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fied in this fashion were statistically significant.

The results of our analysis, therefore, suggest strongly that a substantial part of the variance in expenditures "unexplained" by the independent variables in the study of the 462 cities may be due to differences in (1) the distribution of functional responsibilities among local governments from state to state, (2) the ratio of city to metropolitan area populations, and (3) the nature of the city with respect to its classification according to the criteria indicated above.

HARVEY E. BRAZER

OTHER STUDIES

The varied activities of government are reflected in the three reports published during 1955 and the two in press:

The Ownership of Tax-Exempt Securities, 1913-1953, Occasional Paper 47, by George E. Lent

A Century and a Half of Federal Expenditures, Occasional Paper 48, by M. Slade Kendrick

Minimum Price Fixing in the Bituminous Coal Industry, by Waldo E. Fisher and Charles M. James

The Growth of Public Employment in Great

Britain, by Moses Abramovitz and Vera Eliassberg (in press)

Fiscal-Year Reporting for Corporate Income Tax, Technical Paper 11, by W. L. Crum (in press)

"Federal Programs of Lending, Loan Insurance, and Loan Guarantees," by R. J. Saulnier, Neil H. Jacoby, and Harold G. Halcrow will shortly be ready for review by the Board. John Firestone's manuscript on the cyclical behavior of federal revenues and expenditures since 1879 is being revised.

The statistical work on the monograph on the growth of British governmental expenditures, 1890-1950, by Alan T. Peacock of the London School of Economics, is largely completed. Several chapters are in draft form.

Morris Copeland's report on his study of governmental financial capital requirements is in Section 2, and Roland I. Robinson's report on his study of the markets for government securities is in Section 4. Two new studies are reported briefly in Part Two. One is a broad exploration of the needs for research on the economic effects of public and private pension programs; the other is concerned with the analysis of newly available data on state and local government expenditures.

6. International Economic Relations and Foreign Economies

ECONOMIC GROWTH OF THE SOVIET UNION

The object of this study, begun in 1954 under a grant from the Rockefeller Foundation, is to set forth and analyze the evidence bearing on the question: How rapidly has the Soviet economy been growing in the past thirty years? The study was undertaken in full recognition of the inherent difficulty of arriving at an answer to this question and of the special difficulties attaching to the securing of reliable information.

In addition to the work reported on separately, studies are also being made of Soviet housing construction, labor force and population, and standard of living. Work in these areas is being done by Leo Grebler, Carolyn Shilling, Harold Wool, and Nancy Baster.

Industrial Production

The task of assembling annual figures on output and adjusting them to take account of the absorption of "small-scale" industry has been essentially completed, and some preliminary analysis has been started.

A cross-sectional view of the output series is given in Table 11. The count of series should not be taken too literally since there is some overlapping. In addition, a large number of subsidiary series covering relatively short periods, or containing pronounced gaps, are not included in the table. The best coverage is for 1928 through 1937 and for industrial materials. Here again a word of caution is called for, however, since almost all series contain minor gaps in the periods covered.

The decline in information for recent years results from a general Soviet policy of withholding unfavorable statistics from public view. Begun on a large scale in 1936, this policy was intensified during World War II and the postwar years. It has been carried out in three ways: (1) by publishing virtually no data for slow-growing or declining industries, (2) by omitting data for years of poor performance in other industries, and (3) by couching statistical reports in ambiguous and roundabout terms. Some of our series for the postwar years, for instance, exist solely in the form of annual percentage changes.

The net effect is that data on output, when not actually hidden by an impenetrable curtain, are at least obscured by a heavy veil. No series is known as well as one expects to know the nature of data for the United States. At the same time, internal evidence suggests that what data there are rest on a foundation of facts, not pure fiction. The primary difficulty is getting to the foundation.

These qualifications apply more strongly to postwar years than to the interwar period. The more complete data for the interwar period are fairly adequate for showing growth trends

through 1937 or 1940, though even here there are special problems because of the changing frontiers of industry. It must also be said that the data for recent years, though sparse by Western standards, do cover a number of important products, such as steel, coal, petroleum, electric power, and cement. For a number of reasons, a major part of our analysis will focus on growth trends of such commodities. For some commodities, the series extend back to 1880 or 1870, thus making it possible to compare Soviet trends with those in Czarist days.

The information given out for recent years paints a picture of an economy where output always rises and never falls. The published sample of annual data has been carefully sifted by Soviet authorities to exclude almost all downward movements in output as well as all persistently slow upward movements. Though the upward bias of the resulting sample is undoubtedly substantial, it is very difficult to get a concrete measure of it.

For a few series, it has been possible to find out, through roundabout methods, the extent of declines in output in years when no data were published. These declines seem to have

TABLE 11
NUMBER OF SOVIET OUTPUT SERIES COMPILED BY INDUSTRIAL CATEGORY, 1913-1954

	<i>Number of Series for:</i>				<i>Number of series covering 1913-1954</i>
	1913	1928 and 1937	1940	1954	
All categories	106	147	94	64	43
Industrial materials, total	72	88	52	26	24
Ferrous metals	14	15	11	3	3
Nonferrous metals	9	11	3	3	3
Electricity and fuel	6	7	6	5	5
Chemicals	13	21	11	8	7
Construction materials	21	25	19	7	6
Other materials	9	9	2		
Producer durables, total	11	25	14	11	3
Transportation equipment	6	10	3	2	1
Agricultural equipment		6	6	5	
Machinery	5	9	5	4	2
Consumer goods, total	23	37	28	27	16
Food and allied products	13	17	12	13	10
Clothing	10	13	10	7	6
Durables		7	6	7	

amounted to as much as 20 to 25 per cent in the case of certain producer durables in 1951 and 1952. We are studying ways of indicating the bias caused by this sporadic omission of unfavorable information. There is no simple way to deal with the bias created by the consistent omission of slow-growing industries. One approach is to see how the picture of United States growth changes when the slow-growing industries are ignored, and also when all declines in output are ignored. Clearly, there are serious dangers in moving from published postwar Soviet data to aggregate measures of industrial production.

Despite these general shortcomings of the data and other more specific ones yet to be mentioned, two tentative conclusions seem clear:

1. There seems to be a general tendency, somewhat less marked in the postwar than in the interwar years, for the output of individual products to show a progressive slowing down in the annual rate of growth. The Soviet economy does not seem to differ in this respect from the American and other economies. For some products, retardation is partly obscured because the product is so broadly defined that new and technically different commodities are automatically incorporated into the existing series. For example, "silk fabrics" now include the output of fabrics made from artificial fibers as well as from silk. There are also genuine exceptions to the rule, where there is either no apparent retardation or even apparent acceleration. But these exceptions do not seem to be more numerous than in the United States or to be significantly different in nature. Electric power is a case in point, where growth seems to be proceeding at a rather steady pace; this also seems to be true for the United States.

2. There seems to be a "growth cycle" in the interwar years, coinciding more or less with the "Five-Year Plans." The annual rate of growth in output seems to rise early in the planning period, to reach a peak about midway, and fall to a trough at the end. This pattern shows up in the majority of individual commodities for which we have data. The pat-

tern is somewhat altered in the postwar years, but it is too early to tell whether this reflects a fundamental change in growth trends or simply the peculiarity of postwar recovery and of the biased sample of data.

We are exploring methods of comparing Soviet industrial growth with growth in the United States. One method will show Soviet output as a percentage of United States output at various dates; another will compare Soviet and United States growth rates over the same and other relevant periods; a third will indicate the number of years lag of Soviet output behind United States output at various dates.

Properly qualified, the last method may produce some useful comparisons between the growth of Soviet and United States output at similar stages of development. For instance, Soviet output of steel ingots in 1913 (in the interwar territory) was the same as that which had been reached in the United States in 1890, twenty-three years earlier. In 1928, Soviet output lagged thirty-six years; in 1940, thirty-five years; and in 1954, thirty-eight years. The recently announced Sixth Five-Year Plan would, if realized, reduce the lag behind United States steel production to nineteen years. This would be a sharp reversal of the trend toward an increasing lag; it would make the lag four years smaller than in 1913.

Measures of broad aggregates of industrial production will be approached in steps through the construction of progressively more inclusive indexes. The first will be an index of energy output based on coal equivalents. Work on this index is essentially completed. Next will be an index of consumption of industrial materials, weighted by several alternative methods. Finally, several broad indexes of industrial production may be constructed. These broad indexes are not viewed as the ultimate goal or as the crowning synthesis of all other work, but rather as another way of describing growth.

As was stressed in last year's report, index numbers are doubly treacherous when used to summarize Soviet industrial growth: first because reliable and meaningful weights are so hard to obtain, and second because the Soviet

era has been characterized by radical changes in the structure of industry, administrative questions entirely aside. It is worth emphasizing again the importance of analyzing those structural changes and of disentangling them from the process of growth. In particular, the transformation of Russian industry from the handicraft stage, where this country was before the Civil War, into the factory stage requires special attention.

Among those participating in the work on the industrial sector last year were Alexander Erlich, Israel Borenstein, and Adam Kaufman.

G. WARREN NUTTER

Agricultural Production

During 1955 most of the work on the agricultural sector was devoted to (1) compiling and checking output data and correlative information on crops and livestock with particular emphasis on the period since 1945, (2) assembling information on the prices received by agricultural producers during the period 1925-1945, and (3) compiling and organizing the fragmentary data available for certain years on production costs, labor inputs, and unit labor requirements. Some preliminary and rather experimental computations of measures of agricultural output and of related index numbers for a few benchmark dates were made.

The volume of statistical information on agricultural output published in the Soviet Union declined steadily after 1935. Through 1935, annual output data for some twenty-six different crops could be readily located in Soviet sources. By 1937, the number dropped to nineteen; by 1940, to fourteen. For the period 1950-1955, output figures for only five individual crops and for the aggregate category "grains" were uncovered or derived from percentage changes reported in Soviet publications. For livestock products, the output of major items (major types of meat, milk, eggs, and wool) was directly available or could be estimated annually for the period 1921-1939 or -1941, and for 1950-1955.

The volume of physical output data and of correlative information on sown area and

livestock numbers is sufficient to trace with reasonable assurance and in reasonable detail the course of agricultural output to the beginning of World War II. The postwar data are too sparse to do more than to sketch in roughly the level of gross output for a few years. While the crops and products for which output data are available for the 1950's may account for as much as half the fixed-price value of total agricultural output in that period (they do so for the Soviet measure of agricultural production in 1940 valued in 1926/1927 prices), there is the obvious danger of imparting a substantial bias to the measure of output by basing it on the available data without some adjustment for the selectivity of coverage.

Perhaps a more serious difficulty than the sparsity and selectivity of data for the more recent years is the lack of comparability in published Soviet output data for crops. The shift from utilizable or harvested production as the concept of output to the "biological" concept (abandoned in 1954) occurred in several steps, which cannot be precisely set off. In the absence of detailed data, adjustments to restore some semblance of comparability are bound to be rough.

Yet the problem cannot be side-stepped, for fragmentary evidence indicates that the total size of the required adjustments is quite substantial (the reduction of 20 to 25 per cent in the official figures for grain production, at least after 1934, of 5 to 20 per cent for cotton production beginning with 1940, of about 15 per cent for sugar beet output in 1950 and 1951, to cite a few examples). The compromise solution that I have finally adopted is to estimate reasonable upper and lower bounds to the required adjustments and to carry along in subsequent analysis two variants of basic crop output series.

The choice of weights for an aggregate index of Soviet agricultural output raises interesting conceptual questions. The testable alternatives, however, are limited:

1. Price weights reflecting precollectivization free market valuation (1926/1927 Soviet prices or the like)

2. Average "realized" prices for a more recent period which reflect both planners' valuations and free market (collective farm markets) pricing
3. Unit labor input weights reflecting the allocation of the major input and unaffected by arbitrary pricing

Preliminary computations reveal a perceptible but generally moderate effect on the measure of agricultural output of markedly different weights. The use of postcollectivization average "realized" prices (1935) or unit labor inputs (1937) as weights in place of 1926/1927 prices reduces the level of the index (1926 = 100) because of the relatively greater weight imparted to the livestock component, but never by over 10 per cent.

The next step is to prepare a manuscript giving the documented basic output for crops and livestock, a description of the statistical estimating procedures used in the USSR, an analysis of Soviet measures of total agricultural output, and a set of aggregate output computations of our own employing price and labor input weights. Another manuscript in preparation will give the basic price materials and trace the major changes in the structure of agricultural producer prices. This compilation in conjunction with other data will provide a better basis than heretofore available for the estimation of income accruing to agriculture in the USSR.

GEORGE KUZNETS

Transportation

We have been studying traffic and operating statistics intensively to gain a more complete understanding of their nature because of their significance for the appraisal of general economic growth and their possible use as a rough check upon results in the industrial and agricultural sectors. As a close relationship between production and shipments may be expected in many segments of the industrial economy, and as production data may be based upon shipments data in a number of instances, an understanding of the latter assumes

considerable importance. Here the ground is, unfortunately, quite treacherous.

The data on water transportation, both inland and coastwise, have been assembled, although not without a good deal of trouble. Their reliability is low, but although this has long been recognized by analysts in the Soviet Union, little progress has been made in correcting the deficiencies in reporting. Water transport, however, contributes only about 8 per cent of total ton kilometers in most years. Pipe line and motor transport are of such scant importance that we have relied primarily upon the investigations of other students brought down to the present by our own investigation.

In all postwar years, about 90 per cent of all intercity ton kilometers in freight service was produced by the railroads. Hence major emphasis may be placed upon this form of transportation. It also appears that, while the traffic volume of Soviet railroads approaches that of the United States railroads, the volume of total United States intercity freight traffic in ton kilometers has been more than double Soviet volume in recent years. This is true even though the average haul in the Soviet Union is greater than in the United States. Statistics of total intercity transportation in the United States before 1939 are fragmentary, hence comparisons of earlier growth will have to be made largely between the respective railroad systems. Soviet railway growth in the postwar period has been great, but it parallels earlier phases of American railway growth during the period of intensive development succeeding the era of territorial expansion.

The appraisal of rail traffic and of rail operations is substantially complete and, for the most part, is in first draft. It appears to afford a reasonable explanation of the Soviet railway performance, including particularly an approach to an understanding of key operating indexes. It seems likely that tonnage originated and reported ton kilometers are overstated and that the freight car stock is understated. In consequence, car turnaround (the time it takes a freight car to complete a journey, including the time elapsed from placing for one loading to placing for the next loading) is presented

in a more favorable light than the facts will support.

It has not, however, been possible to secure a quantitative measure of the degree of inaccuracy. No railway system known to this writer is characterized by such looseness of reporting or such glaring absence of methods of internal accounting and statistical control. My conclusion is that the Soviet railway system represents an investment larger than the statistics reflect, while its traffic performance is somewhat less. All major indexes of the efficiency of railway operations, therefore, tend to be presented at overoptimistic levels. These conclusions should not, however, blind us to the fact that the Soviet railway system exhibits both great strength and considerable flexibility although it is far from a modern system by Western standards.

The major remaining task is to tie together the reported and estimated performance of the several types of transportation and to contrast the results with the more familiar pattern in the United States. This phase of the work is now fully under way.

ERNEST W. WILLIAMS, JR.

STRUCTURE OF WORLD TRADE AND PAYMENTS

Progress during 1955 on the broad study of the flow of goods, services, claims, and money between world areas, made possible by a grant from The Ford Foundation, was reflected in several papers given or circulated during the year.

The study of payments accounts. Working with Walther Michael on country payments accounts, I was able in November to give preliminary estimates for the gross and net value of goods and services transactions between world areas in 1951, the amounts financed by private and official transfers, and the remainder to the Subcommittee on Foreign Economic Policy of the Joint Committee on the Economic Report. Although net services transactions between areas showed a quite different pattern, that for net goods and services was

found to be much the same as for goods alone, namely with the sterling area in deficit to each of three other areas and balanced with Latin America, the non-sterling area in deficit to each of the other three, the "Other" area¹ in deficit to Latin America and the United States and Canada,² Latin America in deficit to the United States, and the United States and Canada in surplus with the four other areas. Because of the large official transfers from the United States, however, the pattern of net balances after taking account of gifts displayed a reversal of direction of balances, with the United States in net deficit with both non-sterling European Payments Union (EPU) countries and Other.

Tentative calculations I have made recently of capital movements between areas indicate that the large extension of credit to the sterling area by the nonsterling countries in EPU more than covered the sterling area deficit on goods and services account, so that the balance between these major parts of EPU financed by gold sales, multilateral settlements, and "error" went the other way. Finally, when I introduced some guesses on where \$400 million of gold disappeared and allowed for large gold sales by the sterling area from new production and reserves, the pattern of net balances financed by multilateral settlements and error displayed further modifications.

Chart 4 shows for the first time the patterns of net balances between world areas for a period of time (1951) at the four levels of inclusiveness:

1. Net goods and services = net financed by transfers, capital, gold, multilateral settlements and error
2. Net goods and services and transfers = net financed by capital, gold, multilateral settlements and error
3. Net goods and services, transfers, and capital = net financed by gold, multilateral settlements and error

¹ "Other" includes all Eastern Hemisphere countries not clearing through the European Payments Union.

² Including international organizations located in the United States.

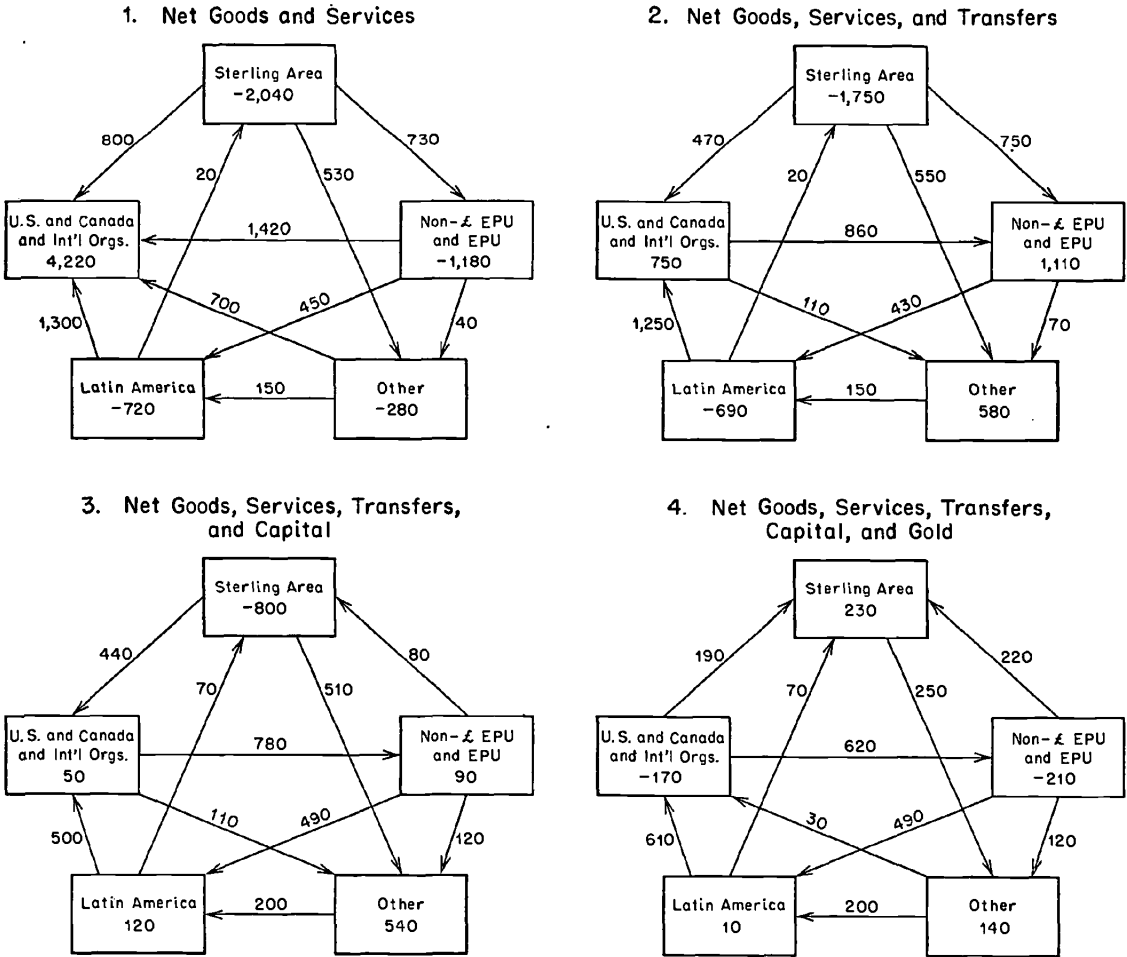
4. Net goods and services, transfers, capital, and gold = net financed by multilateral settlements and error

We see the interrelationships between the flow of goods and services, claims, and money among five broad divisions of the world within the framework of a closed (i.e. complete) system of accounts and have some sense of the accuracy of the estimates. I have considerable confidence that the *direction* of the nets is properly stated except when the balance is under \$50 million, and in these cases approximate balance is indicated. I have some confidence that the order of magnitude of the inter-

area balances is properly given – with more confidence attaching to the nets in (1) and (2) than in (3) and still less attaching to those in (4) (because of uncertainty about interarea gold transactions). I also have some indication as to the likely direction of the errors involved and the modifications in the patterns middle-man activities produce.

By further work on the 1951 accounts we may be able to improve the estimates by taking a different approach to the selection of figures for the matrix. I would also like to elaborate the five-by-five matrix into one distinguishing the United States from Canada, and European

CHART 4
The Pattern of Net Transactions between World Areas in 1951
(an arrow indicates the direction of net payments or debits;
the amount shown under an area's name is its net
balance with the world)
(dollars in millions)



metropolitan areas from associated territories. Progress in these directions was incorporated in a paper for the Universities-National Bureau Committee conference on international economics in April 1956.

The over-all "error" indicated in (4) for each area is not a true measure of the uncertainty attaching to the totals of the several types of transactions by each area with the world. But it represents a minimum emerging from offsetting of errors in the totals for the different transactions accounts. Our audit of each type of transaction as a separate inter-area matrix indicates a substantial amount of divergence between total debits and credits of all countries for the more important categories of goods, services, and transfers. Excessive credits for merchandise and miscellaneous services offset in part the greater excessive debits for other services and transfers. The excess of debits on all current accounts and transfers indicates an underreporting of current credits, notably revenue of the "refugee fleets" and of reinvested earnings on foreign investment. Both omissions imply an underreporting of capital or gold flows.

Because of the generally better reporting of debits, I made up the matrix of goods, services, and transfers for 1951 mainly from reports or estimates of debits.

Our audit of trial-run matrixes and total debits and credits of the different transactions revealed a number of deficiencies and inconsistencies in country reporting of other accounts than merchandise and transportation. These we brought to the attention of the International Monetary Fund officials concerned in a memorandum commenting on proposals to revise their *Balance of Payments Manual*.

Considerable progress was made by Walther Michael and James Griffin in compiling data on country transactions in 1950, 1952, and 1953 similar to those on 1951 we have been studying. By the end of the year merchandise and transportation transactions were in hand, and it is planned to complete this stage of the work in the first part of 1956. In the course of 1956 we plan to have figures like those given for 1951 for the four years 1950-1954 and be

able to observe the stability or shifting character of the patterns in the figure from year to year.

The study of merchandise trade. In his study of the record of merchandise trade, Robert Lichtenberg focused this year on the analysis of the role of the middleman in world trade. He reported his progress in a paper delivered to the American Statistical Association at the annual meeting in December.

Lichtenberg examined data of seven countries which report imports both by country of production and by country of purchase. From these records, and from supplementary material on other countries, he found the bulk of world trade to be *direct*, but that in 1952 middlemen mainly supplied more or less refined foods and materials to the seven countries.

Lichtenberg concluded that:

1. Using trade and payments records to assess the interregional financial position of countries results in some serious distortions.
2. Middlemen make a substantial contribution to the foreign exchange position of some countries both directly and through the support they lend to complementary services.
3. They play a major role in linking the economies of many underdeveloped countries to the world economy.
4. Their activities introduce considerable flexibility into bilateral and regional payments agreements by substituting commodity arbitrage for currency arbitrage, and they are a factor tending to push sterling and, hence, other currencies toward convertibility.

Lichtenberg was not able to incorporate in his paper the results of an analysis of the two-valued record we have compiled for 1951 of trade between countries in some twenty-odd commodities defined by three-digit Standard International Trade Classification (SITC) codes although he did scrutinize the record for coffee and rubber. It is evident from these instances and from Dwyer's more searching study of the petroleum trade that to understand and report correctly the record of merchandise and transactions in the most

homogeneous, standardized goods in which middlemen mainly trade, one must study the enterprise structure of international markets, commodity by commodity. We hope it will be possible to make substantial progress along this line in 1956 for the twenty items, emerging with an indication of the extent of the adjustments to the record required for the twenty as a group and, of course, with a more profound and intimate knowledge of the conduct of international trade.

The program of compiling data on trade in particular commodities for a recent period was drastically curtailed during 1955 to allow more time for the analysis of data already gathered. By the end of the year we had completed the compilation for 1951 and had identified trade between countries in three-digit SITC codes (from the export side only) amounting to over \$55 billion out of the total of \$76 billion. Another \$13 billion is identified by commodity as an export to some unidentified destination. Thus we know from the export side the commodity composition, according to the SITC code, of almost 90 per cent of world trade, and for almost 80 per cent of this 90 per cent we know the country of destination. In addition, we know from the import side the composition and country-to-country detail for part of the remaining 10 per cent, consisting of trades like Thai rice not reported from the export side. For some twenty-odd three-digit SITC codes representing more than a third of world trade, we also have a record from the importers' side of quantities and values imported from particular sources in general accounting for about 75 to 80 per cent of world trade in those items.

We plan to study this selected record of matching importers' and exporters' records for the light it sheds upon differences in recording practice (especially valuation, direction, and timing) and hence upon differences in accounting for interarea merchandise transactions. We have made a start on extending the two-valued compilation for the twenty-odd items into 1952, but owing to the diversion of statistical assistance to analytical work involved in the analysis of middlemen transac-

tions, this work has not been completed. In 1956 we expect to put the compilation for 1951 into publishable form.

Other studies. In connection with her work on adjusting merchandise payments accounts from c.i.f. to f.o.b., Carmellah Moneta undertook during the year to analyze the factors determining the size of the c.i.f.-f.o.b. adjustment. The study focused on the variation in freight rates, unit values, and freight factors characterizing German imports in 1951. It appears that the proportion of freight in c.i.f. value varies greatly by SITC commodity groups and within a group somewhat with distance. More particularly, Mrs. Moneta finds for Germany in 1951 that the proportion (F_i) of the c.i.f. value of a commodity which is freight was related to its unit value (X_i) as follows:

$$F_i = a X_i^{-.75}; 2 < a < 6.$$

The factor a represents the effect of distance and varies within the range 2 to 6; the exponent carries the effect of variation in bulkiness (measured by unit value) between commodities and is observed to vary greatly: from .0030 for textile fabrics to .1375 for ores. She concluded that the differentiation between freight factors of imports of the same commodity from different countries is significant only when bulky commodities (i.e. low-valued ones) are considered. It follows that the failure to identify separate freight factors on bulky items and distinguish between different sources for them in a calculation of the over-all freight bill (e.g. Viner's well-known calculation of Canadian freights in 1907) may result in substantial percentage error.

The study of petroleum transactions between world areas which Cornelius Dwyer is carrying on and the study of transportation transactions which Herman Karreman is responsible for are reported below.

HERBERT B. WOOLLEY

Petroleum Transactions

I presented a paper before the American Statistical Association annual meeting in December entitled "The Oil Trade in the Interna-

tional Balance of Payments in 1951," based upon data obtained from the customs records of seventy-seven importing countries and sixteen exporting countries.

The landed value of free world oil trade — defined as imports of crude oil for refining and of refined products for consumption but excluding re-exports and transit trade — was estimated at \$7,260 million, about 9 per cent of all free world trade. United States oil companies sold 57 per cent of this total, British and British-Dutch, 39 per cent, and other companies, 4 per cent.

The net receipts of the United States from international oil activities were estimated at \$1,790 million, the balance remaining after the deduction of dividends and payments for imports and foreign flag tankers from receipts of oil, merchandise exports to oil source countries, tanker freight, and investment earnings. Foreign exchange receipts are overstated by the inclusion of an unknown but large quantity of oil delivered to American armed forces in Korea and elsewhere. They are understated by the exclusion of sales of services (including those of oil company employees) to the oil source countries.

The paper also provided estimates of the major elements in the United Kingdom's balance of payments on petroleum account, most of the components of which are concealed in a single miscellaneous figure. United Kingdom receipts from exports, tanker freight, merchandise exports to oil source countries, and investment earnings were calculated at \$610 million more than payments for imports, tankers, and dividends. These dividends, to the Netherlands from the earnings of the Royal-Dutch-Shell Group, were considerably smaller than the Netherlands' equity in those earnings, the difference representing an increase in the Netherlands' investment in the United Kingdom (or, looking at it another way, in the different countries where the Group operates). Some of the estimated receipts represented deliveries to United Kingdom armed forces — an overstatement of receipts more than counterbalanced by the excluded sales of services to oil source countries.

The basic figures consisted of f.o.b., freight, and c.i.f. value, and of quantities, for trade in nine categories of crude oil and petroleum products for each importer and each exporter, as reported by one or both parties to the transaction. Freight costs were estimated, in detail, and the missing element, either f.o.b. value or c.i.f. value, calculated therefrom. I believe that the resulting trade and freight figures have a high degree of accuracy although, like all statistics, they can still be improved.

CORNELIUS DWYER

Transportation and Marine Insurance

Most of our work in 1955 went into an effort to assess the amount of data and number of calculations needed to estimate carefully the total amount of freight paid by each country for the transportation of dry cargo from the record of goods moved and freight rates charged. Robert Lichtenberg's compilation for 1951 provided a starting point but, because it was designed to account for a large proportion of world trade by value, rather than by quantity, his selection required considerable supplementation.

We found that a selection of approximately 2,700 movements of particular commodities between pairs of countries (at the five-digit SITC or even more detailed level) would cover about 75 per cent of the tonnage of all dry cargo exported by free countries in 1951; this results from the heavy tonnages of coal, grain, ores, forest products, and fertilizers. A summary is given in Table 12.

The 75 per cent coverage will produce a fairly good estimate of the dry cargo freight bill, provided a sufficient number of freight rates can be secured. The total number of freight rates involved and its distribution by area is given in Table 13. By the end of the summer of 1955, practically all the information we needed on quantities of commodities imported in 1951 had been collected, and of some of the imports in other years.

Early in the summer, I sent letters to a number of European shipping conferences asking them to supply data on the freights charged on

TABLE 12
WORLD SEA-BORNE EXTERNAL TRADE OF DRY CARGO IN 1951

EXPORTING AREA	SELECTED EXPORTS TO:						COVERAGE (2 ÷ 1) (7)
	TOTAL	ALL	NON-CTS	CTS COUNTRIES			
	NON-CON- TIGUOUS (1)	COUN- TRIES (2)	COUN- TRIES (3)	<i>All</i> (4)	<i>U. S.</i> (5)	<i>Other</i> (6)	
	<i>(millions of metric tons)</i>						<i>(per cent)</i>
United States	68	57	26	31	—	31	84
Other CTS	124	86	33	53	7	46	69
All CTS	192	143	59	84	7	77	74
Non-CTS	103	79	22	57	17	40	76
All countries	295	222	81	141	24	117	75

Note: CTS countries are those for which data are published by the United Nations in *Commodity Trade Statistics*.

TABLE 13
NUMBER OF FREIGHT RATES TO BE COLLECTED

EXPORTING AREA	IMPORTING AREA:				
	ALL COUNTRIES	NON-CTS COUNTRIES	All	United States	Other
United States	258	156	102	—	102
Other CTS	1,401	817	584	94	490
All CTS	1,659	973	686	94	592
Non-CTS	1,006	375	631	119	512
All countries	2,665	1,348	1,317	213	1,104

Note: For explanation of CTS, see note to Table 12.

the most important commodities carried by their members on different runs to and from Europe as well as between non-European countries; the replies were disappointing. However, from other sources, notably the United States Maritime Commission, tanker brokers in New York City, and other sources, we have been able to assemble a considerable amount of information on freight rates. We see some prospects for securing more information on them.

Our general impression is that we shall have sufficient information to enable a careful estimate to be made of the amount of freight paid by each country for the transportation of imported dry cargo. The tanker freight bill has already been computed in cooperation with Cornelius Dwyer.

Before beginning the computation of the

dry cargo freight bill, however, I have been exploring more fully the data on transportation transactions. Walter Michael has now compiled for 1950 to 1953, which will enter into the matrix of world trade and payments. As an immediate contribution, I was able to provide rough estimates of the unreported transactions of the Panama, Honduras, and Liberia fleets as well as of the United Kingdom tanker fleet and of the distribution of freight payments by flag of vessel; Herbert B. Woolley used these estimates in preparing the tables presented to the Subcommittee on Foreign Economic Policy. I employed this material in a paper I presented at the conference on international economics in April; it aimed to give an idea of the freight amounts paid and received in 1950 to 1953, in total and by area.

HERMAN F. KARREMAN

CYCLES IN FOREIGN TRADE

Our analysis of the American and British trade balances, 1880 to 1954, has been completed and the results set forth in a paper which has been submitted to the staff. From this report, I mention here only some of the findings about the British balance before World War I.

Our object is to answer such questions as: Has the British trade balance fluctuated in cycles? If so, what was the relation of balance cycles to British business cycles and to world trade cycles? Did the British balance, like the American, decline in business expansions and rise in contractions? Did its turns precede or follow those in general business?

Contrary to the views of some economists, we find that the British balance did fluctuate cyclically and that its cycles were closely related to cycles in the British economy. In the interwar period this relation was of the same type as that of the American trade balance to American business cycles. The British balance fell each time when business expanded and rose when it contracted. Though the regularity with which this pattern was repeated may be surprising, its shape is not. Most economists would expect imports to rise more in business expansions and fall more in contractions than exports.

But the curious fact about the British trade balance is that, contrary to such expectations, it rose and fell regularly *with* British business cycles between 1880 and 1914 and reversed this behavior only after World War I. This, of course, contradicts the recent application of findings for the interwar period to the earlier years. It also contradicts pre-1914 theories about effects of British cycles on other countries that assume inverse movements of the British balance.

The contrast between the American and British balance movements, 1880 to 1914, is most striking around business cycle peaks. Both balances move with amazing regularity during the last stages of business expansions and the first of contractions. But while the American balance fell 9 times out of 10 before, and rose 8 times after, business peaks, the British balance in the same period *rose*

before, and fell sharply after, each of the five British business peaks.

The contrast between the patterns of British and American trade balances seems to result from the difference in the impact of business cycles in the two countries on their foreign trade. More particularly, the difference seems to lie mainly in the behavior of exports shortly before, and of imports immediately after, business cycle peaks. In the United States, late expansion was a phase when export values rose only slightly, or even fell, despite firm or rising prices because of shrinking quantities. In Britain, however, export values rose on the average more in the second, than in the first, half of expansions. Usually prices rose, often sharply, and quantities sold also increased, though more slowly than in the earlier stages of expansion.

The contrast between American and British imports at the beginning of business contractions is even sharper. American imports fell immediately after business peaks, British imports continued to rise sometimes even at an accelerated rate. Various explanations of the different reactions of British and American foreign trade to business cycles suggest themselves. They will be explained with the help of the forthcoming price and quantity indexes (see Robert E. Lipsey's report, below).

The positive conformity of the British balance means that the effects of the balance on the British economy must have been largely destabilizing in this period. Balance movements facilitated credit expansion in prosperity and contributed to credit contraction in depression. The role of the balance was thus the reverse of its role in later years, and of that of the American trade balance.

How large these effects of balance changes were in relation to other factors is difficult to estimate. They may have been insignificant in view of the fact that the variations in the trade balance were, on the average, about twice as large as the variations in the monetary reserves of the Bank of England.

As regards the transmission of British business cycles to foreign countries through the trade balance, our findings do not support the

view that British adjustment was at the expense of foreign countries before 1914. On the contrary, the decline of the British balance in British depressions must have helped to sustain foreign economies. This is again in sharp contrast to the unfavorable effects on foreign countries of British balance cycles in later years and of American balance cycles.

ILSE MINTZ

INDEXES OF AMERICAN FOREIGN TRADE

We have completed the collection of quarterly value data for United States imports by economic classes and commodity groups, 1879-1923, and expect to begin the computation of the price, quantity, and value indexes shortly. As reported last year, the calculation of quarterly price, quantity, and value indexes for exports has been completed.

One new group of series has been completed: a set of quarterly price indexes, covering the years 1924-1929, for five economic classes of United States imports. These indexes are to be used as interpolators for the annual series of the Department of Commerce, and were constructed in such a way as to match the latter closely. They will fill a gap which would otherwise have existed in the quarterly information between the end of the new National Bureau import price indexes in 1923 and the beginning of the Department of Commerce quarterly series in 1929, a gap which can be bridged on the export side by the use of Cowden's indexes.¹

We did not make any attempt to improve upon the Department of Commerce indexes, but our examination of them confirmed our view that the degree of coverage that can be achieved when only export and import unit values are used is inadequate, and that it is advisable to supplement these with other types

of price data, as we have done in our indexes for 1879-1923.

I presented a paper on "Some Sampling Problems in the Construction of Price Indexes," which grew out of this study, at the annual meeting of the American Statistical Association in December.

ROBERT E. LIPSEY

OTHER STUDIES

Several monographs in preparation are devoted to the economies of other countries than the United States. British governmental activity is treated in *The Growth of Public Employment in Great Britain*, by Moses Abramovitz and Vera Eliasberg, which is now in press, and in the companion monograph on governmental expenditures in Britain by Alan T. Peacock, which is near completion. Gerhard Bry's book, "Wages in Germany, 1871-1945" is being prepared for press. Two studies deal with the Canadian economy: *Concentration in Canadian Manufacturing Industries*, by Gideon Rosenbluth, is in press; "The Canadian Balance of Payments since 1868," a Technical Paper by Penelope Hartland, is being revised preparatory to review by the Board.

Oskar Morgenstern's book, "International Financial Transactions and Business Cycles," will shortly be ready for review by the Board. Several of the conferences recently held have made significant contributions to our knowledge of international economic relations and foreign economies, namely, the conferences on capital formation and economic growth, the measurement and behavior of unemployment, problems in the international comparison of economic accounts, and consumption and economic development. A conference on international economics was held in April 1956. For reports on these conferences, see Part Two.

¹ Dudley J. Cowden, *Measures of Exports of the United States*, Columbia University Press, 1931.