenticated, continuous series of wholesale prices by months back to 1890. All series now in Bureau of Labor Statistics files will be checked, and commodity specifications will be clearly defined. The authenticated series will be used in the analytical work of governmental and private research agencies, and will be available to interested economists.

2) To tabulate information concerning the terms and conditions of sale in the distribution of commodities for which price quotations are compiled.

3) To correct individual price series for seasonal variations.

4) To construct monthly index numbers for economically significant classes of commodities. Important principles of classification, additional to those now employed by the Bureau of Labor Statistics and the National Bureau of Economic Research, will be used in this work. Index numbers for commodities imported and exported, for goods purchased by wage earners and clerical workers, for standard, semi-differentiated, and highly differentiated products, for commodities subject to output control and goods not readily subject to output control, for goods sold in open markets and

goods not sold in open markets will be among the new measurements made available.

5) To prepare a comprehensive bibliography of price index numbers in the United States.

The advisory committee set up by the Conference on Price Research includes H. B. Arthur, Swift and Company; M. A. Copeland, Central Statistical Board; R. H. Whitman, R. H. Macy and Co.; and Frederick C. Mills, National Bureau of Economic Research.

### Consumer Instalment Credit Series

BULLETIN 79 presents some results of a study of the monthly and annual volume of consumer instalment credit which will be published in full in the fourth volume of the series on consumer instalment financing, *The Volume of Consumer Instalment Credit, 1929-1938*. This series is part of a broad program of research in finance that was inaugurated by the National Bureau of Economic Research in 1938 with grants from the Rockefeller Foundation, and undertaken in cooperation with government agencies, financial organizations, private enterprises, and university specialists. Other books in the series already published are: 1 *Personal Finance Companies and Their Credit Practices* by Ralph A. Young and Associates (170 pp., \$2); 2 *Sales Finance Companies and Their Credit Practices* by Wilbur C. Plummer and Ralph A. Young (300 pp., \$3); 3 *Commercial Banks and Consumer Instalment Credit* by John M. Chapman and Associates (308 pp., \$3). Others in press and in preparation scheduled for release during the next few months are: *Industrial Banking Companies and Their Credit Practices*; *Government Agencies of Consumer Instalment Credit*; *The Volume of Consumer Instalment Credit, 1929-38*; *Risk Elements in Consumer Instalment Financing*; *Operating Experience of Consumer Instalment Financing Agencies, 1929, 1933 and 1936*; *Consumer Instalment Credit and Economic Fluctuations*; *The Business of Consumer Instalment Financing, A Summary of Findings*.

### Production and Productivity

THE MANUSCRIPT of the first volume of the studies whose costs are being paid by the Maurice and Laura Falk Foundation, *Output of Manufacturing Industries, 1899-1937*, by Solomon Fabricant, has been sent to the Directors. Work is proceeding on productivity in manufacturing and, under the direction of Harold Barger, on production and productivity in non-manufacturing industries. A *Bulletin* on manufacturing productivity is in preparation.