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try's creditor-debtor status. Both countries were creditors in the interwar period; hence if creditor-debtor status were decisive, the United States balance in the earlier period, and not the British, ought again to be the exception.

Another conclusion to be drawn from the contrast between the movements of the British balance before and after World War I is that findings about the later period cannot be applied to the earlier one.

The explanation of the change in the cyclical pattern of the British foreign trade balance is not found in changed relations of world cycles to British business cycles, but in the changed effect of a given business cycle situation on British foreign trade. This change in turn seems to be due chiefly to a shift in price patterns. The reversal, after World War I, of the balance pattern around cycle peaks is clearly due to prices. The next question is, therefore, why export and import prices moved differently in later than in earlier British business cycles. Perhaps the analysis we plan to make of the cycle patterns of these prices and their components will throw light on this question.

#### IV. WORLD CYCLES

##### *Introduction*

In this section we shall discuss the world cycle chronology which we devised for the analysis of foreign trade fluctuations. We believe that the world cycles indicate, however roughly, the direction in which world demand moved and how it affected American and British foreign trade. But it should be stressed that we do not regard these world cycles as anything but a tool for gaining some additional insights into a nation's foreign trade cycles. In analysis of international financial transactions, for instance, differently defined world cycles may well be preferred. Nor does the question whether a "truly international cycle" exists concern us here.<sup>1</sup> We are merely assuming that world cycles as we use them reflect those foreign fluctuations affecting a country's foreign trade.

The term "world" is used loosely in this section. More exactly, we refer to the world ex United States in the analysis of American trade, and to the world ex Great Britain in the analysis of British trade.

Since American trade is our main concern, the following experiments with various approaches to a world cycle chronology deal with the world ex United States. The method adopted for the United States was then applied to Great Britain.

<sup>1</sup>For a discussion of this concept, see Oskar Morgenstern, *International Financial Transactions and Business Cycles*, Princeton University Press for the National Bureau of Economic Research, 1959, Chapter 1, Section 6.

#### *Four Approaches to a World Chronology*

We experimented with three quarterly and one annual series, all of which could be expected to reflect world cycles; actually all four do show unmistakably similar cyclical swings between 1880 and 1938.

*Three-country Composite.* The first of the series was devised by Geoffrey Moore and used by Oskar Morgenstern in his study of international financial transactions. It is based on Burns and Mitchell's careful choice of business turning points for Great Britain, France, and Germany.<sup>2</sup> Cycles in general business defined by their chronology are called "reference cycles" by Burns and Mitchell. The three-country composite is a simple combination of the three countries' reference cycles. Such a combination is justified by the high degree of parallelism in the swings of the three countries; in 70 per cent of the months from 1879 to 1938 they were in the same cycle phase. In such periods of agreement the world cycle ex United States is taken to be in the same phase as the three countries. At those other times when one of the three countries strayed from the others' path, the world cycle follows the majority. Obvious objections to this method are that it ignores the differing importance of the three countries; that it disregards all other countries; that it reflects only direction of change and ignores amplitude of movements. Despite all this, it turns out that the cycles in this three-country series differ little from those in other series described in the following pages.

*Fifteen-country Composite.* The second series is designed to meet some of the criticisms mentioned above. It is constructed by the same method, but with the help of quarterly cycle turns for twelve additional countries outside the United States found in Thorp's *Business Annals* and National Bureau of Economic Research, Bulletin 43. Furthermore, the equal weights of the three-country series are replaced by weights that accord roughly with the countries' roles in international trade. Thus the share of the three countries making up our first series is reduced in this second series to 60 per cent before and 50 per cent after 1914, and is distributed unequally among them. A period of world expansion or contraction means now a period of expansion or contraction in the majority (weighted) of the fifteen countries.

The broader base and more reasonable weighting make this series appear superior to the first one. But it has the disadvantage that the reference dates for the twelve additional countries are much less reliable than those for the first three. Also, it spans a shorter period — 1890 to 1931. But whatever the relative merits of the two series, they both trace the same cycles and both reach turning points in the same or adjacent quar-

<sup>2</sup>A. F. Burns and W. C. Mitchell, *Measuring Business Cycles*, National Bureau of Economic Research, 1946, pp. 78, 79.

ters in every instance but one over forty-one years. In the longer three-country series we discern altogether ten cycles, six in the thirty-five years before 1914 and four in the twenty interwar years. Their duration varies from three to eight years, like national cycles.

*Folke Hilgerdt's index of world manufacturing production*,<sup>3</sup> adjusted to exclude the United States, is our third series. Though this is an annual series which precludes accurate timing comparisons, its generally similar movements support the validity of the three- and fifteen-country series. Minor divergences are explained, with one exception, by the use of annual data and by the strong upward trend of industrial production. This suppresses the brief and mild contraction 1903-04 and shortens those of 1882-86 and of 1890-95. (The exception is the period 1923 to 1925, when exchange fluctuations impaired the reliability of international statistics.)

*World Imports*. Finally, we use the cycle sensitivity of foreign trade for our fourth approach to world cycles. Unfortunately not even an annual continuous series on world trade exists before 1924, and quarterly data are available only from 1929. But since such statistics will not only assist the determination of international reference dates but will be most useful for the analysis of foreign trade in general, it seemed worthwhile to go to some trouble to assemble them. By bridging the gaps and adjusting existing series, it was possible to obtain an annual series of world imports for the years 1880 through 1928.<sup>4</sup>

To transform this annual into a quarterly series, we constructed the

<sup>3</sup>League of Nations, *Industrialization and Foreign Trade, 1945*, pp. 138, 140.

<sup>4</sup> Years

Source and Definition

1880-1894 Neumann-Spallart, *Übersichten der Weltwirtschaft*, Berlin, 1885-1889, p. 736.

1895-1899 Since no series is available for these years and since the available series for the preceding and following years are based on somewhat different definitions of imports, we constructed two series to fill this gap, one as extension of the 1880 to 1894 series, the other as extension of the 1900 to 1913 series.

Both series are summations of imports of about 50 individual countries excluding the United States, listed in *Jahrbücher für Statistik*, Deutsches Statistisches Amt, 1910 to 1913, and United States imports from *Monthly Summary of Commerce and Finance of the United States*, Depts. of Commerce and Labor, December 1910. A few data are from Neumann-Spallart, *op. cit.*, pp. 738, 739. A few more are my estimates.

The first series uses general imports of Great Britain and some small countries, as does the Neumann-Spallart series which it extends. It was compiled for the period 1891 to 1899. The second series covers 1895 to 1904, and uses special imports for the same countries, in conformity with the series 1900 to 1913, to which it is linked.

following interpolating series. For the years to 1923 official monthly statistics of imports of the United States, Great Britain, France, and as far as available (1892-1913) Germany, were converted into quarterly dollar series. To the sum of these, that part of the exports of the three first-named countries was added which went to countries other than those whose imports are included.<sup>5</sup> The inclusion of such exports in the import series is justified, since they represent imports of countries not otherwise included. The percentage of total world imports which is covered by this interpolator is remarkably stable from year to year except for variations in the number of series included. It amounts to 54 to 57 per cent for 1880-91 (five series), 66 to 71 per cent for 1892-1904 (six series), 71 to 74 per cent for 1905-1913 (seven series) and 62 to 66 per cent for 1920-23 (six series).<sup>6</sup>

For the years 1924 to 1928, we used quarterly trade of eleven countries, amounting to somewhat less than two-thirds of world trade for interpolation.<sup>7</sup>

From 1929 to 1938, a quarterly League of Nations index, based on dollars of 1930 parity, is available for total world trade. This was converted into dollars and adjusted to represent imports.

From 1950 on, quarterly world imports in current dollars are available in the United Nations *Monthly Bulletins*. For 1948 and 1949 the same source gives quarterly world exports only. These together with annual imports given in the *United Nations Yearbook* were used to estimate quarterly imports.

The final steps were to deduct United States imports from our series,

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1900-1913,  
and

1920-1925 Deutsches Statistisches Amt, *op. cit.*, 1931 and 1933. Imports of 1900, 1905, 1909 to 1913 are given in this source. The average ratio of imports to total trade was determined for these years and applied to figures for total trade, which are the only ones given for the remaining years.

1924-1928 League of Nations, *Review of World Trade*, 1937 and 1938.

<sup>5</sup>The above-mentioned export series were prepared at the National Bureau of Economic Research by Rollin F. Bennet in 1941. French exports by countries are available only from 1905 on.

<sup>6</sup>See Note on the Interpolator, p. 67.

<sup>7</sup>Quarterly series for ten of the eleven countries were derived from monthly data in national currencies given in the League of Nations, *International Trade and Balances of Payments*. Quarterly series for Argentina is from Argentina Republic, *Estadística General: El Comercio Exterior Argentino, 1920-30*. Exchange rates used for conversions into dollars are taken from Federal Reserve Board, *Banking and Monetary Statistics*, 1943, and from League of Nations, *International Statistical Yearbook*, 1928.

and to adjust the resulting quarterly imports of the world ex United States for seasonal variations.<sup>8</sup>

*World Imports Compared to Three-Country Composite.* Does our roughly hewn import series show any similarity to the crude composites of national cycles described above? Indeed it does. World imports trace out each of the 8½ inverted cycles shown by the three-country series from 1882 to 1913 and from 1920 to 1938 (see Charts 15, 16).<sup>9</sup>

The timing differences between world imports and the three-country series are significant (Table 16). Before 1914 imports kept growing after business had passed its peak, and resumed their rise before business reached its trough. The reverse was true in the interwar period: imports rose later and dropped earlier than general business. In other words, before 1914 every divergence between imports and general business movements was due to a rise in imports; after World War I to a decline.

We have found the same patterns in the relations of British or American imports to British or American business cycles. That our estimates of world imports behave in regard to the composite of national business cycles as national imports do to national cycles is reassuring.<sup>10</sup>

On the basis of this study of the four approaches, we decided on the tentative use of the turning points in world imports in our analysis of foreign trade. This series seems definitely preferable to the other three. Apart from other shortcomings, the fifteen-country composite covers only a part of the time period; the three-country composite is not sufficiently representative; and manufacturing production is available in annual form only. Moreover, fluctuations in the imports of the world ex United States reflect directly those aspects of foreign business cycles which most affect United States foreign trade.

It might be argued that American exports as well as imports should be deducted from world imports if the latter are to be used in the analysis of American trade; in other words, world cycles should be defined as cycles in the trade *within* the world ex United States. However we do not have to enter into this argument since turning points in world cycles are the same by either definition.<sup>11</sup>

<sup>8</sup>World ex United Kingdom imports were derived in the same fashion.

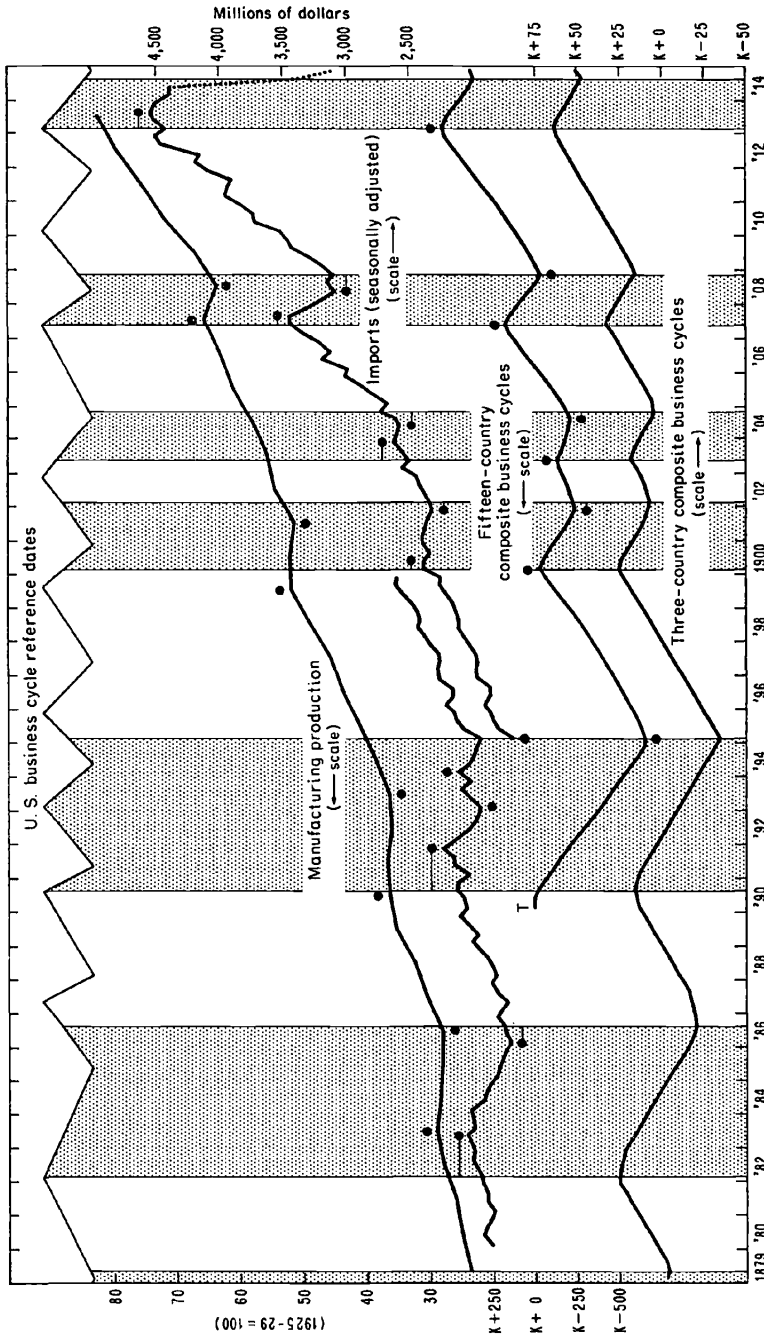
<sup>9</sup>World imports also show a clear cycle with large amplitude, 1948-1953.

<sup>10</sup>It is of interest to note the only long interval between an import and a business cycle turn. After the world cycle as defined by the three-country composite had reached its trough in 1932, imports failed to rise for another 2½ years. This ten-quarter lag stands out in our table, an eloquent witness to the effectiveness of the new restrictive trade policies.

<sup>11</sup>In a similar experiment for Great Britain, turning points in world imports exclusive of British imports and exports also were found to coincide with turning points in world imports exclusive of British imports, except for shifts by one quarter in 1937 and 1938.

Chart 15 *World ex United States, 1879-1941*

FOUR TYPES OF CYCLES



Shaded periods are contractions in three-country composite business cycles. Turns in other series are indicated by dots, tentative turns by T.

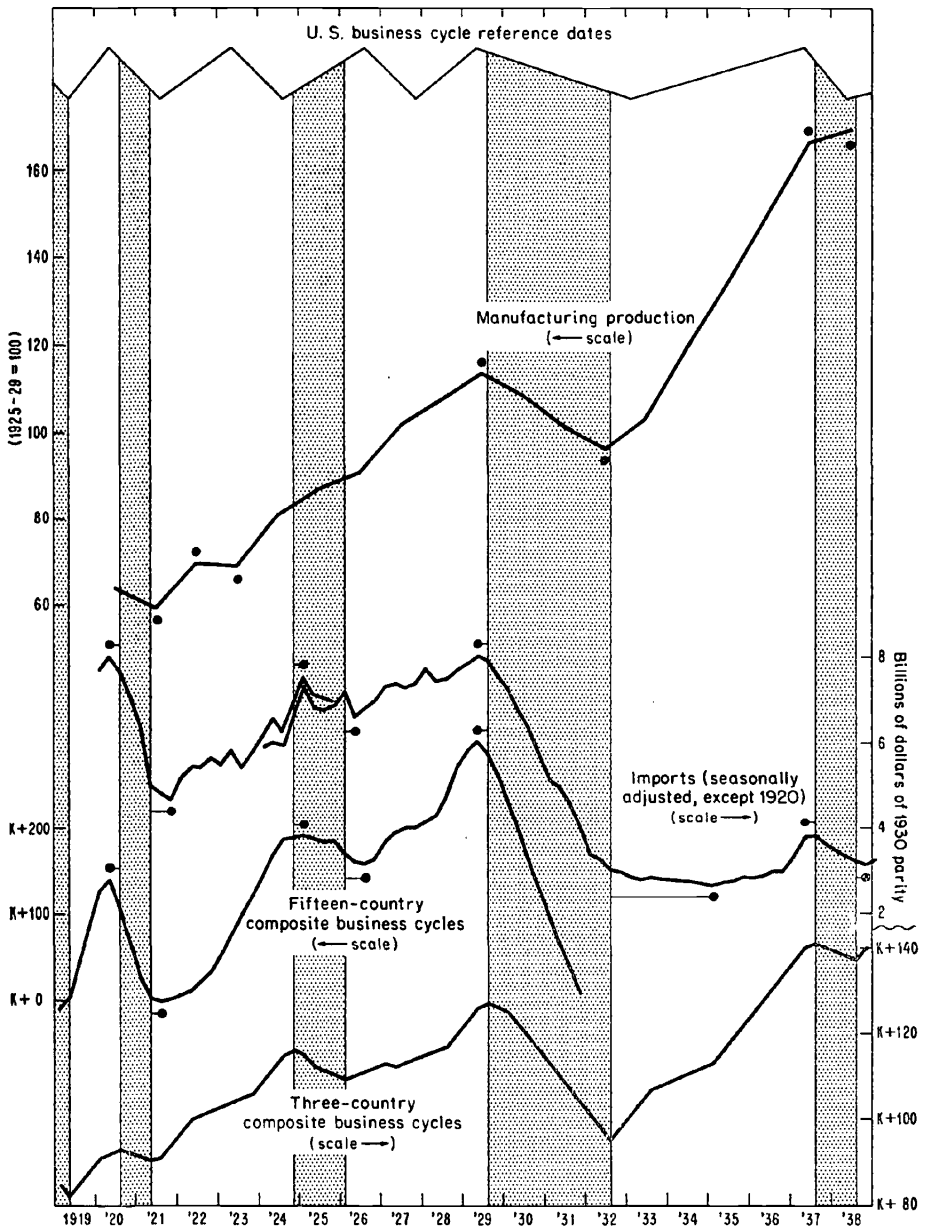
Series for manufacturing production, annual; all other series, quarterly.

Imports for 1914 interpolated without German data, which are not available.

Source: For charts in this section see text.

Chart 16 *World ex United States, 1919-1938*

FOUR TYPES OF CYCLES



Shaded periods are contractions in three-country composite business cycles. Turns in other series are indicated by dots. Series for manufacturing production, annual; all other series, quarterly.

Table 16 *World ex United States, 1879-1938*

LEAD (-) OR LAG (+) OF WORLD IMPORT CYCLE AT TURNS IN THREE-COUNTRY COMPOSITE CYCLE

DATE OF TURNS <sup>a</sup> <i>Three-Country Composite</i>		DATE OF TURNS <sup>a</sup> <i>World Imports</i>		NUMBER OF QUARTERS	
Peaks	Troughs	Peaks	Troughs	Peaks	Troughs
	1879/II	no data		no data	
1882/I		1883/II		+5	
	1886/III		1886/I		-2
1890/III		1891/IV	1893/I	+5	no turn
	1895/I	1894/I	1895/I	no turn	0
1900/I		1900/II		+1	
	1902/I		1901/IV		-1
1903/II		1903/IV		+2	
	1904/IV		1904/II		-2
1907/II		1907/III		+1	
	1908/IV		1908/II		-2
1913/I		1913/III		+2	
	1914/III		no data		no data
1920/III		1920/II		-1	
	1921/II		1921/IV		+2
1924/IV		1925/I		+1	
	1926/I		1926/II		+1
1929/III		1929/II		-1	
	1932/III		1935/I		+10
1937/III		1937/II		-1	
	1938/III		1938/IV		+1

<sup>a</sup>Year and quarter.

Source: Three-country composite derived from business cycle turns of Great Britain, France and Germany from Burns and Mitchell, *op. cit.*, pp. 78, 79. For world imports, see text, this Section.

*Note on the Interpolator for 1880-1923*

To test the interpolator we computed the corresponding series for the period when quarterly League of Nations data are available, i.e. 1929-1938, and compared the two series. Since their movements resemble each other closely for this period, we would evidently obtain good estimates of the total on the basis of the interpolator. The residual (the part of the total not included in the interpolator) also shows movements similar to those of the interpolator. Only in six out of thirty-eight quarters does the residual move in opposite direction to the interpolator. This justifies the assumption that underlies the method of interpolation employed, viz. that movements of the residual and the interpolator are highly correlated.

As a further test we compared the deviations of the interpolator and the residual series from straightline interpolations of their respective annual totals. We found that these deviations lay in the same direction for both series in thirty of thirty-three quarters covered. I consider these results sufficiently reassuring to forego computation of the degree of correlation between the two sets of deviations.

### *Diffusion of World Cycles*

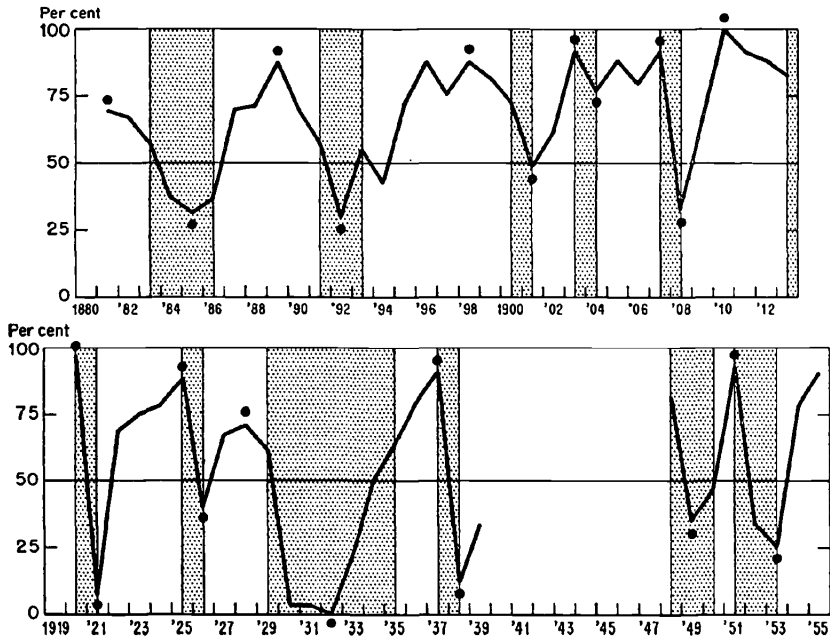
*Relation of the Number of Countries with Import Rise to Value of World Imports.* To what extent are world import cycles representative of import fluctuations in individual countries? Is the aggregate dominated by movements in a few import giants, or does the trade of the majority move in unison? Are there significant changes in the degree of diffusion over the long run or within cycles? To throw some light on these questions we shall study the annual changes in the imports of each of thirty-four countries. Our sample includes all countries for which data are available continuously, or with minor interruptions, since 1881. Seventeen of the thirty-four countries are European, seven American; the United States is excluded. Plotting for each year the percentage of countries experiencing a rise in imports, we obtain a curve which traces clear cycles of considerable amplitude and close relationship to cycles in aggregate imports (Chart 17). Every recovery of aggregate imports is accompanied or preceded by a rise in the percentage of countries with import growth; and every contraction by a corresponding decline. The representativeness of the world import series is thus affirmed.

Timing comparison (Table 17) shows that nine of twenty-three turns in the country percentage series lead those in import value while the others coincide. It is probable that use of shorter-than-annual time units would turn some or most of these coincidences into leads, particularly in short cycle phases. That half of the contractions lasted only one year may explain the predominance of coinciding turns at troughs. The tendency of the country percentages to lead aggregate imports manifests itself at prewar peaks, which typically terminate long periods of expansion, and at the trough of 1935 when six years of trade shrinkage ended.

National cycles in aggregate business activity are known to be preceded by cycles in the proportion of activities undergoing expansion. It is interesting to note that international cycles, as reflected in aggregate world imports, similarly tend to be preceded by cycles in the proportion of countries with rising imports. Narrowing of the scope of expansion similar to that which precedes the downturn in national business cycles is evident, even in annual data, before half of our international peaks. The gradual replacement of a majority of expanding countries by a majority

Chart 17 *34 Countries ex United States, Annually, 1880-1955*

PERCENTAGE OF COUNTRIES WITH RISE IN IMPORTS IN RELATION TO CYCLES IN WORLD (EX UNITED STATES) IMPORTS



Shaded periods are contractions in world trade.

of contracting ones, and vice versa, is analogous to the gradual rise or fall in the number of expanding industries or regions which constitute national business cycles.

The close similarity between cycles in value of world imports, and cycles in the number of countries with like import changes is brought out most clearly in Chart 18. It depicts cumulations of the net percentages of countries with import growth — that is, the excess of the proportion rising over the proportion falling. The path traced out by these cumulated percentages resembles closely that of aggregate imports. All turning points coincide except for a minor divergence in 1893 and for the trough of the Great Depression.

*Degree of Diffusion of Import Changes.* Cyclical variations and the long-run trend in the proportion of countries with like import changes are both of interest. The trend might help, for instance, to clarify the question whether the parallelism of national business cycles has risen or fallen

Table 17 34 Countries ex United States, 1880-1955

## LEAD (-) OF PERCENTAGE OF COUNTRIES WITH ANNUAL RISE IN IMPORTS AT TURNS IN WORLD IMPORT CYCLE

DATE OF ANNUAL TURNS <i>World Imports</i>		NUMBER OF YEARS	
Peaks	Troughs	Peaks	Troughs
1883		-2	
	1886		-1
1891		-2	
	1893		-1
1900		-2	
	1901		0
1903		0	
	1904		0
1907		0	
	1908		0
1913		-3	
1920		0	
	1921		0
1925		0	
	1926		0
1929		-1	
	1935		-3
1937		0	
	1938		0
1948		0	
	1950		-1
1951		0	
	1953		0
Av. 1880-1914		-1.50	-.40
Av. 1920-1938		-.25	-.75
Av. 1880-1955		-.83	-.55

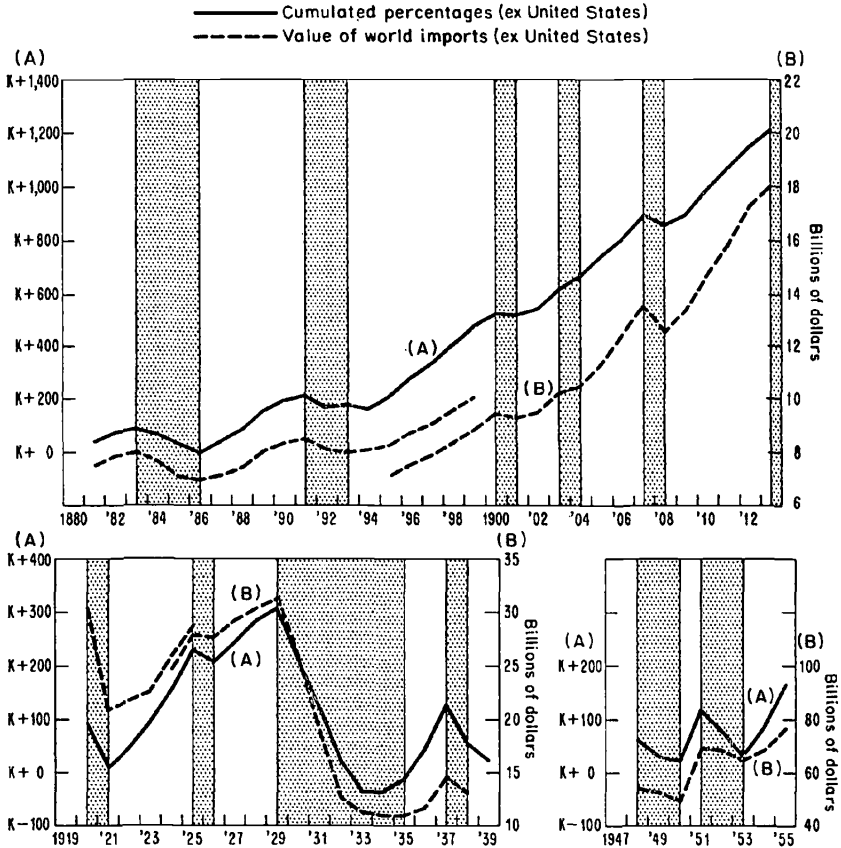
Source: Imports of 34 individual countries for 1880-1889 from Neumann-Spallart, *op. cit.*, vols. for 1881-1889; for 1883-1913 from Deutsches Statistisches Amt, *op. cit.*, 1903, 1905, 1910, 1915; for 1913-1928 from League of Nations, *op. cit.*; for 1929-1955 from United Nations, *Statistical Yearbook* and *Monthly Bulletin of Statistics*.

Exchange rates for 1913-1924 are from League of Nations, *International Statistical Yearbook*, 1928; Federal Reserve Board, *op. cit.*, United Nations, *Public Debt, 1914-1946*.

For world imports ex United States, see text, this Section.

Chart 18 *34 Countries ex United States, Annually, 1880-1955*

CUMULATED NET PERCENTAGES OF COUNTRIES WITH RISE IN IMPORTS AND VALUE OF WORLD (EX UNITED STATES) IMPORTS



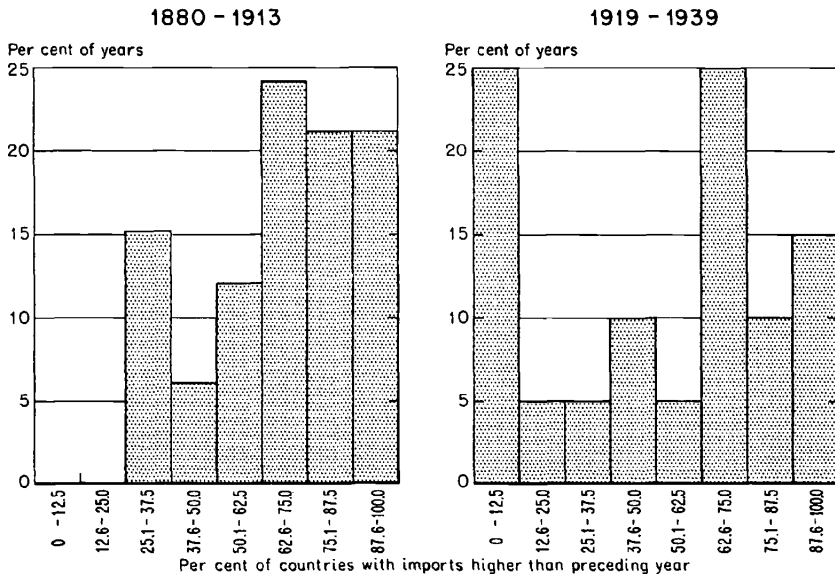
Shaded periods are contractions in the value of world imports.

over the long run. For these purposes we may compare the size distribution of our percentages without regard to their sequence in time, for the two periods 1881-1914 and 1919-1939.

If import fluctuations of individual countries were independent of each other, the annual percentages of countries with rising imports would cluster around their average and extremely high or low figures would constitute the exception. If, on the contrary the diffusion were perfect, if all countries' imports always moved together, the percentage of countries with rising imports would always be either 100 or zero.

Chart 19 34 Countries ex United States, Annually, 1880-1955

**FREQUENCY DISTRIBUTION, PERCENTAGE OF COUNTRIES WITH RISE IN IMPORTS**



The actual distribution for the earlier period shows a considerable degree of interdependence (Chart 19). A simultaneous rise of imports in 75 to 100 per cent of the countries occurred more often than one affecting only 50 to 75 per cent. Declines in those years were less general than rises and never spread beyond 70 per cent of the countries, but the proportion affected was in more years 60 to 70 than 50 to 60 per cent.

The diagram for the second period looks still less like a random distribution. In eight out of these twenty years, more than 87.5 per cent of the countries moved in the same direction.

The visual impression that diffusion of world import cycles was greater in the interwar than in the earlier period is confirmed by comparison of the standard deviations for the two periods. They are 32 per cent for the later against 20 per cent for the earlier period.

Another measure is the ratio of the average deviation of each distribution to the maximum average deviation possible around the mean of this distribution.<sup>12</sup> We find that the average deviation of the percentages from

<sup>12</sup>The maximum deviation of percentages of 100 from their mean is  $2a(100-M)$  where  $M$  stands for the mean and  $a$  for the number of items larger than the mean.

their mean was about 40 per cent of the maximum in the first period, and about 50 per cent in the second.

These findings cannot decide the question whether the interdependence of nations has grown or declined, but they support the view that it has grown.

*Cycles in the Three-Country Series and United States Business Cycles*

To what extent did world cycles move with American and British business cycles? We first consider the three-country series and its relation to American business cycles. We find that in about 70 per cent of the time covered, the United States cycle and the cycle in the three-country series were in the same phase. What is perhaps more interesting is that this proportion was the same 1879 to 1914 as in the interwar period (Table 18).<sup>13</sup> Thus there is no indication in these measures either of greater independence of the United States before, nor of international disintegration after World War I.

Table 18 *Three-Country Composite and United States, 1879-1938*

PERCENTAGE OF QUARTERS IN LIKE CYCLE PHASE

PERIOD	ACTUAL	EXPECTED <sup>a</sup>
1879/2-1914/3	69.5%	51.0%
1919/2-1938/3	70.1%	51.7%

<sup>a</sup>Computed on assumption of independence from the following proportion of quarters in expansion:

1879-1914	World: 56.0%
	U.S.: 58.2%
1919-1938	World: 68.8%
	U.S.: 54.5%

Source: Same as Table 16.

These results do not seem to conflict with Morgenstern's very thorough analysis of relations between national business cycles. One measure presented by Morgenstern is a comparison of United States business cycles to those in each of our three countries separately. The finding is that the proportions of months in which the United States and the British cycles were in the same phase were 35 per cent before World War I and 33 per cent in the interwar period. For France the proportion fell from 39 to 29

<sup>13</sup>The proportion expected in the same phase on the assumption of independence of the two series is nearly the same, about 51 per cent, for both periods.

per cent, and for Germany it rose from 38 to 45 per cent (1919 to 1932 only).<sup>14</sup>

Another measure given by Morgenstern includes only those months in which all three European countries were in the same cycle phase. Such agreement among the European countries was far less frequent 1919 to 1932 than 1879 to 1914, occurring in only 45 per cent of the months in the later against 83 per cent in the earlier period. However, the United States was in the same phase in 79 per cent of the months when the three countries moved together in the interwar period; against a proportion of 64 per cent before World War I.<sup>15</sup> "It is worth noting that the United States was 'out of step' — that is, in a different phase when the three European countries were in the same phase — less in the postwar than in the prewar period. To put it differently, the three European countries became less in step with each other, but more in step (as a group) with the United States."<sup>16</sup>

In sum, Morgenstern finds that the United States cycle was more closely related to the British and to the French cycles in the earlier than in the later period, while it was more often in phase with the German cycle and with the three European countries when they all moved together in the later period. This may be compared to our finding that the American cycle and the three-country series were in phase as often in the later as in the earlier period.

Another way of comparing the two sets of cycles is through their turning points. We find that peaks and troughs in the three-country series are in close agreement with United States business turns before as well as after World War I (Table 19). In the earlier period ten of thirteen turns in the three-country series are within two quarters of United States business turns. The independence of the American economy from world cycles thus is found in the former's *additional* swings, of which there were four in the earlier and two in the later period. It is these extra fluctuations rather than poor agreement overall which need explanation.

Table 19 also shows that the three-country series lags at twelve United States business turns and leads at only three. In particular, all troughs in the three-country series before World War I lagged American troughs. However, we must guard against interpreting this timing relationship as an indication that recoveries originated in the United States in this period. Simple explanations of this sort rarely fit the intricate web of international relationships, as we have seen.

<sup>14</sup>Oskar Morgenstern, *International Transactions and Business Cycles*, Princeton University Press for the National Bureau of Economic Research, 1959.

<sup>15</sup>*Ibid.*

<sup>16</sup>*Ibid.*

Table 19 *Three Country Composite and United States, 1879-1938*

LEAD (—) OR LAG (+) OF THREE-COUNTRY COMPOSITE CYCLE AT  
TURNS IN UNITED STATES BUSINESS CYCLE

DATE OF TURNS <sup>a</sup>		NUMBER OF QUARTERS	
Peaks	Troughs	Peaks	Troughs
	1879/II		+1
1882/I		0	
	1886/III		+5
1890/III		0	
	1895/1		+3
1900/I		+2	
	1902/I		+5
1903/II		+2	
	1904/IV		+1
1907/II		0	
	1908/IV		+2
1913/I		0	
	1914/III		-1
	1919/II		0
1920/III		+2	
	1921/II		-1
1924/IV		unrelated	
	1926/I		unrelated
1929/III		+1	
	1932/III		-2
1937/III		+1	
	1938/III		+1

<sup>a</sup>Year and quarter.

Source: Same as Table 16.

*World Import Cycles, and American and British Business Cycles*

Our purpose in determining turns in world imports was to obtain a kind of international business cycle chronology, which might help us break through the limits on understanding of international activities imposed by use of national business chronologies. In the analysis of foreign trade cycles we use the international and the national turns combined, for a two-way classification of the quarters studied. In other words, we subdivide national business cycle phases by simultaneous movement of the world cycle and study the behavior of trade in each of the resulting four types of periods.

Due to the brief span of some of these subdivisions it seemed best to smooth the trade balance series by three-quarter moving averages with

double weights for center quarters. Consequently, the world chronology for this purpose has also been derived from world imports smoothed in the same fashion. Six turns in world ex United States imports and six turns in world ex Great Britain imports were shifted by one quarter for this reason.

As a further adjustment, we extended the world ex United States imports series backward by recognizing a tentative trough in the first quarter of 1881.

*Per cent of Quarters in American and British Co- and Counter-Phases.* Having decided on the chronology, we want to know the relative importance of the four phase combinations in the two countries before and after World War I (Table 20). One outstanding fact is that British business cycles are — as one would expect — much more closely related to world cycles than American business cycles. For both periods together, the two cycles for Britain were in the same phase in 80 per cent of the quarters covered, while the corresponding figure for the United States is only 62 per cent.

We note further that each world phase coincided more often with the like than with the unlike domestic phase in each country and period. But the opposite is not always true. Domestic contractions before World War I occurred in America twice as frequently during world expansion as during world contraction. The typical American contraction before 1914 was a counter-contraction. In Britain, nearly two-fifths of contraction quarters were counter-contractions. This relatively large role of counter-contractions reflects in part the strong upward trend of world imports in this period, which reduced the duration of world contractions. But even after this trend had ceased in the interwar period, about one-third of the contraction quarters in each country coincided with world expansion. Thus, contractions definitely cannot be treated as if they were identical with co-contraction.

Finally, domestic expansion was as a rule associated with world expansion. For Britain in the first period, we can go further and state that the British economy practically *never* expanded in the face of world contraction. Counter-expansions here are non-existent — world expansion was a necessary though not a sufficient condition for British expansion. That counter-expansions are more frequent in the interwar period is due to the devaluations of the dollar and sterling in the 1930's. When the two years following these devaluations are excluded in each case, the picture is again the same as for the earlier period. Thus our phase-combinations bring out very well that the devaluations were associated with situations which otherwise occurred rarely in the United States and hardly ever in Britain

Table 20 *United States and Great Britain, 1881-1938*

PERCENTAGE OF QUARTERS IN CO- AND COUNTER PHASES

	<i>United States 1881/I- 1913/III</i>	<i>Great Britain 1882/III- 1913/III</i>	<i>United States 1920/II- 1938/II</i>	<i>Great Britain 1920/II- 1938/III</i>	<i>United States<sup>a</sup> 1920/II- 1938/II</i>	<i>Great Britain<sup>a</sup> 1920/II- 1938/III</i>
<b>Number of Quarters</b>						
All Phases	130	124	72	73	64	65
Co-Expansion	61	71	25	33	25	33
Co-Contraction	17	32	23	22	23	22
Total Co-Phases	78	103	48	55	48	55
Counter-Expansion	14	2	13	8	5	0
Counter-Contraction	38	19	11	10	11	10
<b>Per Cent of Quarters</b>						
All Phases	100	100	100	100	100	100
Co-Expansion	47	57	35	45	39	51
Co-Contraction	13	26	32	30	36	34
Total Co-Phases	60	83	67	75	75	85
Counter-Expansion	11	2	18	11	8	0
Counter-Contraction	29	15	15	14	17	15
<b>Per Cent of Quarters Expected on the Assumption of Random Distribution</b>						
All Phases	100	100	100	100	100	100
Co-Expansion	44	43	26	33	26	34
Co-Contraction	10	11	24	18	23	17
Total Co-Phases	54	54	50	51	50	51
Counter-Expansion	14	16	26	23	20	17
Counter-Contraction	32	30	24	26	30	32

Co-phases: Periods when world cycle and domestic business cycle move in same direction.

Counter-phases: Periods when world cycle and domestic business cycles move in opposite direction.

Detail will not necessarily add to 100 because of rounding.

<sup>a</sup>Excluding the counter-expansion phase following devaluation of country's currency.

Source: Business cycle turns for United States and Great Britain from National Bureau of Economic Research. For world imports ex United States see text, this Section.

under the gold standard: domestic expansion in the face of world contraction.

After World War II we find a different situation. American and British business cycles now seem to be quite independent of world trade cycles. Forty-eight per cent of all quarters, 1949 to 1954, were counter-phases in the United States; in Britain the proportion was forty-three per cent.

The period is of course too short to give much weight to these figures, but they make sense in the light of recent developments. It is plausible that the international position of the United States economy was in these years too strong to permit foreign influences to play a significant role. In Britain direct controls were designed to isolate the economy, but it is not clear whether the greater role of counter-phases is due to these controls or perhaps to the devaluation of sterling, which brought a counter-expansion like that of 1931.

*Conclusion.* Our two-way classification of periods by national business cycles and by movements of world trade has proved a simple and useful tool for the analysis of foreign trade. We regard our world import cycles as highly tentative and hope that they will gradually be improved, but they enabled us to discover regularities of trade fluctuations that remained hidden as long as the framework of national business cycles alone was used. We have not tried to apply our method to activities other than foreign trade, but it is not unlikely that the method of subdividing business cycle phases would bring useful results in other fields.

## V. SUMMARY AND CONCLUSIONS

### *Summary of Findings*

Our analysis reveals, first, that the American and the British trade balances fluctuated cyclically over the last seventy-odd years. They have not shown the irregular behavior one might expect of series which measure differences between two largely independent economic activities. The balances also have not merely oscillated around their trends as they might if an adjustment mechanism worked instantaneously. Instead, the balances of both countries typically rose over extended periods of time; then reversed themselves and similarly declined.

Second, these cyclical swings of the trade balances were related to the tides of business in the two countries. Of thirty-nine comparisons between balance changes during business contractions and during the preceding and following expansions, thirty-four show conformity to business cycles. The closeness of this relationship is remarkable in view of the fact that we deal with the *difference* between exports and imports, and that foreign trade must be strongly affected by forces outside the American or British economies.

Though always close, the relations of the two trade balances to business cycles were not all of the same kind. The American balance shows inverse conformity; it rose more (or declined less) when American business con-