

a process, the periods of full employment will be short and periods of unemployment long and severe. Instead of fluctuating from labor shortage to labor surplus, the fluctuations will mostly be from some unemployment to much unemployment.

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In considering the probable trend of the level of prices of commodities at wholesale in the United States during the next decade, three chief groups of factors should be taken into account: (1) monetary and credit factors, (2) changes in technology and the geographical distribution of industry and trade, and (3) the development of market organization. Economic theory has too often concentrated on the first of these groups of factors, slighting the second and third groups by assuming that "other things remain equal." It is here contended that these two latter groups are of paramount importance. In the course of the argument recognition will be given to certain factors which come under none of these three headings.

The money and credit factors will be briefly considered first. The level of commodity prices at wholesale has too often been confused with that general price level which is an item in the equation of exchange,  $MV = PT$ . The level of commodity prices at wholesale is not only *not* identical with this general price level,  $P$ , but it is only a small constituent part. The dollar volume of transactions in the United States in 1929 was probably over \$1,100 billion. Commodity transactions at wholesale and retail were probably not responsible for more than \$250 billion or 23 per cent of this volume. Wage rates, security prices, rents and real estate prices are also constituents of this general price level, and it is important to note that the behavior of these other constituents differs markedly from the behavior of the commodity price level both in cyclical movement and in trend. For this reason we must be careful not to assume that if monetary factors influence the general level of all types of prices involving money work, they will necessarily exert an equal percentage influence on the commodity wholesale price level.

In appraising the probable importance of the influence of monetary and credit factors upon commodity prices we must take account of the ways in which such influence may be exerted. Professor Pearson offers a correlation between (a) English commodity prices and (b) world gold stocks relative to an arbitrary trend. The correlation is for two major cycles covering a period of 90 years. (The similar correlation for other countries does not appreciably increase the significance of his sample of two cycles, since there is a close correlation in these major price cycles in the several countries, which correlation is readily explainable in terms of a causal analysis not involving world gold stocks). Professor Pearson does not, so far as the writer can discover, explain the mechanism by which world gold stocks affect English prices. In view of the questionable status of the theory of sampling as applied to time series even for a larger sample than two and in view of his arbitrary trend adjustment, Professor Pearson ought not in the writer's opinion to make the logical jump from correlation to causation, unless and until he can explain the mechanism of the influence of world gold stocks on English price, and explain also the changes in that mechanism during the past century.

The writer suggests the following as the principal modes of influence of money and credit on commodity prices: (1) a wide variation in exchange rates tends to produce a sympathetic variation in domestic commodity prices, particularly in the

prices of the so-called unsheltered commodities; (2) the issue of currency not backed by collateral as a means of financing governmental purchase of commodities may raise commodity prices by increasing demand. This effect might equally be produced by a more approved form of government financing such as Liberty Bonds. Nor is this effect confined to government finance. International private loans may exert a supporting influence on commodity prices. It is important to note that for all of these so-called inflationary influences, the influence is temporary unless balance sheets show an ever increasing fund of indebtedness, or unless the initial impetus from borrowing serves to inaugurate or enhance an upward swing of the business cycle; (3) national monetary gold stocks, along with many other factors, exert an influence on interest rates. Interest rates in turn, along with many other factors, exert an influence on commodity prices.

For the calculable future of the United States, we may probably neglect the possible effect of mere dollar exchange rate fluctuations. And while government financing of current purchases during the present depression by borrowing may help to moderate the decline or promote recovery in a cyclical sense, it is not likely to be important for the trend of prices. So also foreign loans are likely to exert a cyclical upward pressure during recovery. But that the international balance sheet will show a sufficiently rapid accumulation of indebtedness to us to influence greatly the trend of our commodity price level may well be doubted. The most plausible case for a monetary or credit influence on the trend of our commodity price level is that a shortage of gold stocks in other countries will make for high interest rates and high rates for a downward or a lowered trend of commodity prices abroad and so for a downward or lowered trend in the United States, at least among unsheltered commodities.

Whether there is or has been in the past ten years a shortage in the world total of monetary gold stocks clearly cannot be determined by a pre-war comparison such as Professor Pearson makes. It can only be determined by an inventory of present local credit base requirements, for credit base requirements, including our own, have undergone important changes. Whether or not there has been a world shortage, there have been local shortages. Moreover, whether or not there has been a world gold shortage, it is to local shortages that we must look if we are to trace the mechanism of the influence of gold upon commodity prices, for it is shortages relative to local requirements that affect interest rates.

Professor Pearson finds it paradoxical to argue that the price of wheat is determined by international conditions, while emphasizing the local aspect of the relation between gold and commodity prices. The writer suggests that this is because he fails to analyze the difference in mechanisms involved in the two cases. The local shortages of gold and high interest rates which England has experienced have probably been a factor in the rapid general downward trend of English commodity prices since 1925. But the fact that the English index has trended downward more rapidly than ours since 1925 is due in part to the differences in make-up of the two indexes. Raw and semi-manufactured foods (with exception of meats) and the basic materials of industry, have a considerably larger weight in the English index. An identical group of such items have approximately 64 per cent of the total weight in the English index as compared to 32 per cent in ours. Since these commodities have been the ones declining most rapidly on the whole, it is clear that weighting alone would account for a considerable part of the more rapid decline of the English index. Furthermore, since the downward trend of commodity prices in Germany since 1925 has been less marked than in either England or the United States and this in spite of the high level of German interest rates, it is doubtful whether we should look to monetary and credit factors as the chief explanation of this decline.

In considering whether national gold shortages are likely to lead to high interest rates and so to a lowered trend of prices in say the next ten years, we should note that such shortages are necessarily shortages relative to established legal or customary requirements. History affords numerous examples in which a shortage of bullion relative to established requirements has resulted not in permanently higher interest rates but in a modification of established requirements. To maintain established requirements in the face of a continued bullion shortage is by no means a popular policy. High interest rates exert a depressing effect not only on commodity prices but also on the volume of business—or rather high rates tend to depress commodity prices by exerting a depressing effect on business. Moreover, the present condition of credit base requirements may fairly be described as a state of flux. The Bank for International Settlements offers important possibilities of modification of these requirements. It is conceivable that a sufficient number of important nations will, during the next decade, (a) have persistent gold shortages relative to established requirements (b) maintain said requirements and in so doing raise interest rates in the face of popular opposition (c) suffer as a consequence repeated recessions of business, so that world commodity prices will show a considerably steeper downward trend or a considerably lower upward trend than they would have shown in the absence of such gold shortages. But this combination of events in a sufficient number of important countries seems unlikely. I venture to think it is also unlikely, assuming that a revision of war debt settlements might conceivably lead to a serious depletion of our gold stock, that we would adhere with sufficient rigor to our present credit base requirements to produce an important depressing effect on the ten-year trend of our commodity price level. By way of recapitulation I suggest that credit expansion is likely to support an upward cyclical movement of commodity prices say during the next two or three years, but that it is unlikely that the trend during the next decade will be greatly influenced by monetary and credit conditions.

Let us turn now to the second and third groups of factors affecting prices: (2) changes in technique and geographical shifts and (3) changes in market organization. I suggest that the second group of factors has played a major part in the downward trend of prices since 1925. In this connection three points should be noted about Professor Pearson's attempted refutation of the "overproduction theory."

(1) He argues that the rate of increase in production has recently been less than in the seventy-five years before the Great War, and hence that there cannot have been recent overproduction. He evidently assumes his base period was not one of "overproduction." Whatever overproduction may mean, most of his base period was one of declining prices, technical change and geographic shifts.

(2) To investigate overproduction for many of the commodities he deals with certainly requires world and not local data.

(3) The theory that technical change and geographic shifts tend to depress prices is to be distinguished from the "overproduction" theory, for such changes may involve decreased production cost or declining demand. These influences do not necessarily show an increased rate of production growth. Improved technique and the development of new areas and resources have manifested themselves in declines in production costs and demoralized markets in many basic and staple commodities, e.g., sugar, coffee, cotton, wheat, silk and rayon, copper, tin, petroleum, rubber, and paper.<sup>1</sup> Changes in technique have also brought important declines in the demand for many basic commodities, either through cheapened cost of substitutes or through more

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<sup>1</sup>The writer wishes to acknowledge the assistance of the Federal Reserve Board Division of Research and Statistics by giving him access to certain statistical data which he used as a background for this argument.

economical use, notably coal, leather, wool, lumber, hay. All this is but a renewal of the downward trend of prices during the nineteenth century incident to the technical changes and geographic shifts of the industrial revolution. The new phase of that revolution which we are now experiencing must be accounted a major factor in the downward trend of commodity prices since 1925. The effects of declining demand due to substitutes and to more economical use, and of increased supply and lower costs of basic materials have permeated the entire structure of our system of prices.

The present period of price decline has often been compared to that following the Civil War. There are important resemblances between these periods, but for the purpose of predicting prices we need also to consider a striking difference. The havoc wrought in markets during the earlier period was by no means confined to the extractive industries. This was the period of railroad rate wars and of extreme cut-throat competition in manufacturing. Two major developments marked the end of this earlier era of declining prices at the close of the century: (a) the passing of the American frontier and (b) the growth of restraints upon price competition, particularly in manufacturing and transport. These restraints included widespread consolidation, monopoly of strategic features such as pipelines, communities of interest, price leadership and trade ethics, branding of goods, and other devices for division of the market, and government regulation of railroad rates. There followed these developments a pronounced and fairly steady upward trend of commodity prices extending over a peace-time period of some fifteen years beginning about the turn of the century. If we expect the augmented commodity demand of war-time, this period is unparalleled in the history of major countries which have undergone the industrial revolution, since the inception of that revolution. No doubt a favoring factor in the rise of American prices was our high protective tariff. The upward trend in American prices was more marked than was the upward trend in England, Germany, or France.

On the basis of this brief excursion into the history of prices I suggest that we need to consider the following points as bearing on the trend of our commodity price level during the next ten years: (1) Technical change and geographic shifts are likely to have an important depressing influence. (2) Geographic shifts may be halted as the world's moving economic frontier encounters physiographic, political, or cultural barriers. (3) Market organization on the seller side tends to give an upward thrust to the commodity price level. (We may add parenthetically that it tends to give a greater stability to our structure of prices.) (4) A high protective tariff facilitates a more marked upward rise of domestic prices.

First, let us consider technical change. There is reason to suppose that the disturbances of the World War have given a new impetus to the industrial revolution, that we have actually been experiencing a new phase of that revolution. Manufacturing has been electrified and factory planning has yielded a rapid increase in output per employee. The machine technique has made an entry into coal mining, an industry that has until recently been a stronghold of the handcraft system. Railroad operating efficiency has made rapid strides in the past decade, while railroads have been in part displaced by highway transport. These points are mentioned as illustrative only.

The progress of technical change appears historically as one in which a sudden spurt is followed by a declining rate of change. It may well be that the momentum of the post-war spurt is already partly spent, that the changes of the 1930's will be less marked than those of the 1920's. But there are important technical changes in prospect, particularly in the fields of transportation and the supplying of energy.

Not all types of changed technique are equally significant for our present problem. Improved methods of manufacturing under present conditions have a relatively slight effect on basic and staple commodity prices. They do affect in an important way new highly elaborated articles like radios and electric refrigerators, but such articles have little or no representation in existing wholesale price indexes. The most important effects of changed technique for our commodity price indexes are those which lead to opening up new areas and new resources. Changes in mode of energy supply and in transport have had effects of this sort in the past, and may have again, but technical changes which permit the substitution of a cheaper for a dearer basic commodity have recently played a more striking part in this connection and are likely to be of chief importance during the next decade. Even if the momentum of the new phase of the industrial revolution is partly spent, technical changes leading to raw material substitutions—and perhaps changes in the field of energy supply and transport—are likely to prove an important depressing influence on commodity prices during the next decade.

We may consider next geographic shifts and the opening up of new resources. There have been important shifts in the field of manufactures since the War, but these and the technical improvements in manufacturing processes have been largely offset by rising wage rates. A rough indication of the margin between raw materials and finished products is afforded by the ratio of census "cost of materials" to "value of manufactures." This ratio declined from 57.2 per cent in 1925 to 54.3 per cent in 1929. Apparently raw material costs have declined more rapidly than the margin in manufacturing, so that we can hardly look to the declining margin as the main explanation of declining prices.

On the other hand, an examination of recent price movements of various specific staple manufactured commodities shows a close correlation with their raw material costs both in direction of trend and in shorter-time movements. And in most cases the recent downward trends can be readily traced to increasing supplies or lowered production cost of raw materials or to decreased demand due to competing commodities and services or more economical use. The most important geographical shifts for price changes in recent years have been in the extractive industries, and this, I think, is likely to continue to be true during the next ten years.

I can only pause to mention the possibilities of new areas of development for agriculture and animal husbandry in their broadest sense (including rubber, coffee, sugar and silk) and of similar possibilities for the opening up of raw mineral resources. The passing of the world's frontier is by no means clearly in immediate prospect, and this all the more because of the likelihood that changing technique will make available many types of substitute resources—new ores, new fibres, new forms of energy, etc. New areas and new resources are likely to be a powerful depressing influence on commodity prices during the next decade.

Let us look now at the other side of the picture. Stronger market organization of the seller side, reinforced by the passing of our frontier (which was then a large part of the world's frontier), brought rising prices from 1896 to 1914. May we look to further strengthening of seller organization, to exert a considerable supporting influence on commodity prices during the next ten years? If strengthened organization is to be effective, it is clear that for many commodities it must be on an international scale, at least to the extent of some type of division of the market. Moreover, it will probably have to overcome a more powerful array of opposing forces than was the case in the early years of this century. Yet I think it not unlikely that developments in market organization may prove of considerable importance, at least outside the field of agriculture proper. Many unsuccessful and ephemeral types of or-

ganization were tried in the latter nineteenth century, to be followed by more permanent and successful types in the twenty years preceding the World War. The present problems of market organization are not altogether new, except perhaps in magnitude. And the basic units for combination are much larger today in many lines. Moreover there is no adequate international legal restraining force to contend with. And the trade disturbing influences of the War are now more remote. It is not unlikely that the efforts at market organization in the 1930's will be considerably more successful than those in the 1920's.

The prospect for the trend of commodity prices then, as I see it, resolves itself largely into two opposing sets of forces,—on the one hand technical change, geographic shifts, and development of new resources tending to depress prices, and on the other efforts at market organization designed to prevent overproduction and demoralization of prices. Whether the price raising and stabilizing forces will be able to overcome or even to neutralize the price-depressing forces in the next decade seems questionable, but the price raising and stabilizing forces are likely to be relatively stronger in the next ten years than they have been in the past six, and the price depressing forces are likely to be relatively weaker.

In considering the trend of prices, however, we will do well to consider certain other factors. The decline since mid-1929 has been distinctly of a cyclical and speculative character. There is a fair presumption that it represents an over-reaction to price depressing influences, and that it will be followed probably during the next couple of years by an appreciable and partly speculative rise. The commodity price level in the early years of the next decade is likely to average somewhat above the low point of the depression. The fact that the full effects of the Hawley-Smoot Tariff Act have probably not yet been realized serves to reinforce this conclusion.

Finally, may I call attention to the fact that the price index, in spite of the large number of constituent items, may be considerably affected by the movements of a few heavily weighted prices. Livestock and meats have served to obscure a considerable part of the downward trend of commodity prices since 1923. And a few commodities with heavy weights and a decided contrary price trend might easily offset the milder movements of other prices in the general average hereafter.

Subject to this qualification I offer the following summary. Monetary and credit conditions are more likely to exert an important influence upon the cyclical movements of the general index of wholesale prices in the next four years than they are upon the ten-year trend. The price level during the next three or four years will probably be somewhat above the low point of the present depression, and somewhat below the level of 1929. On the basis of present indications the odds are slightly in favor of the view that the price level in the latter half of the coming decade will average lower than it will in the next five years.

## DISCUSSION BY M. R. BENEDICT

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Professor Pearson and Professor Warren have carried out a most painstaking and time-consuming study of this important problem, and their conclusions merit most careful consideration. Nevertheless, I find myself in some disagreement, in part with the conclusions reached and in part with the methodology and reasoning whereby the conclusions were reached. Time will not permit extended discussion of either aspect.

The methods used involve a number of knotty problems of statistical technique