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## ADDENDA

Work upon business cycles is progressing so rapidly in so many quarters that a manuscript falls somewhat behind date while it is passing through the press. As partial remedy, I add notes on a few developments of which I have learned too late for mention in the proper place. Before the volume reaches its first readers, doubtless I shall be wishing that I might supplement these addenda. Not all the omissions are items of recent date. Probably the most serious are matters of which I should have known long ago, but of which I am still ignorant.

A Russian paper by Albert Wainstein on *Harvests, Meteorological and Economic Cycles, and the Problem of Economic Forecasting*, Moscow, 1926, reviews the recent literature upon weather theories of business cycles. Among the contributions noticed is a series of articles, otherwise unknown to me, published by Axel F. Enström in the *Teknisk Tidskrift* (Veckoupplagen), 1916. From the French synopsis of Wainstein's paper, supplemented by notes which Dr. Kuznets has made, I judge Enström's investigations to merit more attention than they have received. By repeated smoothing and differentiation of numerous time series, most of which run back to 1830, Enström finds non-synchronous cycles of 8 to 9 years in wholesale prices, crops, production, temperature and sunspots. Between sunspot and temperature cycles he gets a correlation coefficient of  $-.94$ . He attributes the lagging cycles in economic activities to the cycles in temperature, and believes that the sequences are sufficiently regular to afford a basis for forecasting economic cycles from solar observations.

In the new volume of *Der moderne Kapitalismus*, "Das Wirtschaftsleben im Zeitalter des Hochkapitalismus" (Munich and Leipzig, 1927), Professor Werner Sombart gives a fresh exposition of his theory of business cycles, showing the relation between the factor which he stresses (the different conditions under which organic and inorganic goods are produced) and other processes.

This discussion, Chapter xxv, also throws light upon the historical connection between business cycles and the form of economic organization. In treating that theme, I ought to have referred to Chapters xvi and xvii in the second volume of *Der moderne Kapitalismus*, 3rd ed., Munich and Leipzig, 1919. Sombart there points out the characteristics which differentiate the economic perturbations of the 16th, 17th and 18th centuries from the business cycles of the 19th and 20th centuries.

Professor A. C. Pigou's treatise on *Industrial Fluctuations*, mentioned in Chapter I as forthcoming, has been published in London. A hasty examination of the copy I have just received suffices to show that the book fulfills the high expectations with which it has been awaited.

Mr. R. G. Hawtrey's article in the May, 1927, issue of the *Quarterly Journal of Economics* on "The Monetary Theory of the Trade Cycle and Its Statistical Test" contains not only a concise statement of his own views, but also a criticism of Pigou's "psychological theory," which Hawtrey seems to regard as the only serious "rival" of the "monetary theory."

An interesting variant of the "profits theory" has been suggested by Professor F. Schmidt of the University of Frankfurt in *Die Industriekonjunktur—ein Rechenfehler*. (*Zeitschrift für Betriebswirtschaft*, 2. Sonderheft, Berlin and Vienna, 1927.)

The gist of Schmidt's contention is that illusions concerning current profits arise from a technical defect in bookkeeping. When the price level rises, profits are overstated, because no allowance is made for the increasing unit costs of replacing the raw materials, current supplies, and other goods which enterprises are continually using up. The whole difference between aggregate buying prices and aggregate selling prices is set down as profits, although the replacement of the necessary working supplies will absorb a larger part of the receipts than in the preceding turnover period. When the price level is falling, profits are minimized, or losses magnified, because no account is taken of the diminished unit costs of replacing the goods used up. This illusory element in profits leads to over-borrowing, over-confidence, and over-extension of industrial equipment in the one case, and to their opposites in the other case.

Dr. Matsuyo Takizawa's *Penetration of Money Economy in Japan and its Effects upon Social and Political Institutions* has now been published by the Columbia University Press.

The American estimate, cited in Chapter II, that savings have averaged about one-seventh of national income, may be compared with the new British estimate by Professor Bowley and Sir Josiah Stamp. "Total savings expressed as a proportion of total social income was . . . 16 per cent in 1911, and 12 or 13 per cent in 1924. If the unemployed are absorbed in industry, and we reach a year of good trade, the pre-war proportion of saving may well be again attained." *The National Income, 1924*, by Arthur L. Bowley and Sir Josiah Stamp, Oxford, 1927, p. 57.

A study of secondary trends, by Dr. Charles A. R. Wardwell of the University of Pennsylvania, will soon be published in Philadelphia under the title, *An Investigation of Economic Data for Major Cycles*. I have seen only the first draft of the manuscript. Dr. Wardwell uses methods different from those of de Wolf, Kondratieff, or Kuznets, and gets from his American data, which run by quarters from 1866 or later to the present, "major cycles" averaging about 15 years in duration. Smaller samples of English and German series also give "major cycles," but somewhat briefer ones.

My remark in Chapter I, that "no one has yet devised a satisfactory method of measuring . . . cyclical fluctuations directly," has been made questionable by Dr. Martin Allen Brumbaugh. His doctoral dissertation, published at the University of Pennsylvania and in New York in 1926, is entitled *Direct Method of Determining Cyclical Fluctuations of Economic Data*.

"The method developed arrives at the relatives of cyclical differences in two major operations, first, the division of each item of data by the item of the same season of the preceding year, and secondly, the correction for trend residue. The first step removes the seasonal variations, reduces the data to relative form and, since it is a chain index, removes the normal growth. The second step removes the small residual trend element which represents the increase of one year. . . .

"In the final result we have not measured cycles but cyclical differences. . . . We have demonstrated that the relative cyclical

differences lead to a wave curve whose periodic changes conform to those of a curve of relative cycles. Further, that the amplitudes of the curve of cyclical differences express rapidity of change whereas the amplitudes of the curve of relative cycles express amounts which are the results of such change." (Pp. 71, 72.)

Dr. Brumbaugh recognizes that the final test of his method "must come from an appeal to business conditions." In his judgment, the method "has satisfactorily fulfilled every reasonable requirement for the cases to which it has been applied." (P. 73.)

Mr. A. W. Flux publishes a valuable paper upon "Indices of Industrial Productive Activity" in the latest issue of the *Journal of the Royal Statistical Society*, vol. xc, part ii, pp. 225-271.

Mr. Carl Snyder has brought together in one volume his numerous studies of cyclical fluctuations (of which such free use is made in Chapters III and IV), and added valuable new results to the papers already published. *Business Cycles and Business Measurements: Studies in Quantitative Economics*, by Carl Snyder, New York, 1927.

In "The Summation of Random Causes as the Source of Cyclic Processes" (*Problems of Economic Conditions*, vol. iii, part i, published by the Conjuncture Institute in Russian with an English summary, Moscow, 1927), E. E. Slutsky presents two theses:

- (a) that cyclic . . . processes may originate owing to a summation of mutually independent chance causes, and (b) that these chance waves may show a certain regularity, being an imitation in lesser or greater degree, of strictly periodical fluctuations.

The first thesis, which is supported by a most interesting analysis of a random series from numbers drawn in a lottery, has a bearing upon my inference from the distribution of cycle durations (see above pp. 419, 420). But Mr. Slutsky thinks that I am not justified in treating the variability of cycle durations

as a reason for denying the regular periodicity of cycles . . . for a similar result could be obtained also for many curves composed from regular sine curves.

The preliminary annals for 1926, prepared by Dr. Willard L. Thorp and published in the National Bureau's *News-Bulletin* for May 20, 1927, indicate that recessions occurred last year in France, Italy, and Argentina. These reports add three new observations upon the duration of business cycles to the collection analyzed in Chapter IV. All three of the cycles just terminated lasted about 6 years.



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