

TWENTY-FOURTH
ANNUAL REPORT
OF THE
SECRETARY OF COMMERCE



1936



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TWENTY-FOURTH ANNUAL REPORT
OF THE
SECRETARY OF COMMERCE

DEPARTMENT OF COMMERCE,
OFFICE OF THE SECRETARY,
Washington, October 15, 1936.

To the CONGRESS OF THE UNITED STATES
(Through the President).

The Secretary of Commerce has the honor to present his Twenty-fourth Annual Report covering the fiscal year ended June 30, 1936.

ECONOMIC REVIEW

The marked improvement in conditions which has characterized the 2 preceding fiscal years continued to gain throughout the year 1935-36. Economic recovery broadened this year with acceleration of activity in the durable goods industries and in construction lines, the further rise in farm income, the increase in the number of persons employed, and the expansion in industrial pay rolls. The upward recovery was especially noteworthy in the late months of the fiscal year. According to the seasonally adjusted indexes of the Federal Reserve Board, the volume of industrial production in June 1936 was the highest, with the exception of December 1935, since April 1930.

Table no. 1 is intended to show the extent of the rise in some of the important economic units from the low year of the depression, and to furnish comparative historical data for the period subsequent to the World War. Each of the series included shows progress for the fiscal year, as compared with the preceding year. In manufacturing, the increase in volume was 20 percent; freight traffic over 10 percent. The increases are quite noteworthy in the dollar measurement in cash income from farm marketings, factory pay rolls, and department-store sales. The largest relative increase in the series presented was the 75 percent gain in construction contracts awarded.

Prices.

Fluctuations in the general level of wholesale prices during the fiscal year were relatively slight, the index presented in table no. 1 showing a variation of about 2 points during the 12-month period. The average for the year was 2.6 percent above the 1934-35 average and was more than 25 percent above the low year of the depression. The slight fluctuations which occurred during 1935-36 were due mainly to variations in the prices of farm products and foods. The Bureau of Labor Statistics index of farm prices was 77.1

for July 1935, reached its maximum of 79.5 in September, and again in February; it declined to a low of 75.2 for May, but recovered to 78.1 in June 1936. The index of food prices was 82.1 for July 1935; it reached a maximum of 86.1 for the fiscal year in September, a minimum of 78.0 in May, and closed the year with 79.9 for June 1936. The drought was primarily responsible for the advance in the last 6 weeks of the fiscal year. The fluctuation in the monthly wholesale-price index, exclusive of farm and food products, was confined to little more than a single point, the extremes being 77.8 in September and 79.0 in February.

TABLE No. 1.—Indexes of major economic changes

[NOTE.—Based on calendar-year average 1923-25 as 100, except cash income from farm marketings which is based on calendar-year average 1924-29 as 100]

Year ended June 30 and month	Industrial production ¹	Manufacturing production ¹	Cash income from farm marketings ¹	Net ton-miles of freight carried, class 1 railroads	Electric power production	Department-store sales, value ¹	Factory employment ^{1,2}	Factory pay rolls ²	Wholesale prices	Construction contracts awarded value ¹
1920.....	89	91	-----	96	-----	88	112	112	153	77
1921.....	74	73	-----	90	70	92	92	97	124	51
1922.....	74	75	-----	79	72	84	84	74	94	70
1923.....	98	98	-----	96	88	91	100	95	101	83
1924.....	98	97	-----	98	95	99	102	102	98	89
1925.....	99	99	100	98	102	100	96	96	101	101
1926.....	105	107	103	105	116	104	101	103	103	130
1927.....	109	108	97	111	129	107	100	104	87	130
1928.....	106	106	100	104	338	107	98	100	96	133
1929.....	118	118	102	110	154	110	103	107	96	127
1930.....	110	110	100	104	363	108	101	102	93	107
1931.....	87	86	72	86	155	99	84	77	79	76
1932.....	70	69	50	66	146	80	71	56	68	40
1933.....	67	66	42	57	136	64	62	41	63	23
1934.....	83	82	53	67	149	72	78	59	72	34
1935.....	82	80	60	67	156	76	80	64	78	28
1936.....	96	96	67	74	176	82	84	74	80	49
Months, 1935-36:										
July.....	86	86	61	62	167	80	81	65	79	35
August.....	87	88	63	70	171	77	82	69	81	38
September.....	90	91	64	74	164	81	82	72	81	43
October.....	95	95	67	84	176	78	84	74	81	48
November.....	97	98	67	74	173	82	85	74	81	60
December.....	104	104	66	70	182	83	86	76	81	67
January.....	98	97	68	75	184	81	85	72	81	61
February.....	94	91	66	78	172	83	84	72	81	52
March.....	93	93	67	75	178	84	84	76	80	47
April.....	100	99	70	75	177	84	85	77	80	47
May.....	101	100	73	75	181	87	86	79	79	46
June.....	103	104	80	72	182	87	86	79	79	52

¹ Monthly figures adjusted for seasonal variation; cash income from farm marketings does not include rental and benefit payments during the period such payments were made.

² Indexes have been adjusted to conform with the figures for employment and pay rolls for the years through 1931, as published by the Bureau of the Census, Department of Commerce.

Sources: Industrial production, manufacturing production, department-store sales, and construction contracts awarded, Board of Governors of the Federal Reserve System; cash income from farm marketings, Bureau of Agricultural Economics, Department of Agriculture; ton-miles of freight carried, etc., Interstate Commerce Commission; electric-power production, Federal Power Commission; factory employment, factory pay rolls, and wholesale prices, Bureau of Labor Statistics, Department of Labor.

Considerable progress must yet be made before the 1928-29 level of production and consumption is reached. However, it will be noted that a per capita volume equivalent to that of 1928-29 would mean a higher aggregate since the population has increased about 4 percent in the past 7 years. The strength and persistence of the upward movement, however, during the past fiscal year, despite the many obstacles yet to be overcome, have favorable implications with regard to the

immediate prospects of narrowing this gap and of providing a more adequate flow of goods and services in the national economy.

Industrial production.

The significant features for the year with regard to industrial output were: (1) Substantial increase in the output of durable goods manufactured, (2) further, but less marked, increase in the production of nondurable goods industries, and (3) the fact that the forward movement was not checked by an important set-back at any time. The December 1935 peak, indicated by the seasonally adjusted production index, and subsequent moderate recession in the first quarter were influenced to a considerable degree by the shift in the fall date of new model introductions in the automobile industry. For this it is difficult to make a proper seasonal adjustment.

Steel production, which is an accepted barometer of conditions in the durable industries, climbed from 41 percent production capacity in June 1935 to 70 percent in June 1936, when output was only about 12 percent under the 1928-29 average. Production of agricultural implements, machinery, electrical equipment, railway equipment, and similar products all made material advances during the year. These increases generally were made from relatively low levels, and at the end of the year the volume of output of durable manufactures was only about one-sixth below the 1928-29 average.

The Federal Reserve Board's June 1936 production aggregate for the manufacturing industries which it places in the durable classification, was nearly 50 percent higher than the figure for the final month of the preceding fiscal year. The aggregate for the nondurable goods was up 8 percent. The output of the two classifications prior to the 1929 collapse was divided about equally between durable and nondurable products. At the low point of the depression the output of durable manufactures, the demand for which is relatively elastic, had declined 78 percent from the 1928-29 average, while the output of nondurables had declined only 30 percent. With the marked recovery of this fiscal year in the output of steel, building materials, and like products, the balance was considerably improved. In June 1936 the production of durable manufactures, as measured by the index of the Federal Reserve System, had recovered to within 17 percent and of nondurables to within 8 percent of the 1928-29 level.

Expansion in manufacturing activity was accompanied by a further decline in the available stocks of raw materials, thus tending to strengthen the existing price structure. The Bureau of Foreign and Domestic Commerce's index of raw material stocks, which provides an indication of the general trend, rose from 133 in the fiscal year 1928-29 to 183 in the year ended June 1932 (1923-25=100). After a decline in the following year there was another moderate rise, but in the past 2 years such stocks have been materially reduced. Currently the index is approximately at the same point as before the decline which started in 1929.

Construction industry.

Part of the improved demand for manufactured products is traceable to the improvement in building construction. Although building operations are still on a restricted scale, far below the level of the 1920's in both the residential and industrial fields, the comparison

with the preceding fiscal year reveals considerable improvement in actual operations, and a change for the better in some of the factors which are important in the long-term trend of building activity. This is particularly true of residential building. The mortgage market generally was more favorable than in the preceding year, with funds available in most areas on more reasonable terms; the volume of distress properties coming on the market was definitely less; rents were upward; and the percentage of vacancies materially less.

These factors, coupled with expanding income and a further enhancement of economic security, have produced a revival in residential construction. The value of residential contracts awarded nearly doubled during the fiscal year, although the total was less than a third of the volume in the era of extensive residential construction which followed the war.¹

In the nonresidential field, the large expenditure of public funds was a major cause of expanding activity, but there was an increase in commercial and industrial building which was more significant perhaps as an indication of an upward movement than for the magnitude of the actual increase which occurred. Construction by private utility concerns, although larger than in the preceding fiscal year, was relatively small. However, with electric power production running at record figures during the year, the need for expansion of production and distribution facilities is more pronounced.

The activities of the Federal Government in the field of real estate finance have been an important influence on the general mortgage situation and the availability of capital for new construction. Particularly important in this field have been the operations of the Federal Housing Administration, which have promoted the development of sounder and less onerous mortgage financing, and the lending operations of the Home Owners' Loan Corporation, which had outstanding at the end of June 1936 more than 3 billion dollars of mortgage loans which had been advanced to distressed home owners. This refinancing has been one of the factors contributing to the more wholesome mortgage situation existing at the end of the year.

The importance of the revival in construction to the general nature of economic improvement may be appreciated when it is recalled that in years of moderately high activity, such as 1930, the construction industry required, on the construction site itself, some 2½ million men during a major part of the year. An even larger number of workers were dependent upon construction for their normal employment in the fabrication, manufacture, and transportation of construction materials and equipment. The unemployment resulting from the tremendous shrinkage in construction work during the depression has been extremely large and prolonged, and has been only partially alleviated by the recovery experienced in the industry up to the present.

Agriculture.

Conditions in agricultural areas during the fiscal year 1935-36, which closely corresponds to the marketing season for the 1935 agricultural production, were favorably influenced by the more normal agricultural harvest, higher prices, easier financial conditions, ex-

¹ From report of E. W. Dodge Corporation.

panding consumer income, the larger demand for cotton, and the absence of excessive stocks which had assumed such burdensome proportions in the earlier years of the depression.

The Department of Agriculture's estimate of the gross income from farm production in 1935 was 17 percent higher than for 1934 and 59 percent larger than that for 1932, the low year of the depression for agriculture. The improvement in farm income during the 1935-36 fiscal year over the preceding fiscal year was primarily the result of the increase in prices of farm products, since agricultural production in 1935 was about 2 percent less than in 1934, while the index number of farm prices increased by 12 percent in 1935-36 over 1934-35. Crops were considerably larger than in 1934 when output was curtailed by the drought, but this increase was more than offset by smaller production of livestock and livestock products.

Estimates of gross and cash farm income alone do not fully reflect the improvement in the economic position of the farmer. Agricultural production expenses during the recovery period have not increased as rapidly as has farm income so that the net income available to the farm operator for his labor, capital, and management has reflected an even more favorable situation.

The 1934 drought exercised an important influence on agricultural marketings and prices during the fiscal year 1935-36, and before the close of this period it was apparent that the 1936 drought would cause a marked reduction in the yield of crops, and also would affect the livestock industry. This situation did not exercise a major influence in the year under review, however, except to cause a renewed upturn in the prices of farm products in the closing weeks of this period, with the grains and dairy products, particularly, reacting promptly to unfavorable weather reports of May and June.

Retail and industrial sales.

Increased purchasing power of the farm population was one of the factors contributing to the marked growth in retail trade during the fiscal year. Those concerns which do business largely in rural areas enjoyed some of the widest sales increases. A measure of the extent of the sales improvement is provided by the Bureau of Foreign and Domestic Commerce's index of rural sales of general merchandise. This seasonally adjusted index, which had dropped to 48 in 1933 (1929-31=100) at the low of the depression, had recovered to 112 in June 1936. The June figure was only 10 percent under the average for the calendar year 1929. Increases in June 1936, compared with the corresponding period in 1935, were reported for each of the four major geographical areas, with the largest relative gain in the far Western States, and the smallest in the Middle Western region.

The sales increase in farm areas was accompanied by a considerable trade expansion in urban centers. During the latter half of the fiscal year the dollar volume of all retail sales was estimated to be running about 10 percent higher than in the corresponding months of the preceding year. In the calendar year 1935, retail sales climbed to \$32,600,000,000, compared with a depression low of about 25 billion dollars.

While practically all major lines of retail trade realized increased volume in sales during this fiscal year, pronounced gains were re-

ported in those lines where purchases were suspended on account of the depression. Sales of automobiles, furniture, jewelry, vacuum cleaners, washing machines, and mechanical refrigerators, for example, rose sharply as consumers evidenced both a greater willingness and a greater ability to acquire products which, in general, require a relatively large expenditure per unit and more often than not a settlement on a deferred payment plan.

The tendency for industrial sales to increase during the year was as important as the rise in sales to individual consumers. The railroads purchased equipment on a substantial scale for the first time in several years. Sales of machine tools, foundry equipment, wood-working machinery, electrical equipment, paints, motor trucks, and electric industrial trucks and tractors all give evidence of increasing demands incident to the expanding needs of industry.

Railroads.

The improvement during the year in the financial position of the railroads was a noteworthy development. The economic recovery in this industry has been slow, and but recently have managements been able to increase their capital outlays. Mounting costs of operations during the recovery period, coupled with the comparatively slow increase in operating revenues, have made it necessary for the carriers to husband their resources. Further recovery in traffic from present levels will bring important showings in operating results.

In the final month of the fiscal year, on order from the Interstate Commerce Commission, the eastern railroads reduced passenger fares materially, the basic passenger fare being cut from 3.6 to 2 cents a mile for coach travel, and from 3.6 to 3 cents for Pullman travel, with the Pullman surcharge eliminated. Experimental reduced fares had been in operation in other districts for some time, but in the eastern region where passenger traffic is heavy, the principal railroads were loath to try the lower rates. While one month's operation under the new schedule of fares does not provide the basis for judging the probable results, the increase in passenger revenue with the reduced fares for even so short a period is certainly a favorable sign. The public's desire to travel and the carrier's desire for increased revenues here meet for the advantage of all the Nation.

Foreign trade.

Coincident with the expansion of domestic industry and trade, there was a continuation of the increase in our foreign trade which, in the last 3 years, has brought this phase of our economic activity to a level far above that in the low year 1932-33.

Among the factors contributing to the expansion of our export trade, the following are worthy of note: (1) the further improvement of economic conditions in a number of foreign countries which resulted in an increased demand for many United States products; (2) the moderation of tariffs and other trade barriers in a number of Latin American countries which permitted a freer movement of our wares into those markets; (3) the unsettled conditions abroad and threats of war which caused some countries to expand their purchases of certain raw materials and industrial equipment; (4) the progress made in the extension of our reciprocal trade agreement program which has tended to stimulate the flow of goods.

American producers in many lines, affecting in some measure almost every branch of our national economy relating to export trade, have enjoyed larger opportunities for foreign sales which have been opened up through concessions obtained from the foreign countries with which trade agreements have been consummated thus far, or have been assured of stability through the guarantees against further increases in duties or other barriers against the admission of their products to those countries.

Among contrary influences may be mentioned the high and often discriminatory tariffs of certain European countries, along with quota embargoes, exchange control, and trade-balancing agreements, which in many instances were as restrictive as in the immediately preceding years, and in some individual cases more so. The reduction of our domestic supply of certain agricultural commodities as a result of the drought in 1934 and other influences continued to affect adversely our exports of these products. Internal difficulties in several important countries, notably Germany and China, curtailed exports to those markets.

The improvement of domestic economic activity increased our need for many raw materials. Larger incomes and greater purchasing power, which accompanied improved domestic conditions, resulted in an increased demand for certain tropical and semitropical foods which we either do not produce at home or do not produce in sufficient quantity to meet our domestic requirements. The reduced supply and smaller production of a number of agricultural products following the 1934 drought led to larger imports of feedstuffs, oilseeds, vegetable oils, and certain dairy and other animal products.

Our total exports of merchandise amounted to \$2,413,000,000 in 1935-36 which was 14 percent more than in 1934-35, while imports which amounted to \$2,216,000,000 were 24 percent larger. Compared, however, with the depression low reached in 1932-33, exports were 68 percent larger in value and imports 90 percent larger.

TABLE No. 2.—*Foreign trade in the United States*

Year ended June 30 and percentage change	Millions of dollars							Quantitative indexes (1923-25 calendar year average 100)	
	Exports		General im- ports	Imports for con- sump- tion	Excess of exports (+) or imports (-)			Ex- ports ¹	Im- ports ¹
	Total	United States mer- chan- dise			Mer- chan- dise	Gold	Silver		
1929.....	5,373	3,284	4,292	4,253	+1,082	-155	+17	² 136	² 125
1930.....	4,094	4,618	3,849	3,916	+845	-223	+18	121	121
1931.....	3,053	3,032	2,432	2,407	+651	-297	+5	98	101
1932.....	1,948	1,908	1,730	1,735	+218	+714	-5	80	91
1933.....	1,440	1,412	1,168	1,177	+272	-264	-27	65	76
1934.....	2,042	2,008	1,721	1,674	+320	-576	-29	75	91
1935.....	2,121	2,085	1,756	1,789	+335	-1,090	-154	72	93
1936.....	2,413	2,373	2,216	2,207	+197	-1,443	-373	82	111
Percentage change:									
1936 from 1929.....	-55.1	-55.1	-48.4	-48.1				-39.7	-11.2
1936 from 1933.....	+67.5	+68.0	+89.8	+87.4				+26.2	+46.1
1936 from 1935.....	+13.8	+13.9	+24.1	+23.3				+13.9	+19.4

¹ Export indexes are based on domestic exports; import indexes are based on "General imports" through 1933 and "Imports for consumption" thereafter.

² Estimated by fiscal year; for calendar year indexes see Statistical Abstract of the United States.

Source: Bureau of Foreign and Domestic Commerce, Department of Commerce.

Since the price level of exports changed only slightly during the year, the increase in value reflects closely the increase in the physical quantity of goods entering into our export trade as compared with the preceding year. The import price index rose 3 percent and the quantity index 19 percent in comparison with 1934-35.

The gain in the value of exports, although shared to a small extent by crude foodstuffs and semimanufactures, was due principally to larger shipments of crude materials and manufactured goods. Exports of crude materials increased roughly 19 percent in quantity and 15 percent in value, chiefly because shipments of unmanufactured cotton, leaf tobacco, and crude petroleum were substantially larger than in the preceding fiscal year. Exports of finished manufactures increased 16 percent in both quantity and value with machinery, automobiles, and mineral oils showing the largest increases in absolute value among a wide range of articles.

The increase in imports was distributed among practically all classes, although two-thirds of the gain was in the imports of semimanufactures for further processing and in crude materials needed for domestic industry. All the leading commodities of the semimanufactures class, including wood pulp, copper, tin, vegetable oils, and diamonds gained in quantity and value. The largest absolute increases in value among leading commodities of the crude-materials class occurred in the imports of unmanufactured wool, raw silk, hides and skins, undressed furs, and crude rubber.

Employment.-

Available data indicate that the number of people employed increased in all but 2 months of the year, and that for the entire period from June 1935 to June 1936 there was a net gain of approximately 1,500,000 in the estimated number at work.

Estimates of the Department of Labor place the total number at work in May 1936 in nonagricultural employment at approximately 31,000,000 compared with 26,300,000, for May 1933 and 36,000,000 for May 1929. These figures suggest, of course, that the number without private employment is still very large since there must be added to the shrinkage in employment since 1929 the number of employables who have entered the labor market and also the number idle at that time. Not all of the individuals omitted from the employment figures given above were without work, however, since the Department of Labor reports that 3¼ million were employed on emergency projects financed by Federal funds.

Finance.

Developments in the financial field during the year reflected in part the forces of business recovery and in part the effects of governmental fiscal and monetary policies designed to combat the depression. Gold continued to flow into the country in large volume, raising the monetary gold stock of the United States and the reserves of member banks of the Federal Reserve System to new high levels. The excess of member bank reserves over legal requirements also reached a new peak during the year. Banks utilized a part of their excess reserves to increase their loans and investments. This increase was principally in holdings of United States Government obligations but, in contrast to other recent years, holdings of domestic

corporate securities and loans of member banks also showed fairly substantial increases. There was continued growth in bank deposits during the year and the total volume of deposits on June 30, 1936, was virtually as large as it has ever been. The rate of turnover of deposits, however, continued low. Both short-term and long-term money rates remained at low levels, reflecting the large volume of loanable funds seeking employment, as well as the relatively small volume of security issues for new capital and the small demand of business for new loans, notwithstanding some increase in these demands during the year. The interest rate at which new security issues could be floated caused a large increase in new bonds issued for refunding outstanding obligations.

Stock prices, as well as bond prices, rose substantially during the year and the index of 419 common stocks advanced from 75.5 of the 1926 average in June 1935 to 105.6 in June 1936.² Bank failures, which were numerous in the early years of the depression, were fewer in number, and involved a smaller volume of deposits than in any corresponding period since before the war. Commercial failures were also the lowest in many years.

Total loans and investments of all member banks of the Federal Reserve System increased nearly $3\frac{1}{2}$ billion dollars during the fiscal year to \$32,259,000,000. The major part of the increases occurred in holdings of securities, particularly United States Government obligations, which increased nearly $2\frac{1}{2}$ billion dollars. There was an increase in "other" loans to customers (mainly commercial obligations) of approximately a half-billion dollars. This increase is significant, since, in the two preceding fiscal years the total of such loans did not show a rising tendency, notwithstanding the expansion in business activity. At the end of the fiscal year 1936, 42 percent of the total loans and investments of all member banks were in direct or guaranteed obligations of the United States Government.

Some increase in the amount of new capital secured by corporations through publicly offered securities occurred during the year; the volume was still relatively small and was overshadowed by the large amount of refunding issues placed on the market. Total corporate issues amounted to \$4,282,000,000 compared with \$858,900,000 in the preceding year, and \$8,944,900,000 in the fiscal year 1928-29.³ Less than 20 percent of last year's total represented the acquisition of new capital.

While the refunding of interest-bearing obligations at lower rates had some effect on corporate earnings, the increases in profits were mainly attributable to the growth in the volume of business. Industrial corporations made the most impressive showing, but the railroads and public utilities did better than in the preceding fiscal year; 161 corporations reported profits for the year 1935-36 equal to two-thirds of the 1926 volume: for the final quarter, profits, seasonally adjusted, were more than 80 percent of the 1926 average and were about on a par with those of the third quarter of 1930.⁴ In the fiscal year 1932-33, earnings of these corporations dropped as low as one-twentieth of the 1926 average. While the companies included in this index are generally the larger corporations whose stocks are widely

² From Standard Statistics' index.

³ As reported by the Commercial and Financial Chronicle.

⁴ Index compiled by Standard Statistics.

held, the data afford some indication of the recuperation in corporate earning power in the past few years. Rising profits were accompanied by an increase in dividend payments. The average dividend rate per share for 600 leading corporations, which had dropped from about \$3 in the latter half of 1929 to \$1.05 at the end of the fiscal year 1933, advanced to \$1.51 by the end of the past fiscal year, with the trend distinctly upward.⁵

In the field of public finance, a further rise in receipts, heavy expenditures for relief and recovery measures, and an increase in the Federal debt were the outstanding features of the year. Total Federal revenues rose from 3.8 billion dollars in the fiscal year 1935 to 4.1 billion dollars in the past year, the latter figure being just about double the total for each of the fiscal years 1932 and 1933. Total expenditures rose from 7.4 billion dollars in the fiscal year 1935 to 8.9 billion dollars in 1936, the difference between the two years being more than accounted for by the payment of the adjusted service certificates held by World War veterans.

The several governmental credit agencies continued to play an important part in the financial system, although the demands placed upon these agencies were not so great as in the preceding year. While the large volume of Federal financing in connection with the relief and recovery activities of the Government exerted a pervasive influence upon the entire financial structure, the influence of Federal fiscal policies cannot be separately appraised, with so many other elements in the situation which also had far-reaching effects. In connection with the increase in the Federal debt, it should be borne in mind that in the past several years the Government has acquired a substantial volume of assets from which repayments to the Treasury may be expected.

National income.

The broad nature of the improvement in the economic situation during the year was reflected in a further marked rise in the national income, with all major industries contributing to the gain. Data are not computed by the Department on a fiscal year basis, but in the calendar year 1935 the national income reached 53 billion dollars, an increase of 4.6 billion dollars over the preceding year, and of 13.4 billion dollars, or 34 percent, over the 1932 low. During the first half of the year 1936 the national income rose further and, at the rate of progress at the end of the fiscal year, it is not improbable that the national income produced will reach at least 60 billion dollars for the calendar year 1936. The drought is, of course, a factor yet to be appraised, but since the national income is measured on a dollar basis, the price increases in certain farm products which were beginning to be noted before the end of the fiscal year will provide an offset to the reduction in the volume of agricultural production and marketings.

A 60-billion dollar total for the current calendar year would be about one-fourth less than in 1929, although the decline in "real" income is much less by reason of the decline in the price level.

It also appears probable that the national income produced may equal the amount of income paid out for the first time since 1929.

⁵ From Moody's report.

The difference, which was almost 9 billion dollars in 1932, was reduced to less than two-thirds of a billion dollars in 1935. The extent to which the disparity between income produced and income distributed has been narrowed, if it has not been eliminated entirely at the present time, is of paramount significance and an important underlying factor of strength in the present situation.

RECIPROCAL TRADE AGREEMENTS PROGRAM

Several divisions of the Bureau of Foreign and Domestic Commerce, which have been closely identified with the reciprocal trade agreements program since its inception, continued this relationship. Substantial contributions were made during the fiscal year, in the conclusion of nine additional trade agreements, namely, with: Colombia, Canada, Honduras, the Netherlands, Switzerland, Nicaragua, Guatemala, France, and Finland. Material was also prepared for possible future use in negotiations with a number of other countries.

These services added important responsibilities to the Divisions of Foreign Tariffs, Regional Information, Finance, and Foreign Trade Statistics. Contributions were also made by nearly all of the industrial divisions of the Bureau, and by several officers of the Foreign Commerce Service who responded to requests for analyses and suggestions. The district offices, in their respective communities, were increasingly identified with the dissemination of data concerning various trade agreements which were closely related to local products. Cooperation of the Department of Commerce with the Department of State, which is in charge of negotiations, was close and continuous, as was that with the Department of Agriculture, and the United States Tariff Commission, respectively.

These trade agreements constitute a major step toward the recovery of our foreign trade on a definite and equitable basis. Correspondence with manufacturers, producers, and exporters during the year reflected, both in volume and character, the realization in American business circles of the importance of the trade-agreements program in restoring channels of trade formerly closed or severely limited by official restrictions. At the end of the year, trade agreements had been concluded with 14 countries, which together have accounted for more than a third of our foreign trade.

The various divisions, district offices, and foreign commerce officers cooperating in this program have added materially to the information and facilities available to American business. At the same time, improved organization and concentration of this work have made possible the reduction of the personnel engaged, and the return to their posts abroad of several foreign commerce officers brought to Washington for special counsel and research.

PROPOSED CENSUS OF UNEMPLOYMENT

Although approximately 6,000,000 unemployed persons have obtained gainful work since March 1933, and the number of unemployed is steadily diminishing, the Federal Government must cooperate with State and local agencies and industry in making work available whereby the unemployed may provide a livelihood for themselves

and their families. The desirability of decreasing Federal expenditures to relieve unemployment and at the same time protecting those who would be without work if governmental assistance were withdrawn is recognized by all who are interested in this subject.

It is essential to the proper solution of this national problem that specific information be gathered as to the causes of unemployment, the experience of the unemployed, their occupational aptitudes, and availability for absorption in other phases of industry. The assembling of reliable data in this respect will permit of the formulation of a policy to meet intelligently and effectively the present and future unemployment necessities.

It is recommended that early consideration be given to this important subject both as to present needs and subsequent periodic checking of the data, and that legislation necessary to carry its conclusions into effect be enacted and necessary funds be provided.

RESEARCH DATA FOR BUSINESS

The severity and duration of the recent depression demonstrate very clearly that in connection with measures to be taken to stimulate recovery, there is need for making a more exhaustive study of our business structure. If we wish to preserve the legitimate functioning of business under our democratic form of government, we must have more factual data on which to base the policies of government. This information is likewise needed by business executives as a background for the formulation of their own practices and policies.

Agriculture has long been served by the Bureau of Agricultural Economics. Labor has been served in somewhat the same manner by the Bureau of Labor Statistics. The establishment of a similar unit in this Department would make it possible for industry and trade to enjoy the benefits of valuable research data not now obtainable. If basic research can give us an adequate diagnosis of the causes of sharp declines in business activity, if data can be collected which will enable us to formulate sound policies for the future, and finally if small, as well as large industry can be kept in close touch with this helpful research, surely the results are bound to be of great assistance to industry and to the country as a whole.

Among the fields in which more extensive research should be made are the construction industry, statistics on national income, wealth, price structures, inventories, credit data, price fixing, trade practices, and price discrimination. Other studies should be made on the costs of marketing and wasteful competitive practices. It is hardly necessary to stress the value of this type of information to those who are responsible for developing far-sighted business and governmental policies.

FUNCTIONS OF THE DEPARTMENT OF COMMERCE

Through its 10 bureaus of diversified, but interrelated activities, the Department of Commerce has pursued this year its promotive, regulatory, and service functions with increased vigor. Especial emphasis has been placed on the responsibility of safeguarding human life and property in the air, on the sea, and on the land.

Encouraging progress in efficiency has been made in improving safety in the air through aeronautic inspection and better regulations of air traffic. The Congress enacted on the recommendation of the Department, more beneficial legislation in behalf of safety at sea, the welfare of the seamen, and the interest of operators than any previous Congress. A large contribution toward public welfare has also been made through improved lighthouse service, marine inspection, including coastal and inland waters, while accident prevention on the highways and in homes and in industrial plants has been carried forward under the impetus of widespread public interest and cooperation. Advancement in transportation technology is constantly imposing increased responsibility upon regulatory authority and the bureaus legally charged with these regulations have promptly and effectively adapted their activities to meet the changed and changing conditions.

With the marked expansion of trade and commerce during the year the duties of the Department for the promotion of the welfare of business and industry at home and abroad, have received unusual emphasis. These include the cultivation of foreign markets and assistance to exporters and importers in dealing with those market conditions to best advantage. Assistance has also been rendered manufacturers in increasing and improving output; eliminating waste in production and distribution; also making available vast informational services on economic conditions generally, including tariffs, exchange, and credits.

Through specialized bureaus, the Department promotes the conservation and development of the country's fisheries and cooperates with the fishery industry in every way made possible under the laws. Then the Department promotes the welfare of industry through the protection of patents and inventions; collects and tabulates population figures and many other lines of statistical data desired and utilized by the public, business, and all Government departments and agencies. The activities of the Department extend from the supervision of trained commercial observers in most of the countries of the world to the protection of the public against false weights and measurements; from the control of airplanes and ships to the coordination of the work of statisticians and economists; from the compilation of a census of religious bodies and trade surveys to the care and protection of the seals in Alaska. The Department of Commerce has been correctly described as the central switchboard of American business. It may also be said to be the portal of business to its Government, that is, the place where business and Government meet for consultation and mutual protection and benefit.

FINANCES

For the regular expenditures of the Department of Commerce in the fiscal year ended June 30, 1936, the Congress appropriated a total of \$34,921,756. In addition, funds were transferred to this Department during the year from other Government departments and agencies in the total amount of \$6,721,762, bringing our aggregate expenditures to \$41,643,518 for the year. As miscellaneous receipts totaled \$9,810,134, the net outlay was \$31,833,383, as compared with \$36,347,808 for the previous fiscal year.

EMERGENCY FUND ALLOTMENTS

Table no. 3 shows all allotments from emergency funds made to the Department during 1934, 1935, and 1936, and the total obligations incurred during the year. The accomplishments through the use of these funds will be found discussed under the respective sections of this report pertaining to the bureaus receiving the allotments.

TABLE NO. 3.—*Allotments to the Department of Commerce for work incident to emergency relief and obligations incurred thereunder during fiscal years 1934 to 1936, inclusive*

	1934	1935	1936	Total allotments	Total obligations to June 30, 1936
Office of the Secretary.....			\$1,000,000	\$1,000,000	\$943,000
			³ 120,000	120,000	56,799
Total.....			1,120,000	1,120,000	999,799
Bureau of Air Commerce.....	¹ \$2,058,803	² 973,075	¹ 17,915 ² 7,509 ³ 225,000	2,076,718 980,584 225,000	2,072,675 974,072 200,621
Total.....	2,058,803	973,075	250,424	3,282,302	3,247,368
Bureau of the Census.....		³ 41,000,000	³ 8,231,948	9,231,948	7,048,087
Coast and Geodetic Survey.....	² 6,503,120	² 1,429,800	² 360,300	8,293,220	8,269,040
Bureau of Fisheries.....	² 639,500	² 1,500		641,000	641,000
			³ 155,996	155,996	123,760
Total.....	639,500	1,500	155,996	796,996	764,760
Bureau of Lighthouses.....	¹ 5,611,972			5,611,972	5,588,463
			³ 20,000	20,000	20,000
Total.....	5,611,972		20,000	5,631,972	5,608,463
Bureau of Marine Inspection and Navigation.....	¹ 33,043	¹ 60,000		93,043	90,974
National Bureau of Standards.....	¹ 100,000			100,000	99,601
			² 70,000	70,000	63,997
			³ 75,000	75,000	30,257
Total.....	100,000		145,000	245,000	199,855
Grand total.....	14,946,438	3,464,375	10,283,668	28,694,481	26,228,346

	1934	1935	1936	Total obligations to June 30, 1936
¹ N. I. R. A.....	\$7,803,818	\$60,000	\$1,017,915	\$8,794,713
² P. W. A.....	7,142,620	2,404,375	437,809	9,954,109
³ F. E. R. A.....		1,000,000	8,827,944	7,479,524
Total.....	14,946,438	3,464,375	10,283,668	26,228,346

⁴ Allotted from "Loans and relief in stricken agricultural areas 1934-35."

FOREIGN AND DOMESTIC COMMERCE

Improvement in business, trade, and economic conditions in the United States and abroad brought to the Bureau of Foreign and Domestic Commerce a greater number of inquiries and requests for services during the last fiscal year, and markedly increased the work of the Bureau. The demand on the Commercial Intelligence Division for sales-information reports relating to foreign trade, for instance, increased 77 percent over the preceding year. The Chemi-

cal Division's correspondence was 20 percent greater, while subscriptions to its bulletins and statistical services gained 30 percent. Requests for information received by the Metals and Minerals Division were approximately 30 percent more. The Specialties Motion-Picture Division's output of market surveys surpassed all existing records, and the volume of services in the field of foreign marketing exceeded any previous figure. The number of requests for copies of reports prepared by the Commercial Laws Division on foreign commercial laws has far exceeded the available supply (indicating a significant growth of interest in foreign trade), while the subscription list to this Division's bulletin service tripled during the year.

Other agencies of the Federal Government have, to an increasing extent, called upon the Bureau for information and assistance. This has included studies in specific fields requested by such agencies as the Agricultural Adjustment Administration, the Bureau of Dairy Industry, Department of Agriculture, the Civilian Conservation Corps, the Federal Housing Administration, the Tariff Commission, the Federal Reserve Board, the New York Reserve Bank, the Securities and Exchange Commission, the Interstate Commerce Commission, and the Corps of Engineers of the War Department.

In addition to its close cooperation with governmental agencies, the Bureau continued its intimate and mutually advantageous relations with many trade associations and private commercial organizations; and the Bureau's industrial divisions gave considerable aid to business within the United States.

Slightly increased appropriations for the fiscal year 1936 made it possible to strengthen some of the weak spots in the Foreign Commerce Service of the Department of Commerce, and to reopen offices at Caracas, Venezuela, and at Guatemala, Guatemala.

The facilities of the Division of Foreign Trade Statistics proved inadequate to meet the demands for services which resulted from the expansion in the volume of United States foreign trade since 1933 and the intensified interest in foreign-trade statistics as a result of the reciprocal trade-agreements program.

The Finance Division during the year gave preferred attention to its annual study of the balance of international payments, and to currency and exchange developments abroad. The Division also made a more searching analysis of several important phases of finance, notably a comprehensive census of foreign investments in the United States and an analysis of international insurance transactions from 1919 to 1935. One of the distinct achievements, also, was the completion of the foreign currency handbook.

Much publicity to foreign discriminatory legislation and other forms of action favoring national industry at the expense of foreign business was given by the Division of Commercial Laws. The correspondence relating to foreign legal and tax problems has grown, and a definite evidence of trade revival is revealed by the increase in the Division's trade-adjustment service, which seeks to discourage trade practices detrimental to American interests or injurious to American prestige abroad.

The work of the Bureau's district offices was maintained at a high standard during the past year, and they were able to keep pace with the greatly increasing demands made upon them for service as the

result of the revival of interest in world trade and the general upward trend in domestic business. The interest in domestic marketing has become an increasingly important part of the district-office work. One of the features of the year was the development of the retail sales-reporting program in conjunction with the Marketing Research Division.

The Marketing Research Division expanded its program for studying the fields of manufacturing, wholesaling, retailing, and consumption, with special reference to marketing problems and to providing businessmen with currently collected monthly sales and credit statistics, general market data, economic data on construction, and information on trade-association activities. Within the Division the Construction Economics Section was established in response to requests from the industry and recommendations of the Business Advisory Council of the Department of Commerce.

The Transportation Division inaugurated a world-wide study of communications systems, covering the economic aspects of the telephone, telegraph, cable, and radio services of 80 foreign countries; and at the request of both the Association of American Railroads and the American Trucking Associations, Inc., particular attention was accorded to significant physical and financial developments in foreign lands with respect to railway and motor transportation.

The Bureau's Conferences and Expositions Section, the functions of which include coordination of activities of all bureaus of the Department of Commerce in the furtherance of conferences, fairs, expositions, and related projects, was occupied with an unusual number of undertakings during the year. The Department of Commerce was interested in, and represented at, more than 90 conferences, conventions, and meetings held in the United States. Of these, many were meetings of scientific, trade, or other organizations in whose fields the Bureau of Foreign and Domestic Commerce is primarily interested, and equipped to render valuable service.

AIR COMMERCE

The increase in flying through and over the clouds, with pilots navigating their craft entirely by reference to instruments and radio, has augmented the importance of existing radio aids on the Federal Airways System and has pointed to the course which further research and development must follow if the Federal aids are to keep pace with modern flying technique. Additional funds for 1937 will permit a number of airway facility improvements.

During the year, the Bureau had its simultaneous radio broadcast and range transmitter in operation at Pittsburgh. This new transmitter permits the broadcast of directional signals and voice at the same time on a single frequency channel, thus solving the long-standing problem of interruption of the radio range service for weather broadcasts. Since tests during the past year definitely demonstrated that the equipment will be satisfactory it is to be installed at additional new stations.

Proceeding with its work on aids to landing under conditions of low ceilings and poor visibility, the Bureau installed at Indianapolis a combination improved instrument approach with which it is possible to undertake blind landings by both of the methods devel-

oped to date as well as by a combination thereof. Also, an entirely new method of instrument approach is being developed, the principal feature of which is a straight line glide path, three points of its plane being transmitted to the pilot's cockpit.

The Bureau continued experiments with radio facsimile and radio teletypewriter communication and effected general improvements in radio equipment, such as the link circuit relays and contractors used in radio signaling and microphones used for voice communications.

Other developments concerned with dependable flight included a de-icing device for airplane propellers and ice-free carburetors for aircraft engines. Problems which will have to be faced in operations at high altitudes, from 20,000 to 30,000 feet, were studied, with particular emphasis on requirements for physiological comfort and safety of passengers and pilots.

Test installations were made of airport runway approach lights, indicating the approach to a runway, as an aid to pilots landing when ceilings are low but when the ground can be seen during the last stages of the landing operation. A new type of runway illuminator developed by the Bureau is designed for use on airport landing areas when ground haze interferes with illumination of the ground by landing-area floodlights.

In regulation of air commerce, safety standards for air-line operation were strengthened by amendments having to do with minimum airport ceilings, weather reports, high-altitude flying, qualifications of pilots, hours of flying duty for pilots, and instrument flying. During the year nearly all of the operators submitted operations manuals, now required, which have been reviewed and approved by the Bureau of Air Commerce.

The increased volume of radio and instrument flying along airway routes has made necessary a system of traffic control to provide for orderly progression of all craft moving along the airways, to avoid congestion in the vicinity of terminal airports and to guard against the possibility of collision. In cooperation with the air lines, the Bureau established airways traffic control stations at Newark, N. J., Chicago, Ill., and Cleveland, Ohio, and on July 6, 1936, assumed entire responsibility for this work. Other stations are to be established later.

For closer coordination and to facilitate solutions of technical problems in aircraft manufacturing, the Bureau of Air Commerce initiated the Army-Navy-Commerce Committee on Aircraft Requirements, which now is engaged in standardizing airplane design requirements and test methods.

Toward the end of the year the work of revising and bringing up to date all Air Commerce Regulations was undertaken and will be completed in the next fiscal year.

Continuing its work on development of flying equipment, the Bureau accepted delivery of four new-type airplanes which have promise as aerial vehicles for private owners. The Hammond airplane, first to be ordered in the development program, has demonstrated the possibility of constructing airplanes so that they may be safely and easily flown by the average individual with a very small amount of training. The Waterman tailless airplane also exceeded expectations in some respects. The Weick airplane, purchased for

experimental testing, has been tested by the National Advisory Committee for Aeronautics with good results. The Curtiss-Wright coupe demonstrated the possibility of using all-metal construction in small airplanes. An airplane powered with an automobile engine and a roadable autogiro were under construction at the end of the year.

Cooperating with the Works Progress Administration, the Bureau encouraged and assisted cities in construction or improvement of airports in the W. P. A. program. Each individual project had to be recommended and approved by the Bureau of Air Commerce in order to be acceptable to W. P. A. The program also included air marking of towns with roof-top signs for identification from the air, promoting the establishment of seaplane bases, and establishment of air navigation aids on the Federal Airways System as W. P. A. projects.

LIGHTHOUSE SERVICE

Substantial progress has been made during the year in the systematic improvement of aids to navigation along several lines. All lightships not previously equipped with radio beacons are now being so equipped, a program which will be completed before the end of the calendar year. The synchronizing of radio beacons with sound signals for distance-finding purposes is proceeding rapidly at all most suitably located stations. Following a conference in 1935 between officers of the United States and Canadian lighthouse administrations, identical principles of radio-beacon operation have been adopted by both, such principles now being completely effective in United States waters. Additional operating periods have been provided at nearly all radio-beacon stations, and there has been a standardization of characteristics and distance-finding methods. A further study of frequency assignments has also brought about a reduction in the possibilities of interference between stations.

Important progress has been made in the modernization of the radio-beacon equipment of lightships and light stations. Radio-beacon equipment is developing so rapidly that the present minimum requirements of performance are far beyond the possibilities of apparatus constructed only a few years ago.

In order that transmissions from radio-beacon stations may have a high degree of reliability as respects frequencies, adherence to schedule, and power, attention has been given to the provision of monitoring stations which make daily checks of the broadcasts of all radio-beacon stations. The radio-beacon system has also been improved by the establishment of 8 new stations, bringing the total of stations in operation to 116.

The extension of radiotelephone communication facilities has brought about improved administrative control and has fostered a sense of security among personnel at remotely situated stations.

A systematic revision of the characteristics of the lights on buoys is being made in order to give them a significance for night navigation comparable with the shape and color distinctions. It is also intended to undertake during the coming year the systematic improvement of secondary fog signals, both ashore and afloat. Suitable internal-combustion engines to replace much of the older apparatus are now available for such signals.

During the year just closed the construction program, accomplished with funds allotted from the appropriation National Industrial Recovery Act in the amount of \$5,611,972, and from the Works Progress Administration in the amount of \$20,000, has been substantially completed. Only funds from either of these emergency appropriations remaining available are for the final completion of two projects heretofore undertaken and nearing completion.

The total number of aids to navigation maintained by the Lighthouse Service at the close of the fiscal year was 26,680, an increase of 2,221 over the previous year. A large proportion of these new aids are small buoys and minor lights in inland waters. An important change is the increase in the number of lights using electricity—2,440 in 1935, and 2,697 in 1936.

The rapid and comprehensive improvement of the navigational channels of the Mississippi River requires that special attention be given to the means for establishing and servicing the necessary aids to navigation. There is the need for the augmenting of the lighthouse tender equipment of the river district by smaller and more mobile vessels. Funds are available for the construction of one such vessel, which will be used in the Missouri River. The effectiveness of this vessel will be carefully studied, as a means of determining the rapidity with which other similar vessels should be provided.

The rapid increase in the number of pleasure craft in use in waters of the United States requires that this class of water-borne traffic be facilitated by aids to navigation in proportion to its volume. The projects involved will not be individually large, except in cases of extensive interior waterway improvement. The aggregate demand upon the facilities and funds of the Lighthouse Service will, however, require a moderate increase in the maintenance appropriations for the Service.

Careful regard to the welfare of the personnel, which has long been the policy of the Service as well as recent advances in general legislation and progress in the arts and sciences, indicates that some increase in the personnel of the Service are urgently necessary, for both administrative and humanitarian reasons. The crews of vessels, owing to the special conditions of their operation, will be particularly affected by statutory requirements as to hours of labor, leave of absence, etc., requiring in some localities additional force and in others additional vessels, in order that these necessary functions may be effectively performed. Certain isolated light stations, notably those on wave-swept sites, should have their personnel augmented for humanitarian reasons.

The Lighthouse Service is perhaps the most decentralized agency of the Federal Government, less than 1 percent of a total personnel of about 5,000 being located at the seat of government. This policy is believed to be wise and necessary to efficient and prompt administrative action, but requires for best operation an intimate familiarity with field conditions by administrative officers in Washington, and an understanding of administrative procedure at headquarters by responsible field officers. Such mutual understanding would be promoted by the more frequent interchange of duty between field offices and headquarters in Washington, and this in turn would be facilitated by a consolidation of the appropriations from which these two classes of employees are paid. Such a consolidation of the appro-

priations, "Salaries, Bureau of Lighthouses", and "Salaries, Lighthouse Service", is recommended with proper limitation upon the proportion of the combined amount available for expenditure in the District of Columbia.

ENFORCING NAVIGATION AND STEAMBOAT INSPECTION LAWS

The work of the Bureau of Marine Inspection and Navigation has been greatly extended to accomplish the task of bringing American ships up to the highest safety standards. Long needed legislation was secured this year; 21 acts affecting the work of the Bureau having been passed by the last Congress.

The new Technical Division, to which reference was made in last year's report, has continued to function in its study of the safety factors of seagoing passenger vessels. This particular study has been concluded and, as a result of the recommendations made to operators, a great many improvements have been made on a large number of operating vessels, while other vessels which were found to be below the new safety standard were removed from passenger service. Assurance may now be given that all seagoing passenger ships operating under the American flag are conforming to a much higher safety standard.

As a result of recurring casualties aboard vessels carrying dangerous cargoes in bulk, a new set of rules has been promulgated by the Board of Supervising Inspectors governing the operation and construction of tank vessels.

The load-line requirements have been extended to vessels of 150 gross tons or over when engaged in coastwise trade, including the Great Lakes. At the annual meeting of the Board of Supervising Inspectors, held January 15, 1936, extensive amendments to the general rules and regulations were promulgated. These amendments are contained in the fifty-third supplement to the general rules and regulations, dated February 25, 1936.

The position of the Bureau in discharging its responsibilities in requiring the highest safety standards for American ships was very much strengthened by legislative authorization of the last Congress.

The 1929 Safety of Life at Sea Convention was ratified.

An act of much importance was Public Law No. 622, of the Seventy-fourth Congress, which, while incidentally changing the name of the unit from Bureau of Navigation and Steamboat Inspection to Bureau of Marine Inspection and Navigation, provided for certain changes in its organization, in addition to creating a Marine Casualty Board clothed with plenary power to conduct far-reaching investigations of marine casualties.

The existing laws relating to American seamen were amended by Public Law No. 808, looking toward the improvement of conditions with regard to both the operator and the personnel.

With the large increase in the number of small motorboats operating on the navigable waters of the United States, the activity of the Bureau's patrol fleet has been greatly extended and a concerted effort made to educate the motorboating public in matters of their own safety to the end that casualties aboard this type of craft may be substantially reduced. The renumbering of all motorboats to meet

the requirements of the Antismuggling Act was undertaken and is now nearing completion.

The record of casualties occurring aboard American ships for the past year is most gratifying, since it shows that there were no lives of passengers lost incident to the operation of such vessels.

While the attention given to the legislative needs of this Bureau by the last Congress promises to greatly enhance its service to the public, most of the new laws were enacted at the close of the session, and the necessary rules and regulations will be promulgated during the next fiscal year.

SURVEYING AND MAPPING

The United States Coast and Geodetic Survey has rendered services to marine and other agencies of our Government and to the public for 120 years. These services have increased materially in importance and volume with the growth of our country and the development of means of travel on the water and in the air. Their essential nature is evidenced by the fact that the demand for the Bureau's services has continued to grow in spite of the unusual conditions experienced during the past few years.

The principal function of the Bureau is the production of marine and aeronautical charts and related publications required to safeguard and expedite navigation through all waters of the United States and possessions, and in the air. All activities relating to coastal hydrographic and topographic surveys, geodetic control surveys, tide and current observations, and magnetic investigations, while valuable for many other purposes, contribute to and are essential parts of this function. Through the extension over our country of the control surveys which it first carried on in coastal areas as a necessary part of its charting operations, the Bureau provides basic data required for aeronautical charting, topographic mapping, and other engineering projects. In cooperation with many other agencies it also conducts certain seismological investigations designed to secure information which can be used to reduce earthquake hazards.

There are two phases to the work of producing navigational charts: First, the provision of adequate series of charts with limits and scales appropriate to the needs of the users; and second, the maintenance of the accuracy of these charts. An inaccurate chart is a hazard instead of an aid to navigation, and consequently the collection of information concerning the changes which constantly are taking place in practically all charted areas, the application of this information to the charts affected, and at suitable intervals the publications of revised editions of the charts constitute a continuing task which must be carried on from year to year at an adequate rate, if the charts are to serve their purpose.

The Bureau was not able to meet all demands for its services, charts, and related products, because of insufficient funds. Increasing demands early in the year exhausted emergency funds previously available and the continuation of the reduction in annual appropriations which has been in effect for several years made it necessary for the Bureau to operate on a restricted basis. The funds that were available, however, were used to the best advantage in carrying on the most urgent operations; in this respect excellent results were obtained.

Radical innovations in methods and apparatus, which have revolutionized surveying operations during recent years, were augmented by the development of several new or improved items of operating equipment, all enabling the Bureau to provide very economically the much more comprehensive information required for modern navigation, which a few years ago could have been obtained only at a prohibitive cost, if at all. Cooperation with Federal and private agencies was continued and extended, with results of mutual value.

Much encouragement is derived from the action of Congress in granting an increase in the annual appropriations of the Coast and Geodetic Survey for the fiscal year 1937. This will provide partial relief for the conditions existing during the last fiscal year, and it is hoped that remaining deficiencies may be remedied in the near future.

Concerning the operations of the Bureau with emergency funds which were exhausted early in the year, it is unfortunate that the year passed without the provision of funds to complete the office processing of this work. The uneconomical nature of this situation, whereby the results of a considerable part of the field surveys involved cannot be made available for lack of this final step, is obvious; this is especially true since there is immediate need for these data for a number of purposes.

FISHERIES

Conditions in the commercial fisheries have presented a more optimistic outlook during the past fiscal year than during any other recent year. Available statistics for the period show the maintenance of good yields of fishery products in general, and at the same time prices for many varieties of products are reaching somewhat higher levels. Records of vessel landings at important New England ports indicate that average prices at the point of landing of the more important species have advanced from 2 to 37 percent as compared with the preceding fiscal year. Average prices of halibut at west coast ports increased about 13 percent during the same period. There was also an upward trend in prices of canned salmon.

During the past fiscal year a staff of biologists and engineers were directed to continue their studies of the two previous years of the problem of maintaining salmon runs in Columbia River in spite of the construction of the Bonneville and Grand Coulee Dams. The work at Bonneville was largely concerned with the development of temporary structures to enable the salmon to surmount the dam during its construction period and thus prevent the destruction of one or more cycles of salmon runs. While the construction of temporary structures to accomplish this presents a distinct problem as related to permanent installations our scientists have been enabled, nevertheless, to obtain much valuable information toward the development of permanent structures.

A treaty between the United States and Canada, concerning the sockeye salmon of the Frazier River, was ratified by the United States on June 15, 1936. As certain reservations have been made by the United States since the treaty's ratification in 1930 by the Canadian Government, it must be ratified in its present form by that Government. The reservations made are believed to be acceptable to Canada.

An act to make the Multilateral Convention for the Regulation of Whaling effective was approved by the President on May 1, 1936. The administration of this act becomes the joint responsibility of the Secretary of the Treasury and the Secretary of Commerce.

During the year the Bureau distributed 8,120,000,000 fish and eggs from Federal hatcheries. Over 6¾ billion of the total were eggs of commercial species, such as cod, haddock, pollock, and winter flounder. However, there was also an increase in the game fish produced, particularly in the larger sizes of such game. In this group the Bureau distributed 157,000,000 as compared with 133,000,000 of last year.

Except for the fish-cultural station in Virginia and the station for the Great Smoky National Park in the State of North Carolina, only the stations authorized for the first 2 years of the 5-year building program have been established. Therefore, there are 14 projects authorized by the 5-year program for which no funds have yet been made available. However, on the whole, the Department favors the development of all existing stations to capacity before proceeding with the establishment of new stations.

NATIONAL STANDARDS

The facilities of the National Bureau of Standards are being utilized more and more extensively by other agencies of the Government—Federal, State, and local. Only through adequate tests can the Federal Government determine whether the vast quantities of supplies which it purchases actually conform in quality to the requirements of its specifications. The testing of supplies at a centralized laboratory is efficient and economical, and the cost is repaid manyfold in materials of assured quality. The Federal specifications under which these purchases are made are frequently revised and strengthened in the light of the Bureau's investigations, leading to better goods at no increase in cost.

The Bureau's services are proving of definite benefit not only to the Federal, but also to State and local tax-supported agencies, which to an ever increasing extent are basing their purchases on specifications having national recognition.

The Bureau does not engage in testing on a commercial basis, except in cases where such special facilities as are possessed by the Bureau are not available elsewhere. However, it makes many tests involving comparison with the national standards of measurement. During the past year, the sum total of fees received from private firms and individuals for the calibration of testing instruments is the greatest in the history of the Bureau. This fact reflects in unmistakable terms the increased attention which is being given to the use of measuring instruments which agree, within known limits, with the official standards of the country, thereby promoting accuracy, eliminating disputes, and facilitating commerce.

Interest in commercial standards, developed by voluntary joint action of producers, distributors, and consumers under the auspices of the Bureau, is steadily increasing. These standards provide a mutually satisfactory basis for buying and selling a given commodity. The Bureau's simplified practice procedure reduces the cost of various lines of commodities by eliminating excess sizes and varieties of goods manufactured in large quantities.

The Bureau urgently needs additional support for its investigations looking to broader and more effective utilization of materials and the development of better processes and methods of fabrication. Only through laboratory research, which provides the foundation for the development of better standards and methods of testing, is it possible for the Bureau to speak with authority regarding the countless inquiries it is called upon to answer. Investigations involving fundamental research have been the starting point of the Nation's whole industrial development, and they are of outstanding importance in recovery from depression. Searching investigations in physics and chemistry, like basic research for agriculture, thus become necessary for the further industrial development of the Nation, and deserve its generous support.

The Bureau is carefully planning a program of important specific scientific problems requiring research and an estimate of the amount of funds necessary for accomplishment, so that thorough and detailed consideration may be given to each item as well as the program as a whole.

CENSUS

The compilation of nation-wide statistics of business and industry is essential to any proper understanding of, or adequate planning for, a continuously prosperous society. The Census of Business and the biennial Census of Manufactures, both for the calendar year 1935, together with the 1936 Census of Agriculture and the monthly, quarterly, and annual reports on a wide range of industries and commodities, give a more complete picture of American economic activities than has been obtained heretofore. The Bureau of the Census has made every effort to provide complete and unbiased facts concerning the ebb and flow of economic life. It is unfortunate that a variety of factors have made it impossible for this Bureau to measure similarly the more recent trends of social changes.

The 1935 Census of Business, now being compiled, is the largest and most inclusive inventory of business establishments ever undertaken. It covers all establishments in retail and wholesale trade, service businesses, amusement enterprises, hotels, advertising agencies, banking, insurance, real estate, bus transportation, trucking, warehousing, construction, and distribution of manufacturers' sales through primary channels. This census is being conducted with funds allotted by the Works Progress Administration. Approximately 1,500 persons are employed in the headquarters office at Philadelphia, Pa., and a maximum force of over 16,000 enumerators were employed in the field canvass.

An increase of 31 percent in retail sales, as compared with 1933 was shown by the preliminary statistics in the First United States Summary on Retail Distribution for 1935.

Increasing demands of industry and of governmental agencies for data secured in the biennial Census of Manufactures led to the expansion of detailed data collected for the year 1935. One hundred and sixty special industrial schedules were used to get the necessary production details. Employment data secured by this census will also be somewhat broader in scope and more detailed than heretofore.

The conducting of age searches for social security purposes is a

rapidly expanding service of the Bureau of the Census. A majority of persons over 65 years of age are unable to establish definitely their age or date of birth, yet proof of age is essential for the equitable administration of pension legislation. For many years this Bureau has provided age information by searching the original schedules of earlier censuses (particularly those from 1850 to 1910), and giving the individual applicants data concerning themselves. To facilitate these searches the Bureau is making an index of all persons enumerated in the census of 1900, which index will be kept in the Washington office after its completion in March 1937. This is a W. P. A. project employing approximately 3,000 clerical workers in St. Louis, Mo.

The accurate and rapid tabulation of millions of statistical items contained on census schedules is made possible only by the use of mechanical tabulation equipment. This Bureau has been a pioneer in the development of such equipment. During the past year a new type of adding tabulator has been perfected which promises to save the Federal Government large sums now expended for the rental of commercial equipment. The Department is greatly interested in this development and recommends that funds be appropriated for the immediate construction of a sufficient number of these tabulators to handle the work of the next decennial census.

The reorganization of the Division of Financial Statistics of States and Cities is now in process. In no field is there the paucity of accurate, comparable information as in the fiscal activities of governmental units. A much needed expansion in this field is expected to result from the recommendations of several recent surveys by the Bureau of the Census and its advisory bodies.

PATENTS

Indexes of industrial improvement throughout the United States are reflected in the activities of the Patent Office, during the last fiscal year. The salient evidences of this economic recovery were larger financial receipts; an increase in the number of applications for mechanical patents, designs, trade marks, and prints and labels; a gain in the number of deeds of assignment recorded; and greater sales of printed copies of patents and photoprints of manuscript records, etc.

The total of applications for patents, reissues, designs, trade marks, and prints and labels filed during the year was 85,102, the largest in any like period since 1932. The number of design patents issued in 1935-36 exceeded the aggregate for any year in the history of the Office. This fact is impressive as it indicates the wider use of this form of protection by the makers and merchandisers of goods of all descriptions. Applications for design patents in 1936 numbered 6,127, compared with 5,069 in 1935, and 3,811 in 1934. Registrations of trade marks in 1936 were 15,840, compared with 15,617 in the previous year.

For the first time in 3 years the expenditures of the Office exceeded receipts. A deficit of \$78,364.52 was incurred, notwithstanding the fact that receipts exceeded those for 1934 and 1935. In January 1935, an increase in salary was granted to 269 junior examiners

who had served from 3 to 6 years at the same compensation. This increase for the full fiscal year 1935-36 was \$131,300, or \$52,936 more than the deficit incurred in the same 12 months. In the period from 1923 to 1933 the annual deficits ranged from \$134,433 to \$827,342. The deficit in 1936—amounting to less than 2 percent of the receipts—is disappointing principally because it defers indefinitely a reduction in the amounts of fees now collectible under the law from applicants for patents and trade-mark registrations.

There was a slight recession of the work of the 65 mechanical divisions of the Office in 1935-36. All of them, however, were within 4 months, and 17 were within 2 months of current work. The Design Division is operating within less than 30 days of current demands. The work of all of the clerical divisions is current. The number of patent applications awaiting action on June 30, 1936, was 33,540. Final disposition was made of 61,990 applications, either by their issuance as patents or their abandonment by the applicants. At the close of the fiscal year 104,095 applications were pending, 2,260 fewer than on June 30, 1935.

The classification of many thousands of patents, a necessity felt for many years, is now in progress. In the 12 months ended June 30, 10 classes, comprising 39,734 patents and 27,960 cross-references, were revised and the revision of groups of subclasses in classes containing 10,068 original patents was completed. The division is now engaged in the revision of 17 classes, comprehending 154,189 original patents.

Improvements in the Rules of Practice have benefited the Office, inventors, and industry as well. Chief among the good results achieved by the changes effected is the reduction in the period of pendency of motions and proceedings governed by rules 109 and 122. At the end of the latest fiscal year but 200 interlocutory matters were awaiting hearing. This figure contrasts with 550 under the former practice, when the interval between the last date for the filing of motions and the hearing was seldom less than 6 months and often as much as 12. Motions are now being set for hearing within 60 days after the last day for filing. The number of interference cases suspended for consideration of interlocutory proceedings is now less than 350, compared with a maximum of 900 under the previous practice.

MERCHANT MARINE

During the fiscal year 1936 the Shipping Board Bureau continued the administration of the functions created by the various shipping acts with respect to the regulation and development of the American merchant marine. The Bureau's regulatory activities have been more intensively exercised, and departmental orders, issued during the fiscal year and based on investigations carried on by the Bureau, have been of far-reaching importance to both the public and the shipping industry.

The Bureau has cooperated fully with the members of the Senate Committee on Commerce and the Merchant Marine and Fisheries Committee of the House of Representatives in the drafting of legislation providing for the promotion and development of the American

merchant marine. Much research has been carried on and the resultant material placed at the disposal of the Members of Congress engaged in the preparation of shipping legislation. On June 29, 1936, the President signed the Merchant Marine Act, 1936, climaxing a long period of discussion concerning various subsidy methods. The provisions of the act will go far toward the creation of an adequate, well-balanced American merchant marine, capable of meeting the intense competition existing on the world's trade routes, and at the same time will safeguard as far as possible the Government's interest in the construction and operation of ships for the foreign-trade service.

The repayment of construction loans and ship sales-obligations, and the payment of interest thereon have continued satisfactorily during the fiscal year. The volume of these collections amounted to more than $18\frac{1}{4}$ million dollars. In this connection it is interesting to sum up the service of these obligations during the 3 years the Shipping Board Bureau has been under the jurisdiction of the Department of Commerce. On August 9, 1933, outstanding mortgages amounted to approximately \$155,000,000; by June 30, 1936, this total had been reduced to \$104,284,000, notwithstanding the fact that most of the loans were to run for either 15 or 20 years. During this same period the status of the lines in default has been greatly improved. On August 9, 1933, 13 companies were in arrears in the payments due under mortgages held by the Government. Although 2 small companies have since been added to this list, 6 of the 13 companies in default have completely paid up all arrearages; a seventh has reduced its arrearages from \$853,000 to \$109,600; 2 other companies are in much sounder condition, and only 2 have resorted to receivership.

Consistent with these accomplishments has been the annual reduction in the Shipping Board Bureau and Merchant Fleet Corporation expenditures which have been reduced during the 3-year period to approximately one-third of the expenditures of the last year under the former Shipping Board.

During the fiscal year 1936 a new agreement—Operating Agreement 1935—was entered into by the Merchant Fleet Corporation with managing agents of Government-owned lines. This agreement, replacing Operating Agreement 1930, is a straight agency agreement, under the terms of which the Merchant Fleet Corporation exercises direct supervision of the activities of each managing agent but leaves the actual operation of the lines to the agent. The managing agent is allowed a fixed amount for overhead expense, a percentage of the gross revenue, and a percentage of the net profit. It is confidently believed that the new agreement will prove conducive to greater economy of operation of the five Government-owned lines.

The Government-owned terminal properties at Boston, Brooklyn, Hoboken, Philadelphia, and Norfolk continued under the custody and administration of the Bureau throughout the fiscal year. The Charleston terminal remained under the jurisdiction of the Bureau until June 16, 1936, on which date title to the property was conveyed to the city of Charleston pursuant to the provisions of an act of Congress approved May 27, 1936.

A reorganization of the various divisions and sections of the Bureau and the Merchant Fleet Corporation was effected during the year, resulting in a more logical allocation of activities and more efficient administration of functions. This reorganization will facilitate the transfer of Bureau activities to the United States Maritime Commission as required under the Merchant Marine Act, 1936. Upon the creation of the United States Maritime Commission, the Bureau and the Merchant Fleet Corporation will be abolished and the functions of these two organizations will be separated from departmental jurisdiction and transferred to the new independent body.

In compliance with the injunction of the President, as expressed in his message to Congress of March 4, 1935, no new construction loans were granted and but two applications for loans were received during the fiscal year.

Liquidation of the Government-owned shipping properties was continued, three vessels having been sold for operation or conversion. In addition, 40 vessels of a total deadweight tonnage of 318,565 were sold for dismantling and scrapping.

While the pendency of important legislation naturally has had a restrictive effect on efforts to act affirmatively in behalf of the American merchant marine, the Bureau has continued the analysis of the various ocean trade routes with a view to keeping up to date the essential data which will be needed for the formulation of policy by the United States Maritime Commission. The possibility of standardization of ship design has also been under investigation and the Bureau has continued to develop basic data and plans for ships that are suitable for various commercial trades and adaptable for naval auxiliary service during a national emergency. The specifications and design for a proposed standard tanker were published during the fiscal year.

It would appear that the modernization and replacement problem confronting the American merchant marine will be afforded a long-awaited solution by the shipping legislation enacted during the fiscal year 1936. This problem has been of increasing concern in view of the fact that, in 5 years, more than 90 percent of the cargo carriers operating in the foreign trade will have passed the 20-year limit of efficient operation. In fact, those vessels built during the wartime shipbuilding program were built from plans then at least 10 years old and were therefore more or less in a state of obsolescence at the time of their launching. It is idle to expect such noncompetitive and inefficient tonnage to maintain our valuable trade routes against the modern and highly efficient ships of the foreign-flag fleets.

It is confidently expected that the United States Maritime Commission will take steps to put in force many of the plans for the promotion and development of the American merchant marine that have been formulated by the Shipping Board Bureau over a period of years but which have necessarily been held in abeyance until such time as legislation such as the Merchant Marine Act, 1936, could be enacted. It is gratifying that the personnel of the Shipping Board Bureau has been so active in the preparation of legislation, as well as the formulation of constructive plans, which will do much to bring about the creation of a competitive merchant fleet equal or superior to the commercial fleets of the other great maritime powers.

FOREIGN-TRADE ZONES

On January 29, 1936, the Foreign-Trade Zones Board granted to the city of New York the privilege of establishing, operating, and maintaining a foreign-trade zone on municipally owned piers and land at Stapleton, Staten Island, N. Y. This grant was the first to be made in accordance with the act of Congress approved June 18, 1934 (48 Stat. 998, 1001). Under the requirements of the Board the zone must be in operation early in 1937.

The Foreign-Trade Zones Board, as established by legislation, consists of the Secretary of Commerce, chairman, the Secretary of the Treasury, and the Secretary of War. Under the provisions of the law, both public and private corporations may make application to the Board for the privilege of establishing a foreign-trade zone. In the case of a private corporation authority for filing an application must first be obtained from the State legislature of the State in which it is proposed to establish the zone.

Because of the experimental nature of foreign-trade zones in this country, and because of a lack of familiarity on the part of the public with the purposes of such facilities, and with the details of operation, the establishment of such areas has proceeded slowly. In addition to the privilege already granted to the city of New York, the Board has, during the fiscal year, received applications from San Francisco, Calif., Mobile, Ala., and San Juan, P. R.

A number of other municipalities and localities have indicated that they are considering the question of filing applications for grants to establish foreign-trade zones. In some instances, delay in making application has been due to the necessity of obtaining approval of State legislatures, the lack of necessary specific public corporations to handle the work, and the desire to observe the methods employed by the city of New York in the establishment of its zone and the results of its operation.

LIQUIDATION OF NATIONAL RECOVERY ADMINISTRATION

By an Executive order of December 21, 1935, certain functions and duties of the National Recovery Administration were transferred to the Department of Commerce as of January 1, 1936. Congress had fixed April 1, 1936, as the maximum time within which those functions were to be liquidated.

On January 1, 1936, there were 2,424 persons on the pay roll of those units of N. R. A. transferred to the Department of Commerce, of which 1,066 employees had already received notice of termination of their services at the expiration of their accumulated leave.

Orders were issued closing on January 31, 1936, the 63 field offices, and the files were shipped to Washington, D. C., for storage in the Archives Building. The several offices in rented quarters in Washington were promptly consolidated with the headquarters office in the Commerce Building, and as rapidly as possible the employees were released after being given an opportunity to take their accrued annual leave. By March 31, 1936, the entire personnel had been separated; the headquarters files had been assembled in the Com-

merce Building; the furniture in the field as well as that in Washington which was not needed by the Department of Commerce, was turned over to other Federal Government activities upon proper receipts, and the functions of the former N. R. A. were completely liquidated as contemplated by Congress.

The many requests from other Federal departments and agencies and committees of Congress for information and statistics, etc., from the headquarters files have made it essential that these files be consolidated, organized, and indexed so as to make them readily available. An idea as to the amount of this work can be gained from the fact that there were over 1,800 four-drawer file cases of material to be assorted and arranged. This work is now practically completed.

COMMITTEE OF INDUSTRIAL ANALYSIS

Under Executive order signed March 21, 1936, a Committee of Industrial Analysis was created to "assemble and analyze the statistical information and governmental records of experience of the operations of the various trades and industries heretofore subject to codes of fair competition formulated under the authority of title I of the National Industrial Recovery Act (48 Stat. 195)." This Committee was composed of the Secretary of Commerce as chairman, the Secretary of Labor, the Secretary of Agriculture, and four persons outside the Government. The outside appointees were Prof. J. M. Clark, William H. Davis, George M. Harrison, and George H. Mead.

The four outside persons were specifically charged under the Executive order to "prepare for the President an adequate and final review of the effects of the administration of title I of the National Industrial Recovery Act upon particular industries or problems and as a whole." There was also created under the Executive order a Division of Industrial Economics subject to the general supervision of the Committee of Industrial Analysis and to assist this Committee in preparing the report.

The sum of \$100,000 was allotted to the Committee from the Relief funds to do the work assigned to it. With the funds available the Committee undertook the completion of certain work of the Division of Review of N. R. A. in addition to the preparation of a general report on N. R. A. for the President. Twenty-four reports had been completed by the Division of Review of N. R. A. by the date of its expiration April 1936, but had not been made available to the public. The Committee at its first meeting decided that these reports should be mimeographed and made available. The Committee of Industrial Analysis decided that the 146 codes for which histories had not been completed by the Division of Review should be completed. The task of completing this work was assigned to the Division of Industrial Economics.

The Committee, with the assistance of the Division of Industrial Economics, has devoted much time to the preparation of a general and comprehensive report on the N. R. A., and it is expected that it will be submitted to the President by January 1, 1937.

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BUSINESS ADVISORY COUNCIL

Under the provisions of the enabling act of the Congress, authorizing the Department of Commerce "to foster, promote, and develop foreign and domestic commerce", a business advisory council, composed of representative leaders of industry and commerce, was organized in June 1933. The purpose of the council was to make available to the Department of Commerce the careful judgment and practical experience of industrial leaders on matters affecting the relation of the Department and business.

The council devotes itself primarily to questions referred to it by the President, or by the Secretary of Commerce, in addition to its regular activity as a clearinghouse and coordination center for industrial views on governmental matters which affect business. The recommendations of the council's committees and of the council as a whole with reference to Federal activities affecting trade and industry have been of valuable assistance in the conduct of the Department's affairs. The council has been considering and advising on more problems than ever before, thereby rendering increasingly effective service in furthering cooperation between Government and business.

The practical value of a sober presentation, through the proper channels, of the businessman's point of view on problems in such significant fields as social security, foreign trade, air commerce, housing, and taxation—to mention only a few—is a matter of gratification both for business and the administration.

The Business Advisory Council formed the parent body from which members of the Industrial Advisory Board of the N. R. A. were drawn. This was understood to be one of the Council's functions at the time of its organization, and throughout the active life of the N. R. A. this function was effectively performed. The experience gained by members of the Council in this industrial advisory service is now of inestimable value in all discussions and considerations arising with respect to industrial relation and the various aspects of trade and economic practices which arose under the N. R. A.

The Council has functioned in a much broader way than was originally contemplated in its relationships with other Government agencies. Originally the Council's functions were limited primarily to an advisory relationship to the Department of Commerce, but as the work continued it was expanded considerably from its original basis. Committees of the Council have reported directly to the heads of other Federal agencies.

Since the Council was organized in 1933, more than 55 formal written reports have been made, and there is ample evidence that these reports have been extremely beneficial contributions to the subjects which they have covered.

In view of the past record and the present vigorous activity of the Council, which still retains a full and representative membership, the Department is confident of its continued invaluable assistance.

In acknowledgment of the hearty cooperation of these businessmen, their generosity in devoting valuable time to these important conferences at the Department despite the exacting demands of their own affairs and in defraying their own expenses without Government reimbursement in any respect, I believe that the names of the members of the council should be recorded in this report.

GENERAL COUNCIL MEMBERS

F. B. Adams, New York, N. Y.	W. A. Harriman, New York, N. Y.
James F. Brownlee, Louisville, Ky.	Henry H. Heiman, Niles, Mich.
Charles A. Cannon, Kannapolis, N. C.	Wetmore Hodges, Santa Barbara, Calif.
William L. Clayton, Houston, Tex.	Charles R. Hook, Middletown, Ohio.
David K. Coker, Hartsville, S. C.	Frank C. Jones, New York, N. Y.
William N. Davis, Bartlesville, Okla.	William A. Julian, Cincinnati, Ohio.
Henry S. Dennison, Framingham, Mass.	H. P. Kendall, Boston, Mass.
R. R. Deupree, Cincinnati, Ohio.	William P. Kenney, St. Paul, Minn.
William C. Dickerman, New York, N. Y.	Fred I. Kent, New York, N. Y.
Thomas A. Dines, Denver, Colo.	de Lancy Kountze, New York, N. Y.
Gano Dunn, New York, N. Y.	Morris E. Leeds, Philadelphia, Pa.
Lucius R. Eastman, New York, N. Y.	C. K. Leith, Madison, Wis.
Robert G. Elbert, New York, N. Y.	Paul W. Litchfeld, Akron, Ohio.
John H. Fahcy, Worcester, Mass.	Thomas H. McInerney, New York, N. Y.
Lincoln Filene, Boston, Mass.	George H. Mead, Dayton, Ohio.
T. Austin Finch, Thomasville, N. C.	James H. Rand, Jr., New York, N. Y.
Ralph E. Flanders, Springfield, Vt.	George A. Sloan, New York, N. Y.
James F. Fogarty, New York, N. Y.	E. T. Stannard, New York, N. Y.
M. B. Folsom, Rochester, N. Y.	Myron C. Taylor, New York, N. Y.
Clarence Francis, New York, N. Y.	W. J. Vercon, Moultrie, Ga.
James D. Francis, Huntington, W. Va.	Thomas J. Watson, New York, N. Y.
A. P. Greensfelder, St. Louis, Mo.	Sidney J. Weinberg, New York, N. Y.
Low Hahn, New York, N. Y.	Samuel P. Wetherill, Philadelphia, Pa.
Roland J. Hamilton, New York, N. Y.	H. Iyer Whiting, San Francisco, Calif.
Thomas S. Hammond, Harvey, Ill.	S. Clay Williams, Winston-Salem, N. C.
Henry I. Harriman, Boston, Mass.	Robert E. Wood, Chicago, Ill.

FISHERY ADVISORY COMMITTEE

For the purpose of advising the Secretary of Commerce and the Commissioner of Fisheries on the problems of development, promotion, and regulation of the fisheries of the United States and its territories, the fishery advisory committee was organized by the Secretary on March 22, 1935.

All segments of the fishery industry and related fields of activity are represented on the committee. The membership consists of prominent fishermen, processors, canners, and distributors of fishery products, as well as representatives from the fields of science, medicine, refrigeration, and transportation.

The committee has held several meetings in Washington, D. C., and at each meeting more than half of the membership has been represented. Since members receive no remuneration and bear all expense which they incur incidental to attending meetings, this is excellent proof of the willingness of the leaders in the fishery industry to advise and cooperate with the Department of Commerce.

There have been formed within the organization subcommittees on game fish, the protection of migratory fish, scientific research, food standards, and marketing and distribution.

Following each meeting a report, including an account of the business session, reports of the subcommittees, and recommendations, is presented to the Secretary of Commerce. These suggestions are studied by the Secretary with a view to seeing how the desired results may be realized.

On January 13, 1936, a meeting between the President and the Fishery Advisory Committee was held. This meeting marked one

of the few occasions on which a group constituted entirely of representatives of the fishery industry has been accorded such recognition.

Since the Fishery Advisory Committee is the first organization in which all branches of fisheries are united in action for the welfare of the entire industry, it is to be expected that, because of its activities, conditions in the industry will continue to improve.

The names of the members of the Fishery Advisory Committee follow:

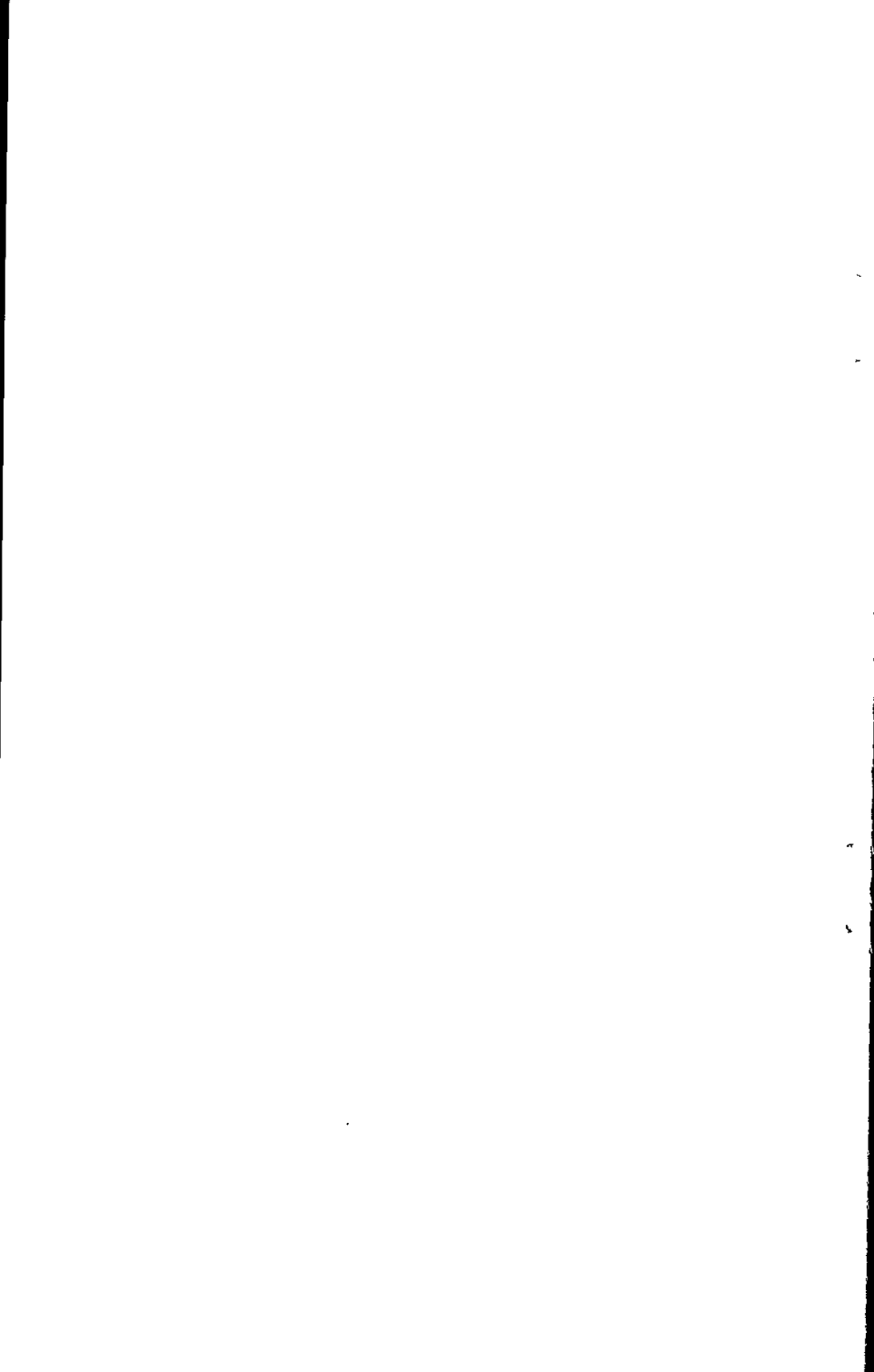
E. B. McGovern, Seattle, Wash., chairman.	L. H. Smith, Port Washington, Wis.
Gardner Poole, Boston, Mass., vice chairman.	Harden F. Taylor, New York City.
Dr. Henry B. Bigelow, Cambridge, Mass.	Dr. R. V. Truitt, College Park, Md.
Howard W. Beach, New Haven, Conn.	J. C. Veatch, Portland, Oreg.
Nick Bez, Seattle, Wash.	William Weston, M. D., Columbia, S. C.
A. F. Cleveland, Washington, D. C.	A. G. Willford, Waterloo, Iowa.
E. H. Cooley, Boston, Mass.	
O. G. Dale, New York City.	
R. P. Fletcher, Chicago, Ill.	
Nelo J. Gonzales, Mobile, Ala.	
Mrs. B. F. Langworthy, Washington, D. C.	
Capt. A. E. Lathrop, Seattle, Wash.	
H. G. Maxson, San Francisco, Calif.	
H. A. McGinnis, Philadelphia, Pa.	
Capt. Val O'Neil, Boston, Mass.	

EX-OFFICIO MEMBERS

Senator Royal S. Copeland, New York.
Congressman Schuyler O. Bland, Va.
Congressman Ralph O. Brewster, Maine.
Delegate Anthony J. Dimond, Alaska.
Commissioner Frank T. Bell, Bureau of Fisheries, Washington.

Sincerely yours,

DANIEL C. ROPER,
Secretary of Commerce.



REPORT BY BUREAUS

CHIEF CLERK AND SUPERINTENDENT

Work throughout the various divisions of the Secretary's Office was never heavier than during the year just closed. At times the demands were beyond our capacity and quite frequently temporary assistance had to be obtained from other branches of the Department. Overtime work performed by employees of the Office of the Secretary during the year amounted to 1,106 days.

INTERNATIONAL EXPOSITIONS

California Pacific International Exposition.—The Congress having authorized Federal representation at this international celebration, reopened from February 12 to run until September 9, this year, the Department of Commerce is continuing its participation with exhibits from the Office of the Secretary and nine bureaus.

Except for the removal of the population map of the Bureau of the Census and the installation of an information booth for the entire Department, the exhibits of the various units were reconditioned and left intact.

Texas Centennial Exposition.—Federal participation in the centennial celebrations being held this year throughout the State of Texas having been provided for by Congress, the Office of the Secretary and all bureaus of this Department furnished exhibits for the Texas Centennial Central Exposition which opened on June 6 at Dallas for a period of approximately 6 months.

The Secretary of Commerce, who with Vice President Garner and the Secretaries of State and Agriculture constitute the United States Commission, was designated by the President to represent him at the opening of the exposition.

Great Lakes Exposition.—The third project of importance in the field of international expositions on which the Department was active during the latter part of the fiscal year was the Great Lakes Exposition, held at Cleveland, Ohio, from June 27 to October 4, this year.

Upon his request, the Secretary of Commerce again acted as personal representative of the President, making the principal address at the opening.

DIVISION OF ACCOUNTS

The following table shows the total amount of all appropriations for the various bureaus of the Department for the fiscal year ended June 30, 1936:

REPORT OF THE SECRETARY OF COMMERCE

Bureau or office	Annual appropriation acts	Deficiencies and supplementals	Special expositions	Emergency	From other departments	To other departments	Total
Office of the Secretary.....	\$900,000	\$20,000	\$32,269	\$1,000,000	\$75,000	-----	\$2,027,269
Bureau of Air Commerce.....	5,909,300	325,000	-----	19,200	88,790	-\$95,039	6,247,751
Bureau of Foreign and Domestic Commerce.....	2,705,100	70,900	-----	-----	250,000	-23,700	3,002,300
Bureau of the Census.....	2,934,000	-----	-----	-----	684,052	-----	3,618,052
Bureau of Marine Inspection and Navigation.....	1,598,000	-----	87	-----	-----	-----	1,598,087
National Bureau of Standards.....	1,802,500	-----	-----	70,000	348,822	-402	2,220,920
Bureau of Lighthouses.....	9,431,000	390,000	-----	-----	-----	-15,645	9,805,355
Coast and Geodetic Survey.....	2,360,900	-----	-----	385,300	32,600	-5,445	2,773,355
Bureau of Fisheries.....	1,414,200	102,000	-----	20,000	-----	-545	1,535,655
Patent Office.....	4,715,000	-----	-----	-----	-----	-----	4,715,000
U. S. Shipping Board Bureau.....	211,000	-----	-----	-----	-----	-----	211,000
Total.....	33,981,500	907,900	32,356	1,494,500	1,479,204	-140,776	37,754,744

Disbursements during the year ended June 30, 1936, from appropriations and from funds transferred from other departments were as follows:

Bureau or office	Appropriation for--				Total
	National Recovery Administration—Commerce	1934	1935	1936	
Office of the Secretary.....	\$959,118 74	\$26,529.50	\$34,768.77	\$1,319,239.99	\$2,339,657.00
Bureau of Foreign and Domestic Commerce.....	-----	-----	108,924 11	2,759,831 03	2,868,755 14
Bureau of the Census.....	19,800.69	-----	56,139 14	3,420,534.64	3,496,474.37
Bureau of Marine Inspection and Navigation.....	1,065.24	329.75	119,695.46	1,693,746.55	1,814,837 00
Patent Office.....	-----	-----	26,924.46	4,320,536.53	4,347,460.99
Coast and Geodetic Survey.....	1,650,948.14	59.86	384,487.81	3,099,044.45	5,134,540 26
National Bureau of Standards.....	81,255.62	374.21	105,917.98	2,159,625.06	2,347,172.87
Bureau of Lighthouses.....	739,623.92	1,245.54	677,282.44	9,111,686.05	10,529,837.95
Bureau of Fisheries.....	52,763 60	24.40	145,502.60	1,351,722.30	1,550,012.90
Bureau of Air Commerce.....	641,676.22	22,376.19	1,042,265.13	5,339,755 03	7,046,072.57
Federal Employment Stabilization Office.....	-----	-----	1,359 62	-----	1,359 62
U. S. Shipping Board Bureau.....	-----	-----	734 33	166,603 37	167,337.70
Total.....	4,146,252 17	50,939.45	2,704,001 85	34,742,324.90	41,643,518.37

MISCELLANEOUS RECEIPTS

Office of the Secretary:	
Copying fees.....	\$236.25
Sale of waste paper.....	31.45
Sale of publications.....	108.95
Sale of stores—condemned.....	494.29
All other services.....	98.25
Bureau of Air Commerce:	
Interest on (deferred collections or payments).....	1.55
Violation, air-traffic regulations.....	990.00
Reimbursement of expenses.....	732.63
Reimbursement, Government property lost or damaged.....	559.57
Reimbursement for transportation.....	8.20
Sale of scrap and salvaged materials.....	1,081.81
Sale of stores—condemned.....	8.87
Profits from business operations, etc.....	55.14
Sale of buildings, exclusive of land.....	984.00
Sale of equipment.....	15,254.21

Bureau of Foreign and Domestic Commerce:	
Interest on public deposits.....	\$5. 23
Fees under China Trade Act.....	1, 325. 00
Sale of photo duplications.....	7. 30
Sale of publications.....	15, 650. 75
Sale of equipment.....	940. 46
Bureau of the Census:	
Copying fees.....	362. 08
Reimbursement of expenses.....	3. 83
Work done.....	2, 193. 70
Bureau of Marine Inspection and Navigation:	
Reimbursement, Government property lost or damaged.....	8. 75
Sale of publications.....	242. 98
Sale of scrap and salvaged materials.....	159. 00
Sale of equipment.....	250. 00
Telephone and telegraph service.....	7. 84
Tonnage tax.....	1, 269, 335. 95
Tonnage tax, Philippine Islands (decision of Comptroller General, Feb. 6, 1931, A-18469).....	10, 789. 34
Fines and penalties.....	27, 623. 33
Fees.....	159, 138. 69
Forfeitures, all other than bonds.....	333. 46
National Bureau of Standards:	
Testing fees.....	59, 854. 08
Reimbursement, excess cost over contract price.....	17. 00
Reimbursement, Government property lost or damaged.....	7. 33
Bureau of Lighthouses:	
Commissions on telephone pay stations in Federal buildings outside of Washington.....	15. 04
Refund on empty containers.....	25. 00
Reimbursement, excess cost over contract price.....	300. 13
Reimbursement of expenses.....	71. 18
Reimbursement, Government property lost or damaged.....	329, 425. 51
Reimbursement for transportation.....	7. 31
Reimbursement, all other.....	153. 07
Moneys received from persons unknown.....	. 55
Sale of publications.....	2. 10
Sale of scrap and salvaged materials.....	6, 979. 93
Sale of stores—condemned.....	5, 582. 99
Telephone and telegraph service.....	31. 87
Work done.....	2, 584. 48
Rent of public buildings and grounds.....	1, 688. 90
Business concessions.....	12. 00
Permits, fishing and hunting.....	4. 40
Pipe-line water rights.....	85. 00
Sale of buildings, exclusive of land.....	73. 25
Sale of equipment.....	6, 648. 91
Sale of land and buildings.....	10, 849. 94
Coast and Geodetic Survey:	
Copying fees.....	947. 92
Reimbursement, Government property lost or damaged.....	175. 04
Sale of charts.....	61, 713. 17
Sale of maps.....	17, 288. 32
Sale of publications.....	7, 499. 82
Work done.....	7. 40
Business concessions.....	1. 00
Sale of equipment.....	2, 123. 55
Bureau of Fisheries:	
Reimbursement, excess cost over contract price.....	35. 98
Sale of furs.....	290. 22
Sale of sealskins.....	175, 950. 13
Sale of fox skins.....	17, 437. 52
Sale of scrap and salvaged materials.....	5, 167. 58
Telephone and telegraph service.....	14. 72
Rent of land.....	25. 00
Sale of equipment.....	1, 528. 29

Patent Office:	
Fees, 1935	\$105,306.56
Fees, 1936	3,790,317.08
U. S. Shipping Board Bureau:	
Interest on money loaned from construction loan fund	2,718,457.27
Interest on deferred collections or payments	11.44
Furlough compensation deductions, vacancy savings	11,000.00
Miscellaneous: Gasoline tax	190.07
Total, Department of Commerce	8,849,440.96

APPOINTMENT DIVISION

At the close of the fiscal year 1936, exclusive of 1,254 persons paid from emergency funds, the personnel of the Department numbered 15,533 (13,825 permanent and 1,708 temporary). Of that number, 4,912 were employed in the District of Columbia, and 10,621 in the field. The total personnel as of June 30, 1935, exclusive of 3,648 persons paid from emergency funds and 1,636 employees in the Bureau of the Census engaged on the work of the census of Agriculture, was 14,680 (13,275 permanent and 1,405 temporary). Of that number 4,189 were employed in the District of Columbia, and 10,491 in the field.

The number of employees retired on annuity during the year under the Civil Service Retirement Act was 57—22 by reason of age, 28 on account of disability, and 7 by optional retirement. Under the Lighthouse retirement system, 20 were retired for age and 46 on account of disability. A total of 1,875 civilian employees have been retired under applicable statutes to the close of June 30, 1936.

DIVISION OF PUBLICATIONS

The following statement gives, for the fiscal years 1935 and 1936, the amounts available to the Department for printing and binding, the amounts expended, and the unused balances.

	Fiscal year—	
	1935	1936
Services other than the Patent Office:		
Amount available	\$369,014.00	\$425,225.00
Expenditures	368,367.35	415,501.98
Balance	646.65	9,723.02
Patent Office.		
Amount available	900,000.00	995,000.00
Expenditures	868,952.37	892,681.82
Balance	31,047.63	102,318.18

¹ The amount available during 1935 included an appropriation of \$350,410, plus \$31,296 provided in sec. 21 (e), act of Mar. 28, 1934, to cover 40-hour week at Government Printing Office, \$4,750 transferred from "General expenses, Bureau of Lighthouses", and \$20,000 appropriated in the Second Deficiency Act, 1935. From that amount the following sums were deducted: \$37,000 transferred to the Interior Department and \$442 transferred to the Treasury Department by reason of the transfer of the Bureau of Mines and the Disbursing Office from the Department of Commerce.

² Includes a contribution of \$225 to the Bureau of Fisheries, accepted under provisions of sec. 8, Public Act 240, 71st Cong.

³ Estimated; exact figures for 1936 cannot be given until all work ordered in that year is completed and billed.

Receipts from sales of the Department's publications for the fiscal year 1935 (the latest period for which complete data are available) were \$557,174.47 compared with \$543,621.56 for 1934. The following table presents a comparison for the 2 years by selling agencies:

Sales	Receipts	
	1934	1935
By the Superintendent of Documents: Miscellaneous sales and subscriptions.	\$141,537.79	\$141,943.65
By Coast and Geodetic Survey: Coast pilots, inside route pilots, tide tables, current tables, charts, and airway maps.	77,143.47	73,432.17
By Patent Office: Specifications of patents, reissues, etc., trade-mark section and decision leaflet of Official Gazette, and classification bulletins and definitions.	324,940.30	341,798.65
Total.....	543,621.56	557,174.47

DIVISION OF PURCHASES AND SALES

During the fiscal year 1936 there were placed 12,550 purchase orders, which, including freight, travel, rent, and miscellaneous accounts, involved the expenditure of \$1,077,177.06. These amounts show a decrease in orders of 3,705 and in expenditures of \$1,255,516.19, under the fiscal year 1935. This decrease is due largely to the curtailment of National Recovery Administration purchases to April 1, 1936, and their cessation on that date.

There were 682 contracts approximating \$2,542,126.71 submitted to this office for examination and forwarding for departmental approval by the various field offices of the Department. In addition to the above there were 22 formal contracts amounting to \$131,660.85 prepared by this division, making a total of 704 contracts examined and prepared, involving a total expenditure of \$2,723,787.56.

Through the cooperation of the Procurement Division of the Treasury Department, there has been obtained by transfer without exchange of funds, surplus and forfeited property valued at approximately \$36,000.

The Department also received large quantities of office furniture and office equipment from the National Recovery Administration, a part of which was used by the Department to replace old and damaged equipment.

Transfers of approximately 50 automobile trucks from the Coast and Geodetic Survey were made to the Bureau of Fisheries.

Approximately 2,000 reports of surplus and seized property have been received from the Procurement Division. Many of these reports require the canvassing of the bureaus and offices of the Department, the tabulation of their replies, and reporting to the Procurement Division. This office is now also required to report to the Procurement Division all unserviceable property which has a sales value.

DEPARTMENT LIBRARY

At the close of the fiscal year the number of books in the library was 223,093, and periodicals and newspapers, 1,689. The number of books cataloged was 7,156; cards added to the catalog, 23,749; num-

ber of books circulated, 53,150; books prepared for shelf, 7,553; transfers from the Library of Congress, 288; books bound, 691; books borrowed from the Library of Congress and other libraries, 1,712; books loaned to other libraries, 535.

TRAFFIC OFFICE

The traffic work of the Department has been consolidated, the new arrangement having proved very satisfactory.

The past fiscal year has been one of many changes in all transportation problems; emergency charges on freight shipments, the reduction of passenger fares, and new legislation bringing the truck and bus under Federal regulation, have eliminated old standards and set up new ones, with many interpretations of new tariffs, substantially increasing the volume of work in this office.

The office has finished and has made final report concerning the transportation records and freight claims of the National Recovery Administration.

OFFICE OF THE SOLICITOR

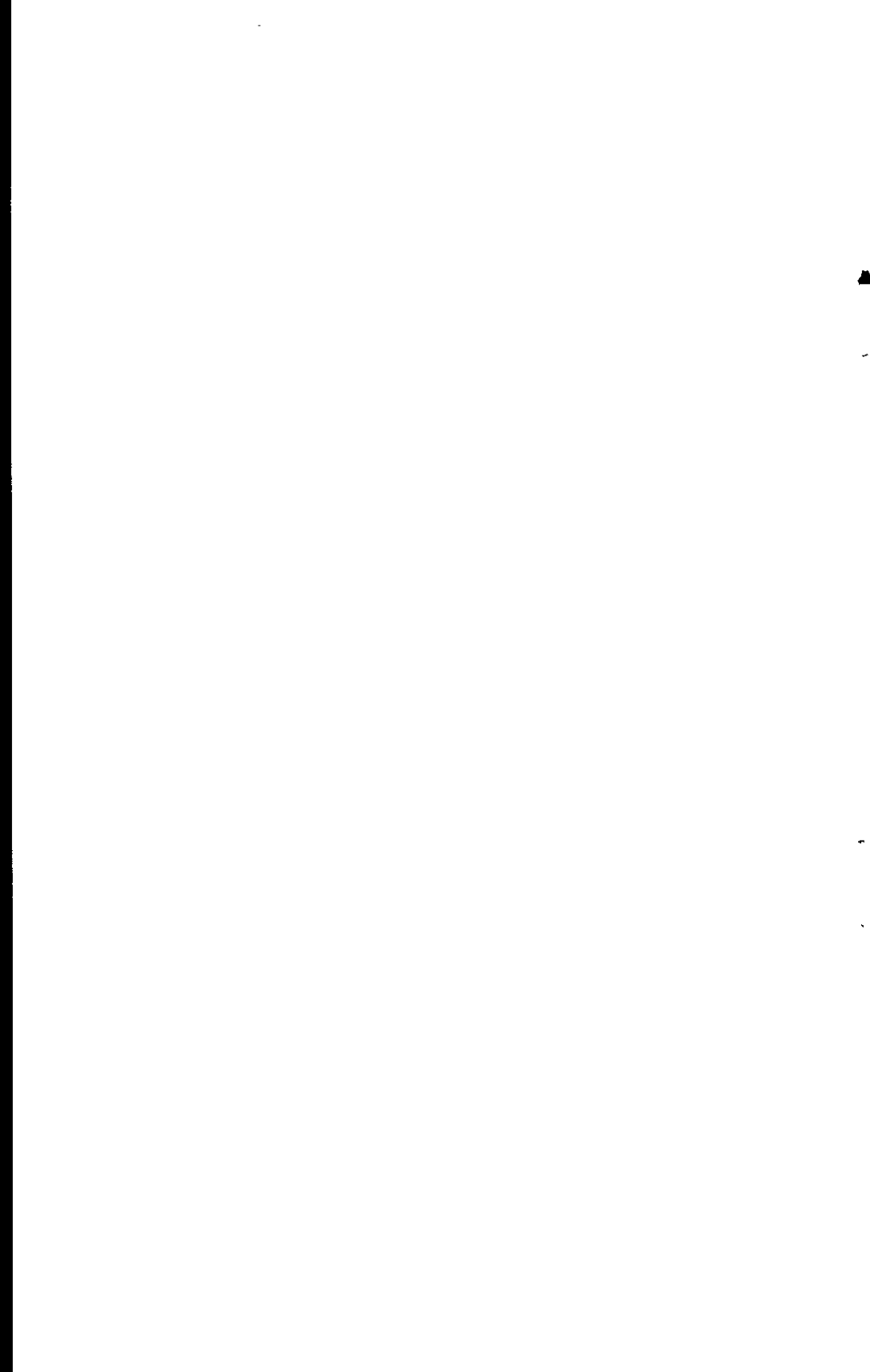
During the fiscal year ended June 30, 1936, there were 710 formal opinions rendered and the following were examined, approved, disapproved, redrafted, or modified: 455 contracts totaling \$2,098,411.21, together with 68 contracts of indeterminate amounts; 1,100 leases amounting to \$224,666.78; 5 insurance policies amounting to \$1,038,600; 61 revocable licenses; 40 deeds amounting to \$98,000; 137 contract bonds amounting to \$1,134,933.57; 78 annual bonds and performance bonds; and 70 official bonds amounting to \$326,000. In addition this office handled 126 legal instruments of the Merchant Fleet Corporation and rendered 101 opinions relating to Shipping Board Bureau and Fleet Corporation matters.

At the beginning of the fiscal year there were 477 cases involving \$71,105,496.83 in litigation—61 new cases involving \$4,115,154.16 were added and 186 cases involving \$7,699,969.79 were closed, so that at the end of the fiscal year 1936 the total number of cases was reduced to 352, involving \$67,520,681.20.

The litigation handled involved for the most part cases arising out of the activities of the Fleet Corporation and Shipping Board Bureau although there were other cases handled for other departments of the Government. There were 264 Fleet Corporation cases involving \$64,993,949.24 pending on June 30, 1936, and on the same date there were 41 cases involving \$1,739,798.10 handled for other departments of the Government. There were also 47 cases totaling \$786,933.86 involving outside protective and indemnity underwriters over which this office exercised supervision. All litigation was handled under the supervision and control of the Department of Justice but active assistance was rendered by this office. In many instances the cases were prepared and tried by attorneys attached to this office; briefs and other pleadings were prepared and other details likewise handled.

Many miscellaneous matters, embracing all phases of administrative law and procedure, were handled. This office was frequently called upon to confer with representatives of the various Bureaus and render informal advice for the guidance of these Bureaus. In this connection many oral and informal opinions were rendered.

Legislative matters handled included the drafting and redrafting of bills and preparation of reports thereon.



BUREAU OF AIR COMMERCE

The organization of the Bureau was substantially unchanged during the year. It is comprised of two major divisions, the Air Navigation Division and the Air Regulation Division, and four smaller sections—Administrative; Aeronautic Information; Airports Marking and Mapping, and Development. Toward the end of the fiscal year certain projects involving deicing devices for aircraft, instrument and radio landing equipment, and studies of high altitude flying were transferred from the Air Navigation Division to the Development Section. Also, the activities of the Bureau were decentralized to an even greater extent, added independence being permitted to 14 field offices.

THE FEDERAL AIRWAYS SYSTEM

Radio development.—The increased amount of “blind” flying along the airway routes, with pilots navigating their craft through or over the tops of cloud levels entirely by reference to instruments and radio, has augmented the importance of existing radio aids and has pointed to the course which further research and development should take.

About a year ago, there was formed under Bureau sponsorship a Radio Technical Committee for Aeronautics, having representation from the following organizations: Bureau of Air Commerce, National Bureau of Standards, Army, Navy, Marine Corps, Coast Guard, Federal Communications Commission, Aeronautical Radio, Inc., air-line operators, and radio manufacturers.

This committee was formed to survey problems in aeronautical radio development and allocate them to subcommittees for detailed study, and the accomplishments have been gratifying. A number of meetings have been held both by the full committee and the various subcommittees.

A new principle was introduced in the operation of radio range and broadcast services at Newark, Cleveland, Washington, Cincinnati, and Buffalo. At these stations the broadcast of weather reports is accomplished with a separate transmitter on the frequency of 236 kilocycles while the radio range operation is continued without interruption on a separate frequency. This arrangement makes it possible for a pilot to receive at his option either continuous range signals or weather information. This procedure solves the difficulty of radio range beacon interruption for these particular stations.

The Bureau installed at Indianapolis a combination instrument approach system which incorporates the radio glide path (originally developed by the National Bureau of Standards), and visual radio range localizer for orientation in a horizontal plane, in addition to the marker features of the Army system and the train of approach

lights leading up to the actual landing area. With this combination system it is possible to practice blind landings by any of the methods developed up to date, as well as by a combination thereof.

An entirely new method of instrument approach for blind landing is being evolved by Bureau of Air Commerce engineers and preliminary tests have been conducted thereon. The principal feature of this is that the glide path is a straight line, not a curve, and that the indicating instrument on board the airplane provides all the information necessary for contact with the earth at the desired angle, making it unnecessary to coordinate the readings of several instruments as is necessary with all other blind-landing methods.

The Bureau continued experiments with radio facsimile and radioteletypewriter communication and has developed the latter to the point where this type of service is now satisfactory for service installation.

Communications.—Commencing February 1, 1936, the Bureau of Air Commerce began maintaining a continuous watch on 3,105 kilocycles, for the particular benefit of flyers other than air line pilots, at all Bureau radio stations except those located on airports which have airport radio stations. At such points, the airport radio station is required to maintain the continuous watch on 3,105 kilocycles.

Miscellaneous developments.—The development of de-icing equipment for airplane wings and tail surfaces, which has received recent general application to transport aircraft, brought to the fore the problem of preventing ice formation on, and removing it after its formation, from propellers and carburetors.

During the past year, the Bureau worked out and tested successfully a de-icing device for application to airplane propellers. It is a "slinger ring" which distributes de-icing fluid to the propeller blades while the aircraft is in flight. This device has already been adopted as standard equipment by several air line operators.

A new carburetor developed by the Bureau has been tested successfully insofar as ice prevention is concerned, and is now being tested to determine its efficiency insofar as fuel consumption and mixture control are concerned. The problem of supplying to the conventional type carburetor a de-icing solution and proper proportion of heat which would prevent or break up ice formation without seriously affecting the engine performance was studied and valuable suggestions were provided for carburetor manufacturers.

Recent developments in instrument flying out of sight of the ground either in or above the clouds at safe altitudes, have brought about a realization that the next step in making scheduled flying independent of surface weather conditions is to schedule flying at considerably higher altitudes than is now practicable. In undertaking to determine the practicable requirements for carrying on flights at altitudes of 20,000 to 30,000 feet, the Bureau is determining first the requirements for the physical comfort and safety of passengers and pilots, realizing that the mechanical requirements for operating aircraft at such altitudes are relatively easily determined and met. Certain information acquired to date has already been utilized in the development and placing on the market of emergency oxygen kits suitable for carrying on board the present-day aircraft.

In connection with the development of blind or instrument landing, there is an intermediate condition midway between minimum ceilings and visibilities for landing in accordance with the current regulations and a totally blind or zero-zero condition, in which some type of visual aid could very readily convert the landing operation from a hazardous maneuver to a relatively simple and safe operation. One such type of aid is a string of approach lights which can be observed by pilots at low altitudes and followed in to the landing area. As an adjunct to this, a string of relatively low powered lights on the landing surface along the path of the landing is an almost necessary complement. The Bureau has made test installations of a number of different types of lights to be used as approach lights, and also of flush type lights on the landing surface to continue the visual guidance of the airplane within the actual landing area.

Another problem in connection with landing in bad weather is the fact that high powered floodlights frequently fail to illuminate the ground surface for the approaching pilot. To provide for some illumination of the ground under these conditions, the Bureau has worked out a type of runway illuminator which is in effect a very small floodlight whose cut-off is not over 3 feet from the ground and which illuminates a relatively small ground area.

Scope of airways.—A compilation of statistics showing scope of the airways system at the beginning and end of the fiscal year follows:

Item	June 30, 1935	June 30, 1936
Airway mileage.		
Lighted.....miles.....	20,760	21,868
Day (unlighted).....do.....	219	71
Lighted routes on day airway status (lights not operating).....do.....	726	482
New routes under construction.....do.....	1,115	10
Intermediate landing fields.....number.....	277	289
Beacon lights in operation.....do.....	1,841	1,893
Radio communications stations.....do.....	73	82
Radio range beacons.....do.....	119	147
Radio marker beacons.....do.....	55	56
Teletypewriter circuits.....miles.....	12,739	13,325

¹ Some final details of construction still are under way on the Nashville-Washington and Seattle-Twin Cities routes.

REGULATION OF AIR COMMERCE

Air lines.—Minimum safety standards for air line operation, as set forth in the Air Commerce Regulations Governing Scheduled Operation of Interstate Air Line Services of October 1, 1934, were strengthened by a series of amendments adopted in December 1935. The amendments have to do with weather reports, high-altitude flying, qualifications of pilots, hours of flying duty for pilots, and instrument flying.

During the year nearly all of the operators submitted operations manuals, which have been reviewed and approved by the Bureau. Included in these manuals are minimums which are considered safe approaches to airports.

In addition to previous duties, the air line inspection service of the Air Regulation Division was given responsibility for clearing proposed changes in and additions to air navigation aids on the

Federal airways system. In this connection a procedure was formulated which provides for recommendations to be made in the field after conference with those who regularly use such facilities, including air lines and other users of the aids, and submission of these recommendations to Washington.

Airways traffic control.—The increased volume of radio and instrument flying along the airway routes brought the necessity for a system of traffic control to provide for orderly progression of craft moving along the airways, to avoid congestion in the vicinity of terminal airports, and to guard against the possibility of collision. The Bureau of Air Commerce, in cooperation with the air lines, established three airways traffic control stations, at Newark, N. J., Chicago, Ill., and Cleveland, Ohio, and will on July 6, 1936, assume entire responsibility for this work. Additional stations are planned for Pittsburgh, Pa., Detroit, Mich., Washington, D. C., San Francisco, Calif., and Los Angeles, Calif.

An airways traffic control station receives departure, progress, and arrival reports on all airplanes operating along airways converging at the airport upon which it is located. These reports are relayed by the air line dispatchers, Bureau of Air Commerce radio and teletypewriter stations and the airport control tower, which are in direct contact with the pilots. Keeping closely in touch with the movements of all airplanes, airways traffic control is aware immediately of any congestion. During periods of poor visibility, when pilots are operating on instruments and radio, airways traffic control assigns varying altitudes of flight to aircraft when they are known to be flying in close proximity to each other, and if this is not sufficient, issues orders for certain airplanes to reduce speed, circle over check points, or land at alternate airports.

Airworthiness of airplanes and equipment.—In the interests of full coordination and to permit more rapid and accurate solutions to the technical problems of the aircraft manufacturers, the Manufacturing Inspection Service initiated and successfully formed an organization known as the Army-Navy-Commerce Committee on Aircraft Requirements. Its membership consists of the responsible technical officers of the Army Air Corps, the Bureau of Aeronautics, Navy Department, and this Bureau.

A preliminary draft of the first publication of this committee has been issued. It is an 84-page book entitled "Strength of Materials Used in Aircraft Construction."

The present airworthiness requirements for aircraft were restudied in detail and decisions reached concerning those parts which need modification at present. The actual drafting of modified regulations is in process. The special requirements for air-line aircraft are in suitable form for publication but are being withheld because of the complete redrafting of all regulations now being undertaken by the Bureau.

Accident investigations.—During the fiscal year, the Bureau issued statements of probable cause covering 13 air-line accidents and 51 accidents in miscellaneous flying operations. Public hearings were held for four air-line accidents.

Medical.—Tests were made in the low pressure chamber at the National Bureau of Standards to study effect of altitude upon the human body. These tests will be continued, together with others regarding effect of fatigue upon the human body from flying many hours under all conditions, the effect of gases, fumes, and odors upon pilots and passengers of aircraft, and the relation of the structure of aircraft to their comfort and safety.

Publication of regulations.—Published regulations, issued from time to time since the organization of the Bureau, include the Air Commerce Regulations and supplementary rules having to do with airworthiness of aircraft, flying schools, entry and clearance of aircraft, parachutes, air lines, airworthiness of components and accessories, airworthiness of engines and propellers, and alterations and repairs to licensed aircraft. During the fiscal year 1936, the Air Regulation Division undertook the task of systematizing and re-drafting all of these regulations.

State coordinator.—During the fiscal year the office of state coordinator was created to provide for liaison between the Federal and various State aviation bodies, encouraging uniformity of regulation, interpretation, and enforcement.

Foreign agreements.—Active participation in the establishment and maintenance of foreign agreements for the reciprocal recognition of airworthiness certificates has continued. At the end of the fiscal year, negotiations with Australia, looking to an arrangement for licensing of American-built aircraft in that country, were nearing completion.

DEVELOPMENT OF FLYING EQUIPMENT

Aircraft.—During the past year the Development Section took delivery for the Bureau on the first Hammond airplane, the Waterman tailless airplane, the Weick W-1 airplane, and the Curtiss-Wright coupe.

The Hammond airplane, the first one to be ordered in the development program, has exceeded expectations and has demonstrated the possibility of constructing airplanes so that they may be safely flown by the average individual with a very small amount of training. This airplane has been taken off, flown, and landed by a wide range of individuals who had not previously flown any type of airplane. The Waterman tailless airplane also exceeded expectations in some respects. As a result of the Bureau's assistance in these two developments, both airplanes are being placed in production to be made available to the general public. The Weick airplane, which was purchased for experimental testing, has been tested by the National Advisory Committee for Aeronautics and the results obtained have been of value. The Curtiss-Wright coupe demonstrated the possibility of using all-metal construction in small airplanes while retaining good performance.

A roadable autogiro was constructed by the Autogiro Co. of America and subjected to tests by this company, which tests indicated that the roadable feature was entirely satisfactory. The airplane was not sufficiently developed during the year for delivery to the Bureau. As a result of a Bureau design competition for a small twin-

engined transport airplane, a number of airplanes of this type are now being developed for the market and the Bureau has ordered one.

Engines and equipment.—A satisfactory method of cooling inline air-cooled engines, when installed as pushers, was developed and applied to the Waterman airplane with excellent results. The possibility of using a V-belt drive for the adaptation of automobile engines to airplanes was demonstrated. Propellers made of solid steel were investigated and found to be entirely satisfactory.

Additional orders, placed during the year, covered a wind tunnel investigation of the Canard type of airplane, the development of a barrel type two-cycle engine, the development of an amphibious float gear for installation on a number of standard land type airplanes, and a wind tunnel investigation of a possible method of reducing the noise created by propellers.

AIRPORT DEVELOPMENT

Airport construction and development.—The Bureau has assisted municipalities applying as sponsors to the Works Progress Administration for Federal funds with which to construct or improve their airports, with engineering advice on the technical features of their airports. The W. P. A. has undertaken and has completed or has under construction 405 airport projects, including 129 air transport terminals, involving Federal expenditures of \$54,725,773. The recommendation and approval of the Airport Marking and Mapping Section of the Bureau of Air Commerce were required by W. P. A. for each individual project before it could be undertaken.

Air marking.—The Bureau has fostered and promoted the air marking of towns, for which W. P. A. funds are being used. During the past 8 months, 27 States were actively engaged in air marking towns in their territories and 7,505 markers are actually under construction.

Scaplane facilities.—The Bureau designated an engineer to assist in promoting the establishment of additional scaplane facilities throughout the United States and to give engineering advice on this subject to municipalities desiring it.

Navigational aids.—Engineers of the Airports Marking and Mapping Section have been occupied in coordinating the establishment of air navigation aids with W. P. A. funds in order to supplement the regularly appropriated funds of the Bureau of Air Commerce in connection with the construction of new airways and the improvement of existing ones. Its function has been to act as liaison between the Air Navigation Division of the Bureau of Air Commerce and the W. P. A. and to put the applications in the proper engineering form so that they will be acceptable to the State works administrator when presented to him for approval.

Sectional aeronautical charts.—Seventy-six of the eighty-seven sectional aeronautical charts of the Bureau were available at the end of the fiscal year. The remaining 11 have been compiled and flight checked and will be ready in the fall. Two regional charts on a 1:1,000,000 scale were issued.

ADMINISTRATION AND DISSEMINATION OF INFORMATION

The Administrative Section, in addition to handling its regular routine duties, prepared a standardized filing manual for the correspondence of the Washington office and all its field offices, and also a revised cash and cost accounting system for the Washington office and the Air Navigation District Offices. The Aeronautic Information Section continued its duties of disseminating information through printed bulletins, special articles and correspondence, motion pictures and photographs; compilation of statistics; and supplying of information on airports; and in addition prepared exhibits for the expositions at Dallas, Tex., and Cleveland, Ohio.

APPROPRIATIONS, PERSONNEL, AND AIR NAVIGATION FACILITIES

A tabulation showing amounts that have been appropriated for the work of the Bureau of Air Commerce since it began to function follows:

Fiscal year--	Departmental salaries	Aircraft in commerce	Air navigation facilities	Total
1927 ¹		\$250,000.00	\$300,000.00	\$550,000.00
1928.....		700,000.00	3,091,500.00	3,791,500.00
1929 ²		859,500.00	4,659,850.00	5,519,350.00
1930.....		998,000.00	5,458,620.00	6,416,620.00
1931.....		1,260,830.00	7,944,000.00	9,204,830.00
1932.....		1,369,660.00	8,992,640.00	10,362,300.00
1933.....		1,000,000.00	7,553,500.00	8,553,500.00
1934.....		1,070,570.00	6,590,210.00	³ 7,660,780.00
1935.....		676,249.54	5,004,782.45	5,681,031.99
1936.....		734,800.00	⁴ 5,189,600.00	⁴ 5,924,400.00
1937.....	\$390,000	⁵ 793,000.00	⁵ 5,727,000.00	6,850,000.00

¹ Second Deficiency Act, fiscal year 1926, approved July 3, 1926.

² Includes under "Aircraft in commerce", \$72,500 appropriated by the Second Deficiency Act of 1928, and \$85,000 appropriated by the Second Deficiency Act of 1929, and under "Air navigation facilities", \$1,000,000 appropriated by the Second Deficiency Act of 1928.

³ Expenditures were limited by Executive order to the following amounts: Aircraft in commerce, \$700,000; air navigation facilities, \$4,472,500; total, \$5,172,500.

⁴ Includes \$14,600 appropriated by the First Deficiency Act, fiscal year 1936.

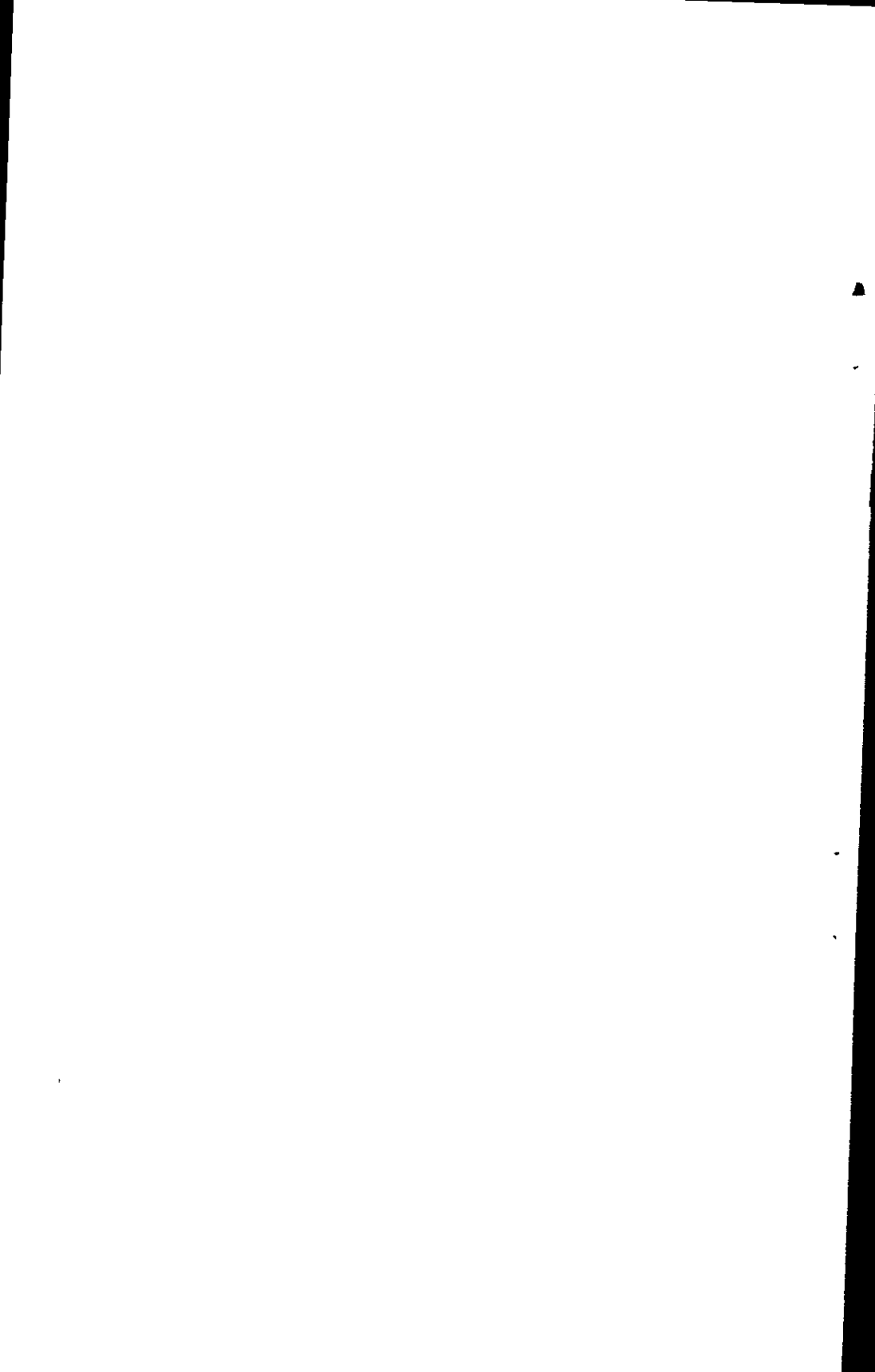
⁵ \$175,000 available on approval of appropriation act (act approved May 15, 1936).

⁶ \$882,920 appropriated for establishment of air navigation facilities, of which amount \$150,000 was available upon approval of the appropriation act (act approved May 15, 1936), and \$4,844,080 appropriated for maintenance of air navigation facilities, of which amount \$80,000 was appropriated by the First Deficiency Appropriation Act, fiscal year 1936, approved June 22, 1936.

Statistics on personnel employed by the Bureau of Air Commerce on June 30, 1936, and at the corresponding date of the preceding year follow:

Item	June 30, 1935			June 30, 1936		
	District of Columbia	Field	Total	District of Columbia	Field	Total
Paid from aircraft in commerce.....	109	100	209	110	114	224
Paid from air navigation facilities.....	46	1,574	1,620	55	1,765	1,820
Total.....	155	1,674	1,829	165	1,879	2,044

¹ In addition, on June 30, 1936, there were 74 employees engaged on projects sponsored by Works Progress Administration and Public Works Administration, and 5 on development work.



BUREAU OF THE CENSUS

INTRODUCTION

The collection of more extensive and detailed statistics of business and industry was the outstanding activity of this Bureau during the past year. The census of business and the biennial census of manufactures, both for the calendar year 1935, were the two major projects in this field. These censuses, together with the annual, quarterly, and monthly census inquiries in selected industries and commodities, the 1935 Census of Agriculture, and the regular reports on cotton and oils, and the Census of Mines (1935) give a more complete statistical panorama of American economic activities than heretofore has been obtained.

Legislation for the Sixteenth Decennial Census.—The revision of legislation necessary for the proper conduct of the Sixteenth Decennial Census (1940) is being given careful study at the present time. It has been the practice of the Bureau since its formal organization in 1902 to submit a revision of laws for each decennial census. This is necessary because: (1) Between census periods relatively few changes are made in the statutes governing the activities of this Bureau; (2) each decennial census must provide data with which to meet a number of new national problems; and (3) in order that more complete and accurate censuses can be taken, improvements attained since the previous census must be given a proper legal foundation.

The taking of the decennial population census is the oldest regular function (that is, nonmilitary) which the Federal Government handles on an emergency basis. The 1940 census will require more than 100,000 persons in the field canvass, and more than 6,000 in the central offices where the returns are compiled. When this Bureau was established as a permanent agency it was understood that it would or could be employed on the preliminary work for the decennial census during the intercensal period, well in advance of the census period. However, other duties of the Bureau have constantly increased, making it difficult to give proper attention to the necessary preparatory work. As a result, there has been a constant pressure to postpone preliminary work until just before the passage of a decennial census act. These preparations are of three kinds: (1) The drawing, testing, and perfecting of plans for a rapid, complete, and accurate enumeration of population, farms, factories, and other business establishments; (2) the modernization of mechanical equipment for tabulation of the census, and the building of additional equipment developed in the Bureau since 1930; and (3) the securing and training of additional personnel to meet the technical and administrative problems of a national census. Adequate preparation many months in advance of the census date will not only result in a better census but a less costly one.

The Bureau is immediately undertaking some preliminary work. However, no extensive plans can be drawn, or large-scale preparatory work be accomplished, without special appropriations and legislation. Request for preliminary funds with which to carry on preliminary work will be made of the next Congress. The Fifteenth Census bill was introduced in the House on December 5, 1927, and approved June 18, 1929; the Fourteenth Census bill was introduced in the House May 8, 1918, and approved March 3, 1919. In each case the necessary legislation preceded the enumeration date by only about 9 months. At least 2 years are necessary for proper preparations.

Reorganization of divisions.—The law provides for the annual publication of Financial Statistics of Cities with a population of over 30,000, of which there are 310, but by Executive order, beginning with the 1932 report, only the 94 cities with a population of over 100,000 have been covered. By order of the Secretary of Commerce, Financial Statistics of States has been discontinued temporarily since the 1931 report. With no comparative basis provided by the statistics for smaller cities, and no individual reports for States, these remaining reports are of greatly reduced value.

A detailed analysis has been made of the needs for data in this field, and of the Bureau's past and present inquiries. Closely related reports have been prepared for the Director by the Central Statistical Board, the Advisory Committee to the Director of the Census, and the Municipal Finance Officers' Association of the United States and Canada. Plans for the reorganization of the Division of Financial Statistics of States and Cities have been completed. The new Chief Statistician and Assistant Chief Statistician will assume office September 1.

The special problems which arise in the decennial enumeration of, and the compilation of statistics for Territories and outlying possessions make imperative the reorganization of this Division of Territorial, Insular, and Foreign Statistics in the near future. During the intercensal period it cooperates with other agencies of the Government in the compilation of statistical reports for the several Territories and possessions and conducts valuable studies as to the census procedures of foreign governments. The functions of this Division in connection with the censuses of population and agriculture, taken by the Puerto Rican Reconstruction Administration with the cooperation of this Bureau, have been assumed temporarily by other divisions.

Special equipment for record preservation and tabulation.—The Bureau has been unable to conduct age searches for social security purposes during the past year as rapidly as the demands came in. Several major steps have been taken to remedy this situation. Most notable among these are: (1) An alphabetical index of all persons enumerated in the Census of 1900 is being compiled in the St. Louis office of this Bureau with an allotment of funds from the Works Progress Administration. (2) Photographic equipment has been purchased with funds provided by Congress and as rapidly as possible film records will be made of all censuses now in active use for age search purposes. These films will require much less active-storage space than the original documents, will make the handling of the original documents unnecessary, and, because of the comparative

speed with which film records may be handled, will increase the rapidity of making age searches. (3) Photostatic equipment was purchased with funds appropriated by Congress to reproduce the volumes of irreplaceable original enumeration sheets. These volumes will be open to the public, except for censuses since 1870, for use in genealogical research and other purposes permitted by census law.

With the completion of the alphabetical index in March 1937, and its transfer to the Washington office for active use, the great majority of these searches will be conducted by the use of this index alone. Only for those cases in which the index for 1900 does not give the required detail will searches in other census records be necessary.

The rapid and reasonable compilation of censuses which have millions of schedules depends upon the constant perfection of mechanical tabulating equipment in this Bureau. A statement is given below of present equipment and recent improvements. Special attention should be called to the development by this Bureau of an adding tabulator which will greatly reduce governmental expenditures for the rental of this type of equipment, particularly in connection with census inquiries. With approval of an impartial committee appointed by the Secretary of Commerce this Bureau will request funds during the next year for the construction of a sufficient number of adding tabulators and the remaking of census unit tabulators to handle the tabulation of the next decennial census.

CENSUS OF BUSINESS

The Census of Business covering the calendar year 1935 is the largest and most inclusive inventory of business establishments ever undertaken. Much broader in scope than either the Census of Distribution for 1929 or the Census of American Business for 1933, it attempts to obtain a reasonably complete picture of essential and comparable items of business information concerning practically all lines of business activity in the United States. It comprises a complete census of retail and wholesale trade, service businesses, amusement enterprises, hotels, broadcast stations, advertising agencies, banking, insurance, real estate, bus transportation, trucking, warehousing, construction, and distribution of manufacturer's sales through primary channels. It will greatly extend the information now existent in many of these fields.

Funds to defray the expenses of this project were furnished by the Works Progress Administration. In order to secure a large number of "security wage" workers who were competent to work on this project, the national headquarters was established in Philadelphia, Pa. A maximum clerical force of approximately 1,500 persons was employed in this headquarters office for the purpose of editing, coding, and mechanically tabulating the schedules, and preparing the data for publication. Although these employees were certified from the State employment office—in keeping with regulations governing the project—all were required to qualify for the work through competitive examinations given by this Bureau. (See section on personnel, below.)

A competent technical staff, the members of which were selected because of their knowledge of, and wide experience in, their respective fields of business, took immediate steps to contact recognized

business leaders throughout the country. Many conferences were held to discuss the schedules, procedures, and other problems inherent in this expanded business census. These conferences were attended by representatives of trade associations, professional groups, chain store organizations, etc., and by official representatives of a number of governmental agencies—Central Statistical Board, Interstate Commerce Commission, Bureau of Foreign and Domestic Commerce, Tariff Commission, Federal Reserve Board, Bureau of Labor Statistics, etc. Each of the 17 schedules used in this census was submitted for criticism to representatives of the business groups and governmental agencies principally concerned before receiving final approval. Special efforts were made by the Bureau to integrate the census of business and the biennial census of manufactures by the adoption of common definitions, instructions, area designations, and field procedures.

Field organization.—Classes were organized by the Bureau in September 1935, for the instruction of candidates for positions as area supervisors in connection with the censuses of business and manufactures. Instructions were given by experienced staff members in such subjects as the filling out and checking of business and manufactures schedules; the duties of, and the instruction required by subordinate field personnel; and field office procedure and reports. Upon completion of the instruction, and after competitive examinations, 23 permanent Census employees and 31 temporary employees were selected as area supervisors and sent to their districts to prepare for the start of this census on January 2, 1936.

Serious delays were encountered in the field because of the difficulty of securing qualified security wage enumerators in sufficient numbers to cover the 405 supervisor's districts. At the peak, 16,331 enumerators were used. On June 30, 1936, there remained 2,692 enumerators in the field (principally in large cities) doing "clean up" canvassing.

Releases and reports.—At the close of the present fiscal year, press releases by geographic areas and a United States summary of the broadcasting industry had been published. These reports contain information such as analysis of revenue, employment and pay rolls, number of networks and stations, etc. Also, the first release on banking institutions had been issued.

It is anticipated that the retail trade series of basic reports, containing such facts as number of establishments, net sales, number of employees, pay rolls, etc., will have been published by the first of October of this year. Similar information for business and personal services and wholesale trade will be available by November 1. Information for other phases of the census will be published from time to time until March 1937, when all basic facts will be available. By the time of the completion of this census there will have been issued, in addition to the data mentioned above, a series of State reports and also trade reports, covering each of the fields of business within the compass of the census, in as much detail as possible without the disclosure of individual operations.

Retail trade survey.—The need for annual business data comparable with that secured by the Census of Business, together with the expense and the organizational difficulties of frequent national enumerations of this magnitude, has resulted in special research on the

possibility of an annual sample survey of retail trade. This research is now an integral part of the Census of Business. It is intended to determine the feasibility of selecting a group of counties, or cities, or both, from each State so as to provide a representative sample of retail sales and of the principal economic and social factors affecting sales. Nearly 300 area samples have been tested with data on retail sales by the elevenfold break-down of the retail reports for 1929 and 1933. Special tabulations of 1934 and 1935 sales, and of 1935 employment, will be made for these areas. No conclusions of this research can be given at this time.

CENSUS OF MANUFACTURES

The last two biennial censuses of manufactures, for 1931 and 1933, were considerably curtailed as compared with prior inquiries in this field. To meet the increasing demands of industry and of governmental agencies for complete, reliable data, the 1935 Census of Manufactures was planned to be as comprehensive in detail of production and of consumption of materials as that for 1929, which was taken in connection with the Fifteenth Decennial Census.

Certain revisions were found necessary on nearly all schedules regularly used in this census. These revisions were made after conferences with representatives of the Central Statistical Board, Bureau of Labor Statistics, Federal Power Commission, Tariff Commission, and other agencies, as well as with representatives of various industries. A total of 160 special schedules, covering 265 of the 310 industries distinguished in the census classification, were prepared for the 1935 inquiry, as compared with but 81, covering 157 industries, for 1933. The experiment of using an abridged schedule for small establishments, first made for 1929 and extended for 1933, is not being repeated because of unsatisfactory results.

Employment data to be secured as a result of the 1935 Census of Manufactures will be somewhat broader in scope and more detailed than heretofore. In addition to the usual inquiries on wage earners and salaried employees, provision has been made for reporting the number and total compensation of technical employees as a separate group, and for reporting the number of clerical employees on the rolls in March, June, September, and December.

Consolidation of the field work for the census of manufactures with that for the census of business somewhat delayed the receipt of returns. Manufacturers who received schedules by mail were instructed to fill them out and hold them until called for by the enumerators, whereas previously it had been the practice to have returns made by mail, using canvassers only for delayed reports.

The remaining final reports, 22 in number, for the 1933 Census of Manufactures, together with the 1933 volume in which the final reports are assembled, were completed and published within the last fiscal year.

REPORTS ON INDUSTRIES AND COMMODITIES

As a result of conferences held by the Central Statistical Board for the purpose of reviewing the various schedules used by the Bureau, a number of changes were made with the view to harmoniz-

ing the schedules used for the collection of current industrial data with those used in the Biennial Census of Manufactures for 1935. Representatives of the various industries participated in these conferences and rendered valuable assistance in advising on technical phases of the schedules.

Current statistical reports are issued by the Bureau for 59 industries (or commodities), 51 being published monthly and 8 quarterly. These reports were prepared from returns made by 13,709 manufacturers and other concerns having 15,475 plants or mills. During the year there was a considerable expansion in the scope of some of the reports, notably the following:

Air-conditioning systems and equipment.	Knit wool gloves and mittens.
Cotton and leather garments and allied products.	Malleable iron castings.
Disillate oil burners.	Paint, varnish, lacquer, and fillers.
Galvanized range boilers and tanks for hot water heaters.	Steel barrels and drums.
	Wool stocks.

In cooperation with the American producers of red-cedar shingles, a canvass on the production and shipments of such shingles in the United States was begun during May 1936. The first report, covering the first 3 months of 1936, was published in July. These statistics were used in connection with the reciprocal trade agreement entered into between the United States and Canada on November 15, 1935.

Annual summaries.—These summaries, compiled from monthly and quarterly reports, were published for the following industries: Boots, shoes, and slippers, other than rubber; underwear and allied products; hosiery; cotton and leather garments and allied products; men's, youths', and boys' clothing; wheat ground and wheat milling products; and wool consumption. For the surveys based on a specified number of identical establishments, the data for the year are summarized and published in the December reports.

Manufacture and sale of farm equipment.—The annual collection of data relating to the production and sale of farm equipment and related products was resumed with data for the calendar year 1935. The last previous collection of these data was made for the year 1931. The 1935 canvass covered 874 manufacturers with 954 plants. A preliminary report on tractors, combines, and grain threshers was issued on April 6, and a preliminary report for the entire industry on April 29, 1936. The final report will be issued July 17, 1936.

Forest products.—The annual reports of forest products cover lumber, lath, shingles, pulp, and paper. Reports of lumber production are limited to mills sawing 50,000 feet or more. This inquiry is conducted in cooperation with the Forest Service of the United States Department of Agriculture.

Clay products.—Quantities and value of production, and the stock on hand of clay products, sand-lime brick, and nonclay refractories are reported annually.

COTTON AND COTTONSEED

During the past season the Bureau received regular reports from 14,500 cotton ginneries, 550 cottonseed oil mills, 350 refiners and consumers of cottonseed oil, 2,800 storage places such as warehouses, compresses and public cotton yards, and from 2,000 cotton-consum-

ing establishments. Under the authority of, and in compliance with acts of Congress these reports give more nearly complete, current statistics on cotton than on any other major agricultural commodity. Semimonthly reports are issued for cotton ginned, and monthly for cotton consumed and held, cotton spindle activity, and cottonseed and its major products.

Closely related to the cottonseed oil reports because of their competitive market are other vegetable and animal fats and oils. Quarterly reports are received from 3,500 factories producing and consuming these oils and from 100 storage establishments. To complete the picture of the domestic market, data on exports and imports of cotton and oils are necessarily considered with production and consumption figures and are published with them in the regular reports.

AGRICULTURE CENSUS

The 1935 Census of Agriculture has had to meet unusual demands for agricultural data. A large number of governmental agencies, non-governmental organizations, and individuals have been active in the analysis of the results of this inquiry. The statistics secured have been of particular value in planning the work being done by such agencies as the Agricultural Adjustment Administration, Soil Conservation Service, Resettlement Administration, and other organizations facing emergency problems in agriculture. While the principal demand for data is for statistics concerning the principal crop and livestock items, the national emergency in agriculture has created an ever-increasing interest in general farm data, population, and farm labor which bear directly on the broad questions which must be dealt with by emergency and regular organizations such as tenancy, the share-cropper problems, drought, crop failure, movement of population back to the farm, part-time farmers, the growth of farming in suburban areas, etc. Thus, the agricultural census has come to be a major source of social as well as economic data.

The tabulation of the 1935 Census of Agriculture was divided into two parts. A rapid summary showing the number of farms, farm acreage, and value by counties for the United States as a whole was released in less than 7 months from the first regular enumeration last year. Following this general summary, State bulletins were issued for the first series tabulations which included the principal crop and livestock items and some general farm data. Within 12 months from the receipt of the first agriculture schedule in the Washington office, tabulations had been completed for all States, counties, and minor civil divisions of the first series data. This established a new record for the compilation of a national census of this scope. In addition to the facts published in the first series bulletins, the Bureau had completed tabulation of the population items for the second series bulletins by the end of January 1936, and of poultry and farm mortgages by April 1936. Volume I of the 1935 Farm Census report, which consists of all State bulletins bound in one volume, came from the press about June 30, 1936. Four State bulletins containing material for the second series, which will become volume II of these reports, are in the hands of the printer.

Most of the information collected at the last farm census has been tabulated by minor civil divisions, principally townships. Publication of all tabulated data by these small areas is impossible with present printing funds. The demand for such detailed statistics is very widespread. All tabulations for most items by minor civil divisions are being made available to those desiring them at a nominal cost of transcription. Three States have had transcriptions made for most of the items for all the minor civil divisions in the State; two States for a few items for all minor civil divisions. The Tennessee Valley Authority, the Department of Agriculture, and the National Resources Committee had a large amount of minor civil division data transcribed for their use by their own clerks working in the Bureau as special agents. Several special tabulations of data other than by minor civil divisions were made for the Department of Agriculture to take care of special problems arising in their planning work. Arrangements have either been completed or are under way for minor civil division transcriptions and other special work for outside agencies, the cost of which will be about \$80,000.

VITAL STATISTICS

The reorganization of the Bureau's work in vital statistics was started in June 1935. A complete study of the Division was effected with the cooperation of the Central Statistical Board and the Census Advisory Committee. The reorganization required considerable internal adjustments and a change in the organization of work of the Division.

The Special Advisory Committee for the Division of Vital Statistics, appointed by Secretary Roper, has held two meetings at which a number of new policies were formulated to guide the work in vital statistics. Adoption of the policy of tabulating births and deaths by place of residence, as well as for the place at which death occurred, involved the construction of new codes and the adoption of a punch card of greater capacity. A change from a 24-column to a 45-column punch card was made beginning with the tabulation of 1935 births and deaths. A consolidated instruction manual was developed in which were included instructions for routine work in handling birth and death certificates and rules to be followed by coders of causes of death. The latter were greatly simplified in the manual by reducing the list of exceptions which previously existed. With the release of the instruction manual the policy of not altering such rules excepting by the issue of officially approved amendments was adopted.

Annual reports of births and deaths have been published for the calendar year 1933, and the corresponding reports for 1934 have been completed. A new series entitled "Vital Statistics—Special Reports" was initiated in January 1936. Although each report in this series is individually identified, the pages are numbered consecutively throughout the year. A table of contents and an index will be supplied at the close of 1936 to complete the volume of Special Reports for permanent binding. Plans have been completed for the publication of individual State summaries for the 1935 data on births and deaths. This will greatly facilitate the immediate release of data

for most States since the report for the United States as a whole must be delayed until all States have completed their returns. Further, this series of State summaries will effect a material saving in the circulation of final volumes by providing rather complete releases of State totals apart from the publication for the United States as a whole. The Registrar, a cooperative official news service publication of the Division of Vital Statistics, and its special agents in the State and local bureaus of vital statistics was initiated in January 1936.

A number of special studies in the field of vital statistics have been in process during the year: (1) Special work has been done in connection with accident statistics. (2) An extensive questionnaire on illegitimacy resulted in the public clearance of the diverse views throughout the Nation as to whether the fact of illegitimacy should be noted on birth certificates. (3) A cross index has been started on the content of available vital statistical material in the United States. (4) With the cooperation of the American Medical Association an effort has been made to secure a satisfactory hospital institutional code. (5) The effect of arbitrary methods in the selection of the primary cause of death from multiple causes of death is being carefully analyzed.

A test for completeness of birth registration in Chicago was conducted by the local health department with the cooperation of the Bureau. Two trained field workers have devoted their time to improving the birth registration and other vital statistics of several States. This service leads to improved statistics for the United States as a whole and is of immediate benefit to each State. Under-reporting of births results in a direct loss of maternal and child health funds which, as specified by the Social Security Act, are apportioned in accordance with the number of births.

ESTIMATES OF POPULATION

This Bureau cooperated with the Population Association of America in its conference on population estimates held September 21, 1935. Twenty representatives of Federal, State, and city governmental agencies, universities, research foundations, business organizations, and the American Statistical Association were present. This conference recommended that the Bureau of the Census resume the making of estimates of population for cities, States, and the United States, and that use be made of State and local data in addition to such information as was available from the census of agriculture and other inquiries.

The estimated population for the United States as a whole, based on the excess of births over deaths and the net emigration, as of July 1, 1935, together with revised estimates for each of the preceding five years, was announced on February 4, 1936. New methods were evolved, making use of current local data, particularly school enrollment and school census statistics, and were used in making estimates of population for all States as of July 1, 1934 and 1935. Estimates of the population as of April 1, 1935, by sex, color, and age, are practically completed, and work is now being done on estimates

for cities, which estimates will be issued as soon as sufficient reliable basic data can be secured for their completion.

Never has there been as much demand for population data for dates subsequent to the census, and never have these data been as difficult to approximate for small areas. That decreases in births, deaths, and marriages have occurred during the past 6 years is evident from a mass of data. However, the net effect of these factors, and of migrations caused by the depression, upon cities and States is too uncertain to permit the making of estimates of population with any high degree of confidence until after another national census.

CENSUS OF PUERTO RICO

At the request of the Puerto Rico Reconstruction Administration this Bureau provided the technical supervision for a census of population and a census of agriculture taken in Puerto Rico by that agency. An official was delegated from the Bureau to supervise the enumeration, including the planning and drafting of the inquiries, the editing and coding of the schedules, and the punching of cards for tabulation, all of which was done in Puerto Rico. The population tabulations will be made on the census unit counter in Washington, while the tabulations of the farm census will be entirely completed in Puerto Rico.

On December 1, 1935, the population of Puerto Rico was 1,723,484, which represents an increase of 11.6 percent since the census of April 1, 1930. This is equivalent to an annual increase of 1.95 percent, as compared with 1.69 percent between 1920 and 1930.

SPECIAL POPULATION CENSUS

A special census of the city of Clanton, Ala., was taken under the supervision of a representative of this Bureau as of November 1, 1935, and a certificate of population was issued on November 9, 1935. The special census showed a population of 3,363, as compared with 1,847 in 1930.

INSTITUTIONAL POPULATION

The reports on juvenile delinquents in public institutions, and children under institutional care, for 1933, were issued during the year. Statistics on these two classes of the population are collected only decennially. Annual reports, somewhat expanded as a part of the decennial census of institutions, were also issued for patients in hospitals for mental diseases, mental defectives and epileptics in institutions, and prisoners in State and Federal prisons and reformatories, for 1933. A supplementary report on crime and mental disease or deficiency, for which the data were collected as a part of the decennial census of institutions, was released during the year and also the first report in bulletin form on judicial criminal statistics, for the year 1933. The 1934 reports on mental defectives and epileptics in institutions, patients in hospitals for mental disease, prisoners in State and Federal prisons and reformatories, and judicial criminal statistics will be released within a few months.

NEW CENSUS TRACT CITIES

Thirty-eight of the 93 cities with 100,000 or more population in 1930 now have census tract plans approved by this Bureau as meeting the requirements for permanent statistical reporting areas. Sixteen of these cities were added during the present year. In 11 other cities, tract plans are now being drawn up by local or State organizations. All cities of 250,000 or more population have adopted tract plans except Memphis, Tenn. Proposed tabulations for the next decennial population census include a number of tables by tracts, for cities with approved plans, comparable in detail with those for small cities in 1930.

PREPARATION FOR REGULAR INQUIRIES

Census of religious bodies.—Under the provisions of the permanent Census Act, the Bureau will conduct the Decennial Census of Religious Bodies for 1936 in the spring of 1937. This census provides the only official data on religious organizations in this country and meets a widespread demand for such data. It is a census of organizations rather than individuals. Unlike a number of other countries, the United States does not inquire into the individual's religious affiliation or preference at the time of the decennial enumeration of population. In addition to membership data the census of religious bodies gives facts as to fiscal matters of churches and an authentic summary of the history of each sect.

ALPHABETICAL CARD INDEX

As previously mentioned in the introduction of this report, the largest alphabetical index of families (and individuals) in the United States is now being compiled in the Bureau's St. Louis office. A complete transcription of the decennial population schedules of the census of 1900 using more than 30,000,000 cards was undertaken beginning in September 1935 with a W. P. A. allotment. To June 30, 1936, a total of 23,511,879 card transcriptions have been made. When the transcription and the verification thereof have been completed the cards will be indexed phonetically by State of residence.

For many years the original population schedules of the decennial censuses have been used by this Bureau in providing certifications of age (in lieu of birth certificates or other legally acceptable proof of age) for the purposes of passports, work permits, insurance, retirement, annuities, old-age pensions, etc. The passage of social-security legislation by the Federal Government as well as by States so greatly increased the number of requests for age searches as to justify the compilation of this alphabetical card index. It will greatly increase the speed and accuracy of age searches and materially decrease the cost thereof. No longer will it be necessary to search geographical files in the Bureau to determine the exact residence locations before searching the enumeration records, nor will it be necessary to examine all of the names in the locality in order to find a particular individual. Plans have been made for photographing the alphabetized cards on 16-millimeter films to facilitate rapid searches and provide a duplicate file at small expense.

CONDUCT OF AGE SEARCHES

Mention has been made above of the Bureau's service activities in making searches of old population census records for purposes of age certification and other identifying information. Approximately 37,500 requests in the form of applications and correspondence relating to age searches were received, and about 1,900 visitors called personally in this connection. Age certifications were requested by various organizations, including the Veterans' Administration, Civil Service Commission, State welfare and social security agencies, insurance companies, legal advisers, etc.

In April 1936, under a cooperative arrangement with the Railroad Retirement Board, a number of employees were appointed for the purpose of searching for the age of applicants for pension under the Railroad Retirement Act. These employees are under the supervision of the Census Bureau and are appointed special agents of the Bureau without compensation, their regular salaries being paid by the Railroad Retirement Board. During the period, 8,444 applications were received by this group and 6,114 age certifications were made.

PHOTOGRAPHIC EQUIPMENT AND RECORD PRESERVATION

During the past fiscal year the Congress appropriated \$150,000 for census record preservation, the purchase of equipment for this purpose, and the conduct of age searches for purposes of the Social Security Act. Constant use of the irreplaceable original records of population census enumerators, from 1790 to 1930, nearly resulted in the destruction of many of these records. With funds allotted by the Civil Works Administration in 1934, photostat copies of the schedules for 1800, 1810, and 1820 were made and bound. The original schedules of these censuses—and the 1790 census which was published in printed form—are no longer in active use.

Three lines of attack on the problem of record preservation are now being made: (1) The volumes with broken bindings and torn pages are being mended and re-bound by personnel in this Bureau and the Government Printing Office; (2) photostatic copies are being made of those volumes which, because of age or the condition of the original enumeration sheets, cannot safely be used for further searches except by special clerks; and (3) film copies will be made of the schedules for 1880 and other censuses which are now receiving the most severe use.

Photostatic equipment.—Four fully automatic photostat machines are now in operation on the volumes most in need of this type of reproduction. A well-equipped laboratory has been provided. After completing their present task, these machines will be used on map work for the next decennial census, at which time there must be produced more than a quarter of a million maps or map segments.

Photographic equipment.—Contracts have been awarded for micro-photographic equipment which will be the most complete in the United States for purposes of record preservation. This equipment consists of six 16-millimeter cameras with continuous drum feed for documents not exceeding 10½ inches in width; two 35-millimeter cameras with drum feed and a maximum document width of 24 inches; two special bound book cameras (35 mm) with a capacity of from

8½ by 11 inches to 26 by 32 inches; and 40 reading projectors equipped for either 16- or 35-millimeter film. This equipment will permit the filming of large census volumes without removal of the bindings, the very rapid filming of unbound records of all sizes, and the use of film copies by most census clerks and others who have to work with the original records. Some research is being undertaken to determine the possible savings through the extension of photography to other lines of census work.

The above equipment is for permanent use in the Bureau and is not readily portable. The Department of Commerce has been actively cooperating with the Navy Department in the development of other photographic equipment, particularly that which might be transported by car from one field office to another. The Navy has perfected an experimental, portable camera which will meet a major need in this connection.

Repairing and binding of records.—From 15 to 22 employees worked on the repair of bindings and torn pages from April 1 to June 30, 1936. By the close of the fiscal year approximately 1,500 volumes of the 1830, 1850, and 1880 censuses had been repaired. In addition, 146 volumes of the censuses from 1880 to 1920 were sent to the Government Printing Office for rebinding and repair.

TABULATION EQUIPMENT

The task of tabulating the decennial censuses of population and agriculture contributed greatly to the early development of mechanical tabulation devices in, and the continuation of this activity by the Census Bureau. For example, the four major inquiries of the Fifteenth Decennial Census (1930), Population, Agriculture, Distribution, and Manufactures, required the punching of 326,586,904 cards, and the tabulation equivalent of handling of one card 4,430,658,896 times through sorting and tabulating machines. Both the speed and accuracy of tabulating census inquiries depend to a large degree on the efficiency of tabulating equipment.

Four types of power-driven machines are used regularly: (1) Census unit counters, which, as the name implies, tabulate unit characteristics or categories; (2) adding tabulators, sometimes called "integrating tabulators", which sum the quantities punched on successive cards; (3) sorters, which arrange the cards in proper order for either type of tabulation; and (4) gang punches, which rapidly punch designations common to many cards in a series. The census unit counters, first used on large inquiries in the 1910 Decennial Census, are now being remade to tabulate 45-column cards in place of the 24-column cards for which they were originally designed. Sixteen of the 46 machines have been changed; the others will need to be made over before the 1940 census. Work is in progress on the building of the new type sorters developed entirely by this Bureau. New gang-punch heads are being built to accommodate the larger codes of the 45-column equipment.

New adding tabulator.—After numerous, severe tests on census tabulations, it is believed that the adding tabulator designed and built by the Bureau's Mechanical Laboratory is capable of performing most of the large-scale tabulations of census work. This machine is

entirely mechanical and is operated by a standard electric motor. It is but little larger than a full-sized calculating machine, is portable, and can be operated from the current of any electric light socket. Cumulations are made on a 53-unit counting device which can be split at any point to give varying capacities. This device is now capable of saving this Bureau and other Federal agencies thousands of dollars in machine rentals for routine tabulations.

WORK DONE FOR OTHER FEDERAL OFFICES AND OUTSIDE ORGANIZATIONS

Emergency Conservation Work.—Monthly tabulations of the personnel and of the work done in all Civilian Conservation Camps in the United States and outlying possessions have been prepared since July 1933. The camps are under the direction of the Director of Emergency Conservation Work and the immediate technical supervision of a number of cooperating agencies, such as the United States Forest Service, National Park Service, Soil Conservation Service, and the Bureau of Indian Affairs. Tabulations are prepared each month from approximately 3,000 schedules showing detailed statistics on personnel and the amount of work completed, by type of job, for new construction and maintenance, by services. Similar tabulations are also made quarterly by type of land for each service and, at intervals, for States and outlying possessions. In addition to the regular tabulations made during the year, a special tabulation was made showing work completed for the 3-year period from April 5, 1933, to March 31, 1936, for services and for States and outlying possessions. Arrangements have been made for the continuance of this work through March 1937.

Tabulation of data for other agencies.—Among other agencies for which tabulations were made are: Food Research Institute of Stanford University, National Association of Leather Glove Manufacturers, Inc., General Mills, Inc., United States Shipping Board Bureau, Bureau of Fisheries, Bureau of Foreign and Domestic Commerce, Agricultural Adjustment Administration, Department of Justice, and Bureau of Public Health Service. Monthly summaries for certain industries were also prepared for the Federal Reserve Board, the Bureau of Foreign and Domestic Commerce, and the Federal Reserve banks at Boston, Philadelphia, and San Francisco.

Income from special surveys and tabulations.—During the past fiscal year the funds received by allotment or transfer from other governmental agencies, from outside organizations, or from individuals to pay for special work, amounted to \$834,989. These transfers and allotments included: \$35,600 from the War Department for Emergency Conservation Work; \$1,168 from the Bureau of Foreign and Domestic Commerce for special tabulations; \$760,000 by the Federal Emergency Relief Administration; \$15,120 by the United States Shipping Board Merchant Fleet Corporation; \$2,600 by the Central Statistical Board; \$425 by the Public Health Service; \$1,575 by the Department of Agriculture; \$100 by the Federal Bureau of Investigation; and \$18,401 from outside organizations or individuals.

PUBLICATIONS

No census or statistical survey is completed until the results are published, yet census publications depend upon allocations of printing funds separate from the funds made available by Congress for the salaries, equipment, travel, etc., necessary for the securing and compiling of census data. In the departmental appropriation bill for the fiscal year 1937, provision was made by Congress for the expenditure of "not to exceed \$35,000 of the amount appropriated (for the Bureau of the Census) to publish census statistics that have been compiled, in some instances for as long as 2 years, without publishing them."¹ The publication of delayed reports is being rapidly completed with these funds.

The House Committee on Appropriations also made the following statement:

Henceforth the committee desires requests for taking any type of a census compilation to include funds to publish the report of the data, once it is gathered. Experience may point to the necessity of making some few exceptions to the policy, but such exceptions, if any, should more firmly establish the rule.²

The following publications were issued during the past year:

1. AGRICULTURE, INDUSTRY, TRADE, AND FINANCE

(a) *Decennial, biennial, and annual reports*

Census of Agriculture, 1935—47 State reports, first series.
 Census of Agriculture, 1935—Volume I for the United States.
 Biennial Census of Manufactures, 1933—Final report, and 22 industry reports.
 Financial Statistics of Cities, 1933.
 Animal and Vegetable Fats and Oils, 1930-34.
 Cotton Production in the United States, Crop of 1934.

(b) *Quarterly industrial reports*

Edible gelatin.	Red cedar shingles.
Electric (mining and industrial) locomotives.	Wheat and wheat-flour stocks.
Electrical goods.	Wheat ground and wheat-milling products (merchant and other mills).
Lacquers.	Wool stocks.

(c) *Monthly industrial reports*

Air-conditioning systems and equipment.	Fabricated steel plate.
Automobiles.	Fire-extinguishing equipment.
Automobile financing.	Floor and wall tile.
Bathroom accessories.	Galvanized range boilers and tanks for hot-water heaters.
Boots, shoes, and slippers (other than rubber).	Hosiery.
Cellulose plastic products.	Knit wool gloves and mittens.
Commercial steel castings.	Leather gloves and mittens.
Convection-type radiators.	Malleable iron castings.
Cotton and leather garments and allied products (formerly Work clothing).	Measuring and dispensing pumps (gasoline, oil, etc.).
Distillate oil burners.	Mechanical stokers.
Domestic pumps, water systems, and windmills.	Men's, youths', and boys' clothing cut.
Domestic water-softening apparatus.	Methanol.
Electric industrial trucks and tractors.	Oil burners.
	Paint, varnish, lacquer, and fillers.
	Paperboard.

¹ Report No. 2286, to accompany H. R. 12098 (74th Cong., 2d sess.) on Departments of State, Justice, Commerce, and Labor appropriation bill, fiscal year 1937, p. 27.

² *Ibid.* The language of the printed report on this subject has been clarified by the Appropriations Committee to make it in agreement with the matter as quoted.

Plastic paints, cold-water paints, and calcimines.	Structural-clay products.
Plumbing brass.	Sulphuric acid.
Porcelain enameled flatware.	Superphosphates.
Porcelain plumbing fixtures.	Terra cotta.
Prepared roofing.	Underwear and allied products.
Public merchandise warehousing.	Vitreous-china plumbing fixtures.
Pulverizers.	White-base antifriction bearing metals (formerly Babbitt metal).
Pyroxylin-coated textiles.	Wheat ground and wheat-milling products.
Railroad locomotives.	Wheat ground and wheat-milling products, by States and capacity groups.
Steel barrels and drums.	Wool consumption.
Steel boilers.	Wool machinery activity.
Steel office furniture, shelving and lockers, and fireproof safes.	

2. VITAL STATISTICS AND POPULATION

Children under institutional care, 1933.	Patients in hospitals for mental disease, 1933.
Crime and mental disease or deficiency, 1933.	Prisoners, 1933.
Juvenile delinquents in public institutions, 1933.	Birth statistics, 1933.
Mental defectives and epileptics, 1933.	Mortality statistics, 1933.
	Vital statistics special reports, volume I, nos. 1 to 18.

EXHIBITS

The Bureau participated in three large expositions during the past fiscal year, held at San Diego, Calif.; Dallas, Tex.; and Cleveland, Ohio. For the San Diego Exposition, continued from last year, some changes were made in the Bureau exhibit. The large electric population chart, showing net change in the population as a result of births, immigration, emigration, and deaths, was moved from San Diego to the Texas Centennial Central Exposition at Dallas, which opened June 6, 1936. This is augmented by wall charts, graphs, etc., showing data resulting from different types of censuses, some of the charts being shown progressively in well lighted frames by electrically driven rollers. A special exhibit of statistics of Negroes was prepared for the Negro exposition building at Dallas. The Great Lakes Exposition at Cleveland, Ohio, opened June 27. The Bureau's exhibit there is similar to the one at Dallas except for the population chart. A number of small pamphlets and folders descriptive of census data and procedures have been prepared for distribution to visitors.

PERSONNEL

Training courses for employees.—The in-service training program inaugurated early in 1935 was continued during the past year and arrangements were made with a local university to allow academic credits for the more advanced statistical work given in this Bureau. Nearly 900 employees have attended the statistics and calculation courses taught by members of the technical staff. These courses will be continued and new courses added during the next year. Only by the constant training and retraining of personnel in the technical problems of census procedure can accuracy and efficiency be maintained. These courses and the Bureau's recreational program have served as an incentive for greater interest in census work and personal advancement on the part of employees.

Examinations of security-wage employees.—Approximately 11,000 workers referred to the alphabetical index and the business census projects by local relief employment agencies were given objective clerical examinations. Preferential selection was made on the basis of competence as shown by these examinations and personal interviews.

Welfare and social service work.—The serious personnel problems presented by 2,865 security-wage employees in St. Louis and 1,282 in Philadelphia, working on the two large W. P. A. projects undertaken by this Bureau, were largely solved by an active program of welfare and social service work. First-aid rooms staffed with graduate nurses were maintained at both centers for the immediate needs of workers who came mainly from relief rolls. Local agencies such as hospitals, medical and dental societies, private and welfare organizations, etc., have cooperated enthusiastically in both cities. This program, together with an active placement program in cooperation with local employment agencies, has met with marked success in improved quality of work and better morale. It is gratifying to note that the majority of security-wage workers on both these projects will leave their employment with this Bureau better trained and more capable of success in private employment than when they were sent to it by relief-employment agencies.

APPOINTMENTS AND SEPARATIONS

	Bureau total	Washington office	Field
Total employees on roll, June 30, 1936.....	8,994	1,490	7,504
Permanent.....	1,481	684	¹ 797
Temporary.....	7,513	806	² 6,707
Total appointments, fiscal year.....	26,760	1,056	25,704
Permanent.....	132	56	76
Temporary.....	26,628	1,000	³ 25,628
Total separations, fiscal year.....	21,249	2,161	19,088
Terminations.....	19,605	1,186	⁴ 18,419
Expirations of appointments.....	421	376	45
Transfers.....	380	359	21
Resignations.....	792	209	583
Retirements.....	23	23	-----
Deaths.....	28	8	20

¹ Includes special agents for cotton and vital statistics, and the Bureau's advisory committee.

² Includes 12 administrative and 2,620 security wage workers on the alphabetical index project in St. Louis; 115 administrative employees and 1,160 security wage workers on the census of business project in Philadelphia; also includes 354 local supervisors, 1,623 local enumerators, and 500 local office employees appointed in the field for census of business.

³ Includes 15 administrative and 3,050 security wage workers on the alphabetical index project in St. Louis; 206 administrative employees and 1,525 security wage workers on the census of business project in Philadelphia; also 424 local supervisors, 17,368 local enumerators, and 2,651 local office employees appointed in the field for census of business.

⁴ Includes 3 administrative and 430 security wage workers on the alphabetical index project in St. Louis; 157 administrative employees and 365 security wage workers on the census of business project in Philadelphia; also 70 local supervisors, 15,745 local enumerators, and 2,151 local office employees appointed in the field for census of business.

A number of temporary employees (1,257) who completed the work for which appointed were given work in other positions, involving reappointment; also 1,721 employees, originally appointed with limitation, were subsequently extended in the same job without lapse of service.

In addition to the number shown in the above table, there were on the rolls on June 30, 404 temporary special agents (205 in the Washington office and 199 in the field) appointed for limited periods, at \$1 per annum or without compensation (employees of other Government services). There were 275 appointments of this character made during the fiscal year to the Washington office and 115 in the field, and 282 and 162 separations, respectively.

APPROPRIATIONS

During the fiscal year ended June 30, 1936, the regular work of the Bureau authorized by specific law was conducted under the appropriation, "Salaries and expenses", in the amount of \$1,969,000, which included the sum of \$35,000 made immediately available by the Appropriation Act of 1937; and under an appropriation for the Census of Agriculture, 1935, of \$1,200,000, of which \$200,000 was made immediately available by the Appropriation Act of 1937. By the terms of the deficiency bill, there was appropriated to the Bureau of the Census, under "Salaries and expenses, Social Security Act", the sum of \$150,000 for the fiscal year 1936, to defray the cost of hiring temporary clerks, making necessary purchases of supplies and equipment, and for travel, etc., in connection with supplying to the Social Security agencies data regarding applicants for old-age pensions as reported on old census schedules. In addition, \$9,200 was made available to the Bureau for the preparation and installation of exhibits at the California-Pacific International Exposition at San Diego; the Texas Centennial Central Exposition at Dallas; and the Great Lakes Exposition at Cleveland.

Appropriations and other funds made available to the Bureau of the Census, by source, fiscal year ended June 30, 1936

Purpose	Total	Source of funds		
		Bureau appropriations	Allotted or transferred from other Federal agencies	Nongovernmental
All Bureau work.....	\$12,395,137	\$3,319,000	\$9,057,736	\$18,401
Regular salaries and expenses.....	¹ 1,969,000	1,969,000	-----	-----
Salaries and expenses, Social Security Act.....	150,000	150,000	-----	-----
Census of agriculture.....	² 1,200,000	1,200,000	-----	-----
Work relief projects:				
Census of business.....	6,427,000	-----	6,427,000	-----
Alphabetical index.....	1,804,948	-----	1,804,948	-----
Work for other Federal agencies:				
Allotments.....	36,768	-----	36,768	-----
Transfers.....	³ 779,820	-----	779,820	-----
Work for outside organizations or individuals.....	18,401	-----	-----	18,401
Exhibits.....	⁴ 9,200	-----	9,200	-----

¹ Includes \$35,000 made immediately available from 1937 appropriation.

² \$1,000,000 appropriated for 1936 and \$200,000 made immediately available for 1937.

³ Includes \$760,000 from Federal Emergency Relief Administration.

⁴ Includes \$3,000 for Great Lakes Exposition from departmental allotment.

BUREAU OF FOREIGN AND DOMESTIC COMMERCE

SIGNIFICANT GROWTH IN DOMESTIC AND FOREIGN TRADE INCREASES BUREAU ACTIVITIES

Accelerated activity throughout its organization—in Washington, in the district and cooperative offices in the United States, and in the foreign offices—characterized the Bureau of Foreign and Domestic Commerce during the last fiscal year. Increased confidence and reviving business, improved trade, and better economic conditions at home and abroad, combined with other potent factors to place upon the Bureau an increased volume of duties resulting from a greater number of inquiries and requests for services. Elsewhere in this report specific instances are cited to illustrate the increase in demands for trade promotional and informational services.

Foreign trade increased in both quantity and value in the fiscal year ended June 30, 1936, the third consecutive year in which gains have occurred. Exports, amounting to \$2,413,000,000, were 14 percent larger than in 1935 and 68 percent larger than in the low year 1933, while imports, amounting to \$2,216,000,000, were 24 percent and 90 percent larger.

The demand for sales-information reports pertaining to foreign trade increased 77 percent over the preceding year, directly reflecting the increased interest in markets abroad on the part of American firms.

BUREAU ACTIVITIES IN FURTHERING THE TRADE-AGREEMENTS PROGRAM

A widespread and increasing national interest has been shown during the past year in the reciprocal trade-agreements program which this Government initiated under the act of June 12, 1934, as a major step toward revival of our foreign trade. In carrying out this program, under which the Department of State announced the opening of negotiations with 18 foreign governments, a primary and continuing responsibility was placed upon this Bureau. In the performance of this task the agencies of the Bureau were actively employed during the past year in contributing to the successful conclusion of the nine trade agreements that were negotiated between September 1935 and May 1936, in addition to the five agreements that had been signed prior to July 1, 1935. Among these recent agreements, of outstanding interest and importance to our foreign trade were those with Canada and with France, which came into force on January 1 and June 15, respectively, of 1936.

The negotiation of the various agreements necessitated a special integration and careful analysis of the information that has been

assembled through the years by the various divisions of the Bureau in Washington. This required not only the services of the technical and industrial divisions of the Bureau, but also the aid and advice of American foreign commerce officers who were summoned to Washington especially for this task.

As in the previous year, studies related to the trade-agreements program constituted a major activity of the Division of Foreign Tariffs, second only to its regular services. Similarly, the Division of Regional Information was called upon to supply statistical and other basic economic data for this purpose. Special tabulations and analyses of trade statistics were made by the Division of Foreign Trade Statistics for the use of the Department of State and the trade-agreement committees. Members of these and other economic and industrial divisions of the Bureau continued in close cooperation with the Department of State and participated actively on various interdepartmental committees in connection with the reciprocal-agreements work.

The Bureau's district offices, through their constant and direct contact with American industries and with foreign trade interests, also have rendered valuable service in furthering the trade-agreements program by (a) making available the information required by firms in their communities desiring to submit briefs to the committee for reciprocity information, and (b) by disseminating the official analyses and texts of the various trade agreements, as well as giving out additional information on tariff concessions and trade benefits granted to the United States which affected products of particular interest to firms in their districts.

This activity has been carried on in addition to the usual work of furnishing information regarding foreign and domestic markets to the businessmen of their respective communities.

SERVICES TO OTHER GOVERNMENT AGENCIES

In the fiscal year 1936 the Bureau has been called upon to an increasing extent by other Government departments and by emergency organizations for information and assistance. The Chemical Division alone acted upon 305 requests from these agencies and received from them 151 visitors seeking consultation. It is impossible to mention here all the cooperative services which the Bureau has rendered, but some appreciation of their importance and timeliness may be suggested by the following examples:

Agricultural Adjustment Administration.—On behalf of this organization a survey of foreign markets for eggs and egg products was made by the Bureau to determine the feasibility of putting into effect an excise tax on imported egg products or an export bounty on these products.

Department of Agriculture.—For the Bureau of Dairy Industry, one of the Bureau divisions made a study of the market in Panama for frozen milk, to aid in an investigation of the possibility of assisting the dairy industry through the development of export markets for a new type of frozen condensed milk.

Civilian Conservation Corps.—Continued cooperation has been extended by the Bureau to the Civilian Conservation Corps in supplying information on species, grades, and specifications of various kinds of wood.

Export-Import Bank.—The Bureau was the contact point between the Export-Import Bank and a number of industrial firms desiring the assistance of the bank. The Bureau also provided the bank at frequent intervals foreign economic and financial data. The Director of the Bureau and later the Chief of the Finance Division served on the executive committee of the bank.

Federal Housing Administration.—The Bureau supplied this organization with statistical data on the construction industry, also with basic information on the lumber and timber products industries and good construction practices.

Federal Trade Commission.—The Bureau has supplied to the Commission, in connection with hearings and investigations, statistical and technical information on various wood-fabricating industries.

United States Tariff Commission.—As one of many cooperative relations with the Tariff Commission, the Bureau took part in a study of farm-machinery imports from Canada.

War Department.—The Bureau aided the War Department in plans for machinery procurement in times of national emergency, and gave assistance to the Army Industrial College in studies relating to industrial mobilization.

Works Progress Administration.—The Bureau assisted the staff of the Works Progress Administration in a study of unemployment and the advance in industrial technique.

Congressional committees.—The Finance Division rendered special assistance to the Senate Special Committee on Silver by providing considerable statistical and other data for the committee's studies.

Other governmental units.—Among other governmental agencies assisted by the Bureau during the year were the Bureau of Public Roads of the Department of Agriculture; the Farm Credit Administration; the Department of Labor; the General Claims Administration, United States and Mexico; Department of the Interior; the National Labor Relations Board; the Post Office Department; the Reconstruction Finance Corporation; the Resettlement Administration; the Securities and Exchange Commission; the Social Security Board, and the Treasury Department.

Bureau officials, moreover, served on various governmental committees. The Chief of the Forest Products Division, for example, served on the Federal Specifications Board, the Special Lumber Survey Committee, and in other advisory capacities for various Government departments.

COOPERATION WITH PRIVATE COMMERCIAL ORGANIZATIONS

The Bureau has continued its intimate and mutually advantageous relations with numerous trade associations and private commercial organizations, in addition to its close cooperation with governmental agencies. The Bureau's Automotive-Aeronautics Trade Division, for instance, collaborated with the Air Transport Association of America in the revision of the Bureau's "World air lines" map and in pro-

viding supplemental data listing foreign air-transport companies, routes flown, and frequency of service.

During the year the Bureau's Electrical Division conferred with the National Electrical Manufacturers' Association to formulate plans for a more effective use of the services of the Bureau and other Government units. The Radio Manufacturers' Association is cooperating with the Division in a study of suitable materials for constructing radio apparatus adaptable to climatic conditions in tropical countries; and in order to aid foreign short-wave listeners, as well as to popularize American radio equipment abroad, the Electrical Division, in cooperation with this association, is sending weekly advance schedules of selected American network programs to foreign officers of the Bureau for distribution to the foreign press and radio trade publications.

Close contact was established by the Foodstuffs Division with many food industries, such as flour milling (particularly that in the Pacific Northwest); citrus and citrus products of Florida; canning, confectionery, and California wine industries.

Credit was given to the Bureau's Forest Products Division by the Pacific Forest Industries for the development of a world analysis of plywood markets which points out definitely those countries which offer possibilities for export sales.

The Textile Division sponsored a conference between representatives of the wool producing, marketing, and manufacturing groups and members of the several Government bureaus dealing with wool in its many aspects, for the purpose of discussing ways and means of adapting Federal activities to the encouragement of larger and more extended uses of wool.

For the Tobacco Association of the United States, the Bureau's Tobacco Division completed a survey of trade with eight foreign countries and discussed the present export situation as revealed by the survey.

ACTIVITIES OF THE INDUSTRIAL DIVISIONS

SERVICES TO EXPORT AND IMPORT TRADE

Demands upon the Bureau for services to the American export and import trade expanded to large proportions during the past fiscal year. Illustrative of the character and variety of assistance which was rendered by the Bureau's industrial divisions are the following examples, selected among the many reported.

Automotive-Aeronautics Trade.—The Automotive-Aeronautics Trade Division reports an increasing number of requests for services, more than 5,000 letters received and answered, and over 2,200 callers. A number of important and timely special reports and studies were made, while world studies, bearing more directly on specific developments, included those on motor vehicles; production of automobiles; highways; and aircraft and automobile exports. The regular publications of the Division were improved, and, at the suggestion of the industry, the *Automobile Foreign Trade Manual* was revised to give better coverage than before. Changes were also effected in the *Automotive World News* and the *Aeronautical World News*.

Chemical.—The Chemical Division's correspondence, totaling 7,900 letters, was 20 percent greater than in the preceding fiscal year, while subscriptions to its bulletins and statistical services increased 30 percent. Basic and current information was presented weekly in the Division's bulletin, *World Trade Notes on Chemicals and Allied Products*, and *World Chemical Developments* (a trade information bulletin) covering the year 1935 was issued to meet the increasing demand for an epitomized presentation of chemical developments abroad. The print and reprint were exhausted within a week.

Electrical.—As a result of numerous trade inquiries received for the new American products listed in the monthly bulletin, *New Developments in the Electrical and Radio Industries* (sent to the foreign officers of the Bureau and those of the Department of State), the Electrical Division has continued this service. The response to the new service, *World Power Manual and Electrical Exporters' Handbook*, exceeded expectations. The radio market series was reorganized to bring the file of information to subscribers up to date. Last year the Division published the first annual statistical number—*Electrical Foreign Trade Notes*. As a result of favorable comments, the second number was issued in April, as well as a new edition of the *Condensed List of Government Publications of Interest to the Electrical Industry* (the latter at the request of the *National Electrical Manufacturers Association*). The compilation of data for a new addition of *World Short-Wave Radiophone Transmitters* is nearing completion.

Foodstuffs.—The fiscal year 1935-36 was the first full year of the Foodstuffs Division's operations under its expanded sectional set-up, and activities were accelerated. Several special export studies were made during the year on the markets for dried fruit, canned fruit, fish, and edible nuts. These were issued in bulletin form and received wide distribution and favorable comment. The Division also made a number of studies in connection with import and export trade, and the results were widely disseminated.

Forest products.—The Forest Products Division during the year received over 10,000 inquiries of various kinds, over 200 special trade opportunities were issued, and about 40 special circulars on lumber markets were released. Over 100 special lists of reference were prepared and revised. Interest in the services of the Division, in fact, reached a new high, attesting to the increasing interest on the part of the lumber and timber products and the pulp and paper-products industries.

Leather and rubber.—The Leather and Rubber Division initiated in January a new monthly periodical, the *Leather Raw Materials Bulletin*, to provide a medium of service to trade interests importing in 1935 hides, skins, and tanning materials totaling around \$50,000,000 in value, and to supplement the statistical statement on tanning-material imports introduced last year. The Division was called upon for economic information to an increasing extent by the trade and by other Federal bureaus.

Metals and minerals.—The year ended June 30 marked the first year of operation of the Metals and Minerals Division under the plan which combined minerals, petroleum, and coal, with the former Iron and Steel Division. During the year two new periodicals were

inaugurated—Construction Abroad, and a Monthly News Letter. The former was designed to bring to American producers of all kinds of building materials and accessories advance notice of proposed foreign construction projects. When the reporting system upon which it depends is completely organized, this service should be a valuable stimulus to the sale of American building materials and accessories in foreign markets. Requests for information increased approximately 30 percent over the previous year.

Specialties-motion pictures.—The Specialties-Motion Picture Division's output of market surveys last year—250 in number—surpassed all existing records, and the volume of services in the form of aid and advice (in addition to the usual statistical services) in the field of foreign marketing exceeded any previous figure. The Division, moreover, was called upon by several leading exporters for suggestions pertaining to their export problems, and was instrumental in arranging a dozen or more successful contacts between manufacturers and the commercial representatives of Latin American foreign missions. Various industries were covered by foreign-market surveys developed by the Division. In addition, publication of Foreign Advertising Media Lists—a service which was discontinued in 1932—was resumed, making available to the industry lists of newspapers, magazines, periodicals, and other advertising media in 49 foreign countries. Two trade information bulletins were issued, one on advertising methods in South Africa and the other on advertising in Argentina. The Division also made a survey of international trade in office equipment, and, upon request, special studies on import and export trade were made and published for five manufacturing industries in different fields. In the field of motion pictures, a complete résumé of world markets—for both film and equipment—was completed and disseminated through publication in trade journals and in the industry's yearbooks. With the cooperation of the Federal Foreign Service agencies, the Division carried on an effective fact-gathering campaign in behalf of its exporting industries. Outstanding among the recipients of this service is the motion-picture industry.

Textile.—The Textile Division during the past year made statistical and market analyses of Latin American markets for cotton goods, for the purpose of appraising recent trends.

Tobacco.—The Tobacco Division analyzed 1,358 reports from representatives of the Departments of Commerce and State, and presented the substance of these reports in the Division's weekly publication, Tobacco Markets and Conditions Abroad. The Shanghai American Leaf Tobacco Board of Trade continued to function under the direction of the Division and the Bureau's office in that city, thus preventing losses by American tobacco dealers. The Division has completed, and will present to the Tobacco Association of the United States, a statistical survey of the tobacco trade of China.

ASSISTANCE TO DOMESTIC BUSINESS

The Bureau's industrial divisions during the past year gave considerable aid in many forms to business within the United States.

Automotive-aeronautics trade.—The Automotive-Aeronautics Trade Division issued a study of raw materials and man-hours in the manufacture of motor vehicles.

Chemical.—Outstanding contributions to the American chemical industry should result from two questionnaires, one on alcohol as a motor fuel and one on printing ink, sent by the Bureau's Chemical Division to all American foreign-service officers. The Division was also concerned during the year with contemplated group promotional efforts in various fields.

Foodstuffs.—Two national questionnaires were conducted by the Foodstuffs Division. One, the results of which were published in printed form, was on confectionery production and distribution in 1935; and the other, the results of which were published in mimeographed form, was a survey of production and distribution of mayonnaise, salad dressing, and related products in 1935. The Division achieved closer contact with the National Cannery Association through informal conferences proposing the realignment of the Division's system of reporting on canned-goods stocks.

Leather and rubber.—The Leather and Rubber Division conducted the 1935 annual survey of United States consumption and year-end stocks of crude rubber and reclaimed rubber, and the semiannual surveys of distributors' stocks of tires and inner tubes were continued. Collectively, these services provide fundamental statistics which materially assist firms in the rubber industry in planning their production programs and outlining policies affecting the purchase of raw materials. Special publications of this Division included bibliographies of the leather and rubber industries; a study of seasonal variations in the leather trade of the United States (a supplement to the *Leather Fortnightly*); service pamphlets on the leather industries, and on the boot and shoe industries; and export glossaries for hides, skins, leather and leather goods, and for rubber products.

Machinery.—Following its policy of giving individual assistance to machinery trade associations, the Machinery Division supplemented the efforts of groups of manufacturers in making market surveys and statistical studies. Other studies were made upon request, showing the contributions which machine development has made to employment. Owing to the variety and complexity of the machine industries and their products, the Division gave special service to 139 machinery trade associations and more than 50 trade papers during the fiscal year. The machinery publication most in demand was a list of purchasing offices of the United States Government, of which 6,000 copies were distributed in response to individual requests.

Textiles.—The chief emphasis of the Bureau's work on textiles and allied products in the past year has been given to the development of data and the analysis of factors which these industries must consider in planning for their future economic progress, both in their domestic development and in the field of foreign trade. The study of the cotton textile industry made by the President's Cabinet Committee on the Cotton Textile Industry (the members of which were the Secretaries of Agriculture, Commerce, Labor, and State), in which the Bureau of Foreign and Domestic Commerce took an active part, suggested a basis on which the Government might cooperate with industry in securing a clearer perspective of trends and in presenting facts necessary to an adequate consideration of the problems involved. In general, much of the work of the Bureau's Tex-

tile Division has followed three main lines suggested by the Cabinet Committee: (1) The correlation of Government purchases with the seasonal and technical factors affecting the textile industries; (2) the improvement of the statistical presentations; and (3) a more adequate reporting on foreign competition, together with the development of trade agreements looking toward more favorable treatment for American textile raw materials and products in foreign markets. In consultation with officials of the Procurement Division of the Treasury Department, specifications were written and adopted for the purchase of more than 150,000,000 yards of cotton goods to be used for relief purposes. The Division also furnished current information regarding market conditions affecting the particular types of textiles.

THE FOREIGN COMMERCE SERVICE

Slightly increased appropriations for the fiscal year 1936 made possible the strengthening of some of the weak spots in the Foreign Service of the Department of Commerce, as well as the reopening of offices at Caracas, in Venezuela, and at Guatemala, in Guatemala. The improvement in administration was aided by the appointment of two additional trade commissioners and six assistant trade commissioners. Only five of these constituted new appointments, however, the others having been named from the personnel of the Bureau in Washington. It was also possible to appoint six clerks for field service abroad; here, again, the Bureau's existing force was called on to furnish two of the individuals designated.

The completion of a number of studies in connection with reciprocal trade agreements and the conclusion of treaties with some of the countries on which studies were made have permitted the return to their posts abroad of a number of the foreign commerce officers who were engaged in this work. The foregoing development has resulted in a much better balanced staff in our foreign offices than has been possible during the past 3 years.

In addition to economic reporting and general trade promotion, one of the major functions engaging the attention of foreign commerce officers has been the numerous services required by American exporters, arising from the trade restrictive measures adopted by various foreign governments, with particular reference to quotas and exchange control. A good illustration of this point is the case of Italy, where Government regulations and economic exigencies peculiar to the period under review resulted in a steady flow of appeals from representatives of American concerns doing business in that country for assistance in obtaining the release of foreign exchange. By taking up these cases with the Italian exchange control authorities the American commercial attaché at Rome procured during the year release of funds owed to American firms amounting to not less than \$800,000. In at least one case the relief thus afforded saved the firm from very serious financial difficulties. Many expressions of keen appreciation have been received from companies so assisted.

The installation of a system for making multiple copies of reports submitted by foreign offices has resulted in a wider dissemination of reports within the Bureau and has made available to other Government organizations copies of such reports as have been considered of interest.

Twenty-two foreign commerce officers who had returned to or were in the United States during the year were sent on itinerary. In cooperation with the District Office Division, itineraries were planned covering 122 visits to the principal commercial and industrial centers where the Bureau maintains district or cooperative offices. Each officer spent about 2 weeks on itinerary.

The system for commenting on and grading reports from field offices abroad is gradually being perfected as experience dictates. The Division is now in a position to furnish periodically full information as to the reporting activity of a given officer or office, as well as the relative time devoted to problems of the various divisions in the Bureau.

FOREIGN-TRADE STATISTICS

The expansion in the volume of United States foreign trade since 1933 and the intensified interest in foreign-trade statistics as a result of the reciprocal-trade-agreements program greatly increased the demands for the services of the Division of Foreign Trade Statistics during the past fiscal year. The facilities of the Division proved inadequate to meet these demands, and it was only through a considerable expenditure of overtime that the Division was able to render so large a proportion of the services expected of it during the year.

A monthly report on imports for consumption—by commodity and by country, as well as by customs district of entry—was supplied regularly to the Tariff Commission. The compilation of monthly and weekly reports on gold and silver, undertaken at the request of the Treasury Department, was continued throughout the year. Calculations of duties paid monthly on imports were made for the use of the Treasury Department and the Tariff Commission.

With the assistance of other divisions of the Bureau of Foreign and Domestic Commerce and the Tariff Commission, both the import and export schedules (lists of commodities which are distinguished separately in the statistics of foreign trade) were revised and extended so as to make them of greater practical use to business and to other Government agencies. A number of special tabulations and analyses were made of trade with the reciprocal-trade-agreement countries for the use of the State Department and the Trade Agreement Committee, and many special tabulations were prepared in response to inquiries from Members of Congress. Some of the several hundred regular monthly statistical statements were revised, and a few new ones were provided to meet the needs of the Department of Agriculture for current and more complete data covering the trade in agricultural products.

During the year the Division issued a new type of regular monthly statement, Trend of the United States Foreign Trade, for the current information of those interested in studying the movement of United States trade with foreign countries. This statement shows the total trade, trade by economic classes, by leading commodities, and by geographic regions, for the year to date compared with (a) the previous year, (b) the high year 1929, and (c) the low year 1932. A special release on our trade in 1935 with individual countries was

prepared and issued in March in order to make annual data available to the public several months earlier than formerly.

The reporting of exports of merchandise shipped by mail was resumed. A special export classification schedule was prepared, and with the cooperation of the Post Office Department these schedules were distributed to more than 13,000 postmasters for their guidance.

Work was pressed on Foreign Commerce and Navigation, the chief statistical publication of the Division, in order to expedite its release. In addition to the Monthly Summary of Foreign Commerce analyses of trade were prepared for Commerce Reports and for the Survey of Current Business; and an annual statistical analysis of trade was prepared for the Statistical Abstract of the United States. An annual summary of foreign trade in 1935 was prepared and issued as Trade Information Bulletin No. 831, and a comprehensive analysis of United States trade in the calendar year 1934 was issued as Trade Promotion Series No. 162.

More than 200 mimeographed statements covering trade in selected commodities were issued by the Division each month and sent to over 6,000 subscribers representing hundreds of different industries. Besides these mimeographed statements, the Division prepared approximately 400 special monthly typewritten statements for subscribers who had need of regular reports for which there was no general demand.

The Division undertook a very limited number of special analyses of imports under the provisions of the act, approved May 27, 1935, authorizing the Department of Commerce to make special statistical studies upon payment of the cost thereof.

GENERAL REGIONAL INFORMATION MADE AVAILABLE

Special activities of the Division of Regional Information have included continued cooperation with the Department of State in (a) the supply of statistical material and basic data for the negotiation of reciprocal trade agreements, (b) participation on committees connected with reciprocity work, and (c) representation at numerous economic and foreign-trade gatherings and conventions. The Division participated with the Interdepartmental Committee and subcommittees on trade relations with the Philippine Islands.

The general work of the Division has continued active, including as heretofore the study of international economic movements (particularly as affecting American branch factories in foreign countries), problems of international trade, current economic conditions throughout the world, and national and international cartels.

The World Economic Review, covering the year 1935, and the 1935 edition of the Foreign Commerce Yearbook were published during the fiscal year. The yearbook presents the most recent basic statistical information available on foreign countries, several new features in form and content having been added to improve its general reference value. A trade information bulletin was issued entitled "Where China Buys and Sells."

Another service, the monthly Review of Economic Conditions in France, was added to the periodic releases of the Division. These releases also include the semimonthly Russian Economic Notes,

monthly trade reports on China and Japan, and a quarterly review of economic conditions in southeastern Asia.

Information pertaining to various phases of economic conditions in foreign countries was furnished to American business. Representatives going abroad for trade promotional purposes called for assistance, and officials of American companies visited the Division to check their impressions of or build up their information on new business opportunities abroad.

FOREIGN TARIFFS AND TRADE RESTRICTIONS

Although further progress was made in some countries during the year in reducing the barriers to foreign trade, the net result was a substantial continuance of these restrictions. Because of certain world political developments and continued economic depression in various countries, there has been an actual increase in trade restrictions in several areas and a spread to certain countries not heretofore resorting to such control of their foreign trade. During the year many changes were made in import duties and charges, quotas, and import license restrictions in foreign countries.

The outstanding leadership in the movement toward easing or removing foreign-trade restrictions was provided by the reciprocal-trade-agreements program of the United States. The most striking examples of countries which have tightened control over their foreign trade are Germany and Italy. Some of the countries of central and southeastern Europe have continued the negotiation of short-term clearing or compensatory trade agreements to solve their foreign-trade problems. A number of Latin American countries resorted to import-control measures for trade-balancing purposes, by establishing differential import duties to apply on imports from designated countries.

As a result of numerous changes in the field of its interests, the regular work of the Division of Foreign Tariffs continued throughout the year substantially as active as in the preceding year. During the year the Division published, as a part of its regular activity in making analyses and interpretations of changes in foreign tariffs and trade regulations, a number of special studies for the information of Americans engaged in foreign trade. The two publications, *Preparing Shipments to Europe* and *Preparing Shipments to Cuba*, were completed and issued in printed form, as was also a revision of the publication, *Preparing Shipments to Canada*. Revisions were issued of various mimeographed circulars previously published by the Division. The annual study of foreign tariffs and commercial policies appeared as a special article in *Commerce Reports*.

A considerable amount of time was devoted to various studies required by the trade-agreements program. Special tariff studies were prepared for each of the agreements to be negotiated, and preliminary studies were made of basic material which will be required for trade agreements with other countries, with which intention to negotiate has not yet been announced.

Close cooperation was maintained with the Department of State and with other governmental agencies, both in the routine day-to-day work of the Division and in the studies made under the trade-agree-

ments program. Close contact was also maintained with trade organizations (together representatives of many industrial, agricultural, and mineral products) with a view to rendering exporters the most efficient service possible in meeting the numerous highly technical problems presented by the import-restriction programs of other countries.

FINANCE

During the year the Finance Division gave preferred attention to its annual study of the balance of international payments of the United States and to currency and exchange developments abroad.

The balance of payments studies which the Finance Division has made for 14 consecutive years took on a new importance with the inauguration of the reciprocal-trade-agreement program. All the agencies of the Government that are primarily concerned with this program have found a practical use for the data contained in these studies, and their requests, as well as those of other interested organizations and individuals, for fuller details on a number of items led to the institution of special studies that had been under-contemplation for several years. With the additional staff provided for this purpose, the Division was enabled during the year to make a more searching analysis of several important phases of finance, notably, a comprehensive census of foreign investments in the United States and an analysis of international insurance transactions from 1919 to 1935.

The 1935 issue of the annual bulletin on the balance of international payments is based in part on the results of these studies, and contains also the results of special analyses relating to short-term capital transactions, international currency movements, and certain aspects of American tourist travel abroad not heretofore made available. The preliminary results of the study on foreign investments in the United States, recently made available, have attracted considerable attention. Similar studies, including a survey of American investments abroad, will be made during the coming year.

Another distinct achievement has been the completion of the Foreign Currency Handbook. The need for an up-to-date treatise on this subject has been emphasized by the frequency of requests for similar publications which have long been out of print.

The Division has performed numerous specific services to American business concerns, especially in connection with their foreign-exchange problems.

In addition to aid given other Government agencies in connection with the balance-of-payment studies, the Division has rendered special assistance to the Federal Reserve Board, the New York Reserve Bank, and the Securities and Exchange Commission on matters relating to international capital transfers, and to the Treasury Department, also, on matters relating to silver; to the State Department and Tariff Commission on matters relating to foreign-exchange control and exchange-clearing agreements; and to the Export-Import Bank, on export credits.

Special attention has been paid to improving the quality and scope of the three series of Financial Notes, each of which is issued

fortnightly. These circulars have continued to receive much praise, especially for the note of caution sounded with respect to foreign-exchange restrictions.

FOREIGN COMMERCIAL LAWS

Many of the less obvious manifestations of the spirit of industrial isolation prevalent in widely separated parts of the world remain sources of irritation and loss to American foreign business, and the detection and analysis of these have become a principal concern of the Division of Commercial Laws, which has given, during the year, much publicity to foreign discriminatory legislation and other forms of action favoring national industry at the expense of foreign business. Some of the laws of this type have excluded all except national labor, or have required the employment of a major percentage of domestic labor, and many cover employees of all kinds, including administrative heads. Such factors have increased the costs in American assembling plants abroad, and have reduced the opportunities for employment of American workmen, technicians, and office workers. Moreover, while a concurrent tightening of the restrictions against foreign physicians, dentists, and lawyers has elicited no surprise, the extension of this policy to other licensed professions, such as brokerage, auctioneering, and accountancy, has had a direct bearing in several countries on the conduct of American business. Where the new law imposes the employment of national accountants, for example, foreign offices of American companies find it necessary to employ such accountants in addition to, but not instead of, accountants trained in the home office and familiar with the accounting problems of the business. Other countries, in restricting certain trades and crafts to nationals or excluding therefrom merchants of specified races, have induced losses and readjustments in American export lines which have been relying on the excluded merchants as dependable outlets.

The demand for copies of reports on the Division's studies of foreign commercial laws has far outrun the available supply, denoting a significant growth of interest in foreign trade. The subscription list to the bulletin service of the Division has tripled during the year, and members of the Division staff have made numerous contributions to law journals and trade papers as a means of disseminating the legal information received from all commercially important regions. The correspondence relating to foreign legal and tax problems has grown in volume and complexity, and a definite evidence of trade revival is revealed in the increase in the trade-adjustment service of the Division, which seeks to discourage trade practices detrimental to American interests or injurious to American prestige abroad.

RELIABLE INFORMATION ON FOREIGN FIRMS

The demand on the Commercial Intelligence Division for sales-information reports increased 77 percent during the fiscal year—a direct reflection of the increased interest in foreign trade on the part of American business. Reports on the size, activity, turnover, and American connections of foreign buyers and sellers engaging in

business with American firms are now available in Washington, on a large percentage of the more active importers, exporters, wholesalers, sales and purchasing agents throughout the world. Approximately 50,000 new reports were added during the year to the 600,000 already on hand—creating one of the largest reservoirs of reliable, basic reference material in existence.

These reports, which sell for 25 cents each, find a variety of uses among American exporters and importers. They give American traders entering an unfamiliar market abroad definite and reliable information as to the foreign firms which may respond to their canvass for customers or agents, and they enable the established trader to check new inquiries promptly and accurately.

More than 2,500 new and revised lists of foreign buyers and sellers were published during the year. The demand for these lists, at 10 cents each, showed a 300-percent increase in June 1936 over the previous June. There are now about 4,500 of these lists available in the district and cooperative offices, covering the leading commodities entering into our export and import trade, and segregated by the principal countries of destination and origin. These lists are being revised constantly, on demand, no list being considered current which is more than 2 years old. They give, by markets, the names, addresses, principal lines handled, type of sales organization, and relative size of the principal foreign importers and exporters abroad. Most of the lists indicate that current sales-information reports are immediately available on each firm or individual listed.

A summary of the credit situation abroad was published from week to week in Commerce Reports on the basis of monthly reports from some 80 field officers of the Departments of State and Commerce. The availability of mercantile credit, the celerity of collections, the trends in draft protests, bankruptcies, and liquidations, gave American exporters and importers a background against which they could evaluate individual risks.

The lists and files of the Commercial Intelligence Division were used by other departments and governmental agencies during the year—particularly by the Export-Import Bank and the Department of Agriculture, and also by the various committees in connection with their work of aiding in the drafting of reciprocal-trade agreements. The Department of State, through its Foreign Service, has met in a fine spirit of cooperation the increased demand for new and revised reports and lists.

SERVICES OF THE DISTRICT OFFICES

The district offices are the outlets through which the vast amount of economic and trade information of the Bureau is distributed to the business public. The work of these offices was maintained at a high standard during the past year, and they were able to keep pace with the greatly increasing demands made upon them for service as a result of the revival of interest in world trade and the general upward trend of domestic business. The duties of the district offices were multiplied by the completion of several reciprocal trade agreements, particularly those with Canada and France, as well as by special work, such as cooperation in the promotion of Foreign Trade Week activities.

The nine additional trade agreements concluded during the year resulted in a larger volume of inquiries in each of the district offices. Following the signing of each agreement, these offices were deluged with inquiries from exporters and others interested in the agreements, for official analyses, releases on and texts of the agreements, as well as for interpretations of tariff concessions and trade benefits affecting specific commodities. With the cooperation of the Bureau's Division of Foreign Tariffs, the district offices were able to meet this heavy demand for its services.

During the past fiscal year the interest in domestic marketing has become an increasingly important part of the district-office work. One of the features of the year was the development of the retail sales-reporting program in connection with the Marketing Research Division. This work was started with a very small special staff in the Chicago office, and the first retail-sales release was issued in September 1935, covering major lines of trade separately for Illinois, Indiana, and Wisconsin. After the reporting work in the Chicago area had become routine in character, the field staff was moved to the St. Louis office to develop the program in five additional States. The cooperation of the reporting firms has been especially good, and the data so far released have been well received by business interests. Because of a more specific division of the type of reporting stores, the retail sales-reporting program gives a more comprehensive analysis of the trend of retail sales than heretofore has been available through any agency—governmental or private.

ECONOMIC RESEARCH

Three major publications were completed by the staff of the Division of Economic Research during the fiscal year 1935-36. These were (a) *The National Income, 1929-35*, (b) *The Internal Debts of the United States*, and (c) the 1936 Supplement of the *Survey of Current Business*.

The comprehensive volume on the national income contains estimates of both income paid out and income produced for the period 1929-34, with preliminary estimates in summary form for 1935. The 1929-34 data are shown in complete detail for the 12 major industrial groups and approximately 40 subdivisions into which the industries of the Nation have been classified. In addition, the volume contains estimates of the full-time equivalent of the number of employees, together with estimates of their per capita income.

The report on public and private long-term indebtedness in the United States covers the period from 1912 to 1935. It presents a historical survey of the trends of the different classes of public and private debt and of the annual interest charges thereon, together with a summary and an analysis of the available information on the distribution of the ownership of the debt, the age of the obligations outstanding in 1933, the extent of debt defaults, and the debtor-relief measures adopted during the depression years. Special emphasis is placed on the extent and character of the adjustments in the private debt structure in the period following 1929.

The 1936 Supplement of the *Survey of Current Business*, a 200-page quarto volume, is the first supplement that has been issued

since 1932; prior to that time they were published either semiannually or annually. This publication, which contains data on some 2,000 series of economic statistics for the period 1913 to 1935, inclusive, will provide a welcome addition to the statistical libraries of both governmental and nongovernmental agencies.

The Division also published during the year the fifty-seventh edition of the Statistical Abstract of the United States and part I (devoted to economic developments and trends in the United States) of the World Economic Review.

MARKETING RESEARCH

The Marketing Research Division has expanded its program for studying the fields of manufacturing, wholesaling, retailing, and consumption, with special reference to marketing problems and to providing businessmen with currently collected monthly sales and credit statistics, general market data, economic data on construction, and information on trade-association activities.

The Construction Economics Section was established during the year in response to requests from the industry and recommendations of the business advisory council of the Department. The functions which the industry particularly requested the Department to undertake in this field were long-range basic studies in the economic problems of construction. One such study, "Fluctuations in the demand for industrial building", has been substantially advanced since its beginning in January. Others are contemplated and will follow as soon as facilities permit. The section has established a file of statistical and other information in its field, has answered many current technical inquiries, and has maintained close cooperative relations with the industry.

The Consumer Market Section conducts research in the broad field of consumption and develops new material for the use of businessmen and others interested in scientifically defining consumer markets and more effectively locating and serving ultimate consumers. The work of this section is illustrated by its series of studies known as "Consumer use of selected goods and services, by income classes", covering nine cities. Six studies of this kind were completed during the year, and similar studies for nine additional cities are under way. This section is also preparing a detailed outline suggesting the procedure involved in making city surveys for evaluating the commercial and industrial status of a city.

The trade-reporting program which was started some 3 years ago has been further expanded during the year by the Market Data Section. New releases include the monthly report on changes in sales of chain drug stores, men's wear chain stores, and independent stores. The retail sales reporting program by independent stores has been expanded to include 15 States in which 9,000 retailers have agreed to furnish monthly figures to the Bureau. Cooperation with the Board of Governors of the Federal Reserve System and with the Federal Reserve banks has permitted wider coverage and has resulted in greater usefulness of these data. In connection with this service, the Bureau is also cooperating with schools of business administration at the University of Texas, the Ohio State University, and the University of Denver. In January 1936 the Bureau, in cooperation with the National Association of Credit Men, initiated a plan to

gather and publish monthly data on sales and collections on accounts receivable of wholesalers and manufacturers, by kinds of business. As rapidly as possible the field will be expanded to include the entire United States.

The Retail Credit Survey for 1935 has been expanded to include two additional kinds of trade and nine additional cities. The number of retailers covered is 40 percent greater than that for 1934.

The Consumer Market Data Handbook was published in June 1936 to bring up to date the data most useful to manufacturers and distributors of consumer goods. The first run of 2,000 copies was entirely exhausted within 30 days after date of publication.

The Marketing Service Section, besides handling about 15,000 inquiries received by the Bureau on general domestic business problems, has made business statistics more readily available through three special services.

The 1936 edition of Market Research Sources was released in April 1936. The entire edition of 2,500 copies was sold out and a new printing made necessary 2 months after the date of release.

The Wholesale Trade Section has made two comprehensive analyses, based on the real property inventory of 64 cities, for the purpose of indicating the markets for electrical, gas, plumbing, and heating facilities in urban dwellings. Attention was given to industrial marketing (a) in the planning of a series of studies presenting the industrial markets in the United States in map form, by counties, the first of which (covering the textile industry) was published in May 1936, and (b) in the preparation of a check sheet for the introduction of new industrial products. The section also prepared an estimate of wholesale trade in 1935.

The Trade Association Section continues to be the leading governmental source of information on the Nation's trade groups. The Construction Industry, including a List of Selected Trade Associations (published in April 1936) is the title of the first of a series of booklets, each of which includes a list of major trade groups in a specific field, governmental and nongovernmental sources of information, and a summary of recent data covering the trade. The Review of the American Machinery Industry contains new data on the various phases of this basic industry. A new edition of selected trade associations of the United States, covering national and interstate associations, is now being compiled.

The periodic publication, Domestic Commerce, has been consistently improved from the standpoint of editorial content as well as from that of increased number of subscribers.

During the past year the Business Information Service, which provides businessmen with data on subjects pertaining to their current problems, has been expanded. The number utilizing this service increased 67 percent, and the volume of abstracts and basic data sheets increased 58 percent.

The Retail Trade Section prepared a study entitled "Retail Parcel Delivery Companies", and a study on store modernization needs is now being printed. Retail-sales estimates for 1935 were prepared, and tabulations were continued on statistics for stores with an annual sales volume of less than \$10,000. A series of booklets was begun dealing with location, arrangement, accounting, and other problems of small-store retailing.

SERVICES RENDERED TO NEGRO BUSINESSMEN

Possibly the largest single achievement of the Negro Affairs Division during the past year was the handling of Negro participation in the Texas Centennial Exposition, held at Dallas, Tex. Early in the year, the Chief of the Division outlined the plans and was named chairman of the Negro Advisory Committee of seven persons. Under the chairman's direction, exhibits on health, æsthetics (including art, music, needlework, and handicraft), education, mechanical arts, and agriculture were assembled. A special section of the exhibit is devoted to evidences of racial progress in business and in other economic aspects.

The Division has compiled information for the following studies: Negro air pilots, Negro chambers of commerce, Negro trade associations, and causes of Negro insurance company failures. The following publications, kept up to date, have been supplied in response to a constant demand: Bibliography of Negro business, list of Negro newspapers and other periodicals, list of Negro chambers of commerce, list of Negro aviators, convention dates of Negro organizations, purchasing power of Negroes in the United States. In addition to this more formal assembly of material, the Division distributed lists of (a) Negro manufacturers, (b) theaters catering especially to Negro patronage, (c) Negro insurance companies, (d) Negro banks, and (e) Negro schools offering commercial training. Information has also been made available on the value of cooperatives and on successful consumer cooperative efforts conducted by Negroes.

In efforts to cooperate with other governmental departments, the Chief of the Negro Affairs Division met in conference with representatives of the National Youth Administration, the Department of Labor, the Public Works Administration, the Civilian Conservation Corps, the Works Progress Administration, the Social Security Board, the United States Public Health Service, the Farm Credit Administration, and others, to advise on special problems affecting the Negro. Recommendations were made for competent Negro personnel as architectural draughtsmen on governmental housing projects, as educational advisers in the Civilian Conservation Corps, as nurses in health projects, and as workers in transient bureaus. Policies have been worked out for the employment of Negro enumerators and supervisors in the Census of American Business, and appointments have been made for Negro businessmen with certain Government officials in order that they might discuss matters affecting the credit of Negro business.

ACTIVITIES IN TRANSPORTATION AND COMMUNICATIONS

The Transportation Division has kept in close touch with conditions at home and abroad and has issued regularly three publications, dealing (a) with foreign railway and motor transportation, (b) with shipping, and (c) with communications. Of outstanding significance also was the inauguration of a world-wide study of communication systems, covering the economic aspects of the telephone, telegraph, cable, and radio services of 80 foreign countries. It is expected that this survey will be available in book form early in 1937.

At the request of both the Association of American Railroads and the American Trucking Associations, Inc., particular attention was

accorded to significant physical and financial developments in foreign lands with respect to railway and motor transportation. Cooperation was extended to railway-supply manufacturers in promoting the sale of equipment abroad. In furtherance of this activity, foreign railway officials who visited the Division were placed in contact with suppliers throughout the country. Assistance was given to various waterway associations, including the Mississippi Valley Association and the National Rivers and Harbors Congress, in supplying general information on inland waterway transportation.

In the field of lake and ocean shipping, close contact has been maintained with the Lake Carriers Association, the National Council of American Shipbuilders, the American Steamship Owners Association, and with various shipper groups. Information has been supplied, to individuals and to groups, on warehousing, packing for shipment, and tourist travel.

The Division has assisted other governmental agencies in matters pertaining to transportation. Several proposed reports of the Federal Coordinator of Transportation have been reviewed at the request of his staff. The Chief of the Transportation Division was asked by officials of the Interstate Commerce Commission to give advice on methods of carrying out the policy, adopted during the year, of requiring system reports from railroads.

In view of the widespread interest in the development of inland waterways, the Division continued to make economic studies of proposed projects. It cooperated with Members of Congress, with the Corps of Engineers of the Army, and with the Florida Canal Association in the presentation of data relative to the proposed Trans-Florida Canal. Similar cooperation was accorded the Corps of Engineers office at Mobile, Ala., in outlining and developing an economic survey of the proposed barge waterway connecting the Tennessee River with the Tombigbee or the Warrior River.

Close relationship has also been maintained with the Bureau of Public Roads of the Department of Agriculture, with the Federal Communications Commission, and, during the deliberations over its proposed domestic transportation survey, with the National Resources Committee.

Numerous requests have been received by the Division for information concerning important legislation in the field of its activities. The Division prepared an analysis of the Motor Carrier Act, 1935; The Hague rules; the water carrier bill; the ship subsidy bills; and the various proposals of the Federal Coordinator of Transportation. A report on conditions affecting the winter storage of grain and other commodities on American ships in Canadian ports was compiled for transmittal to the State Department, and a survey of the movement of petroleum and its products by water was prepared for the Solicitor's office.

FOREIGN TRADE ZONES

During the year the Director of the Bureau continued to serve as alternate of the Secretary of Commerce on the Foreign Trade Zones Board (Public, No. 397, 73d Cong.). This Board, which consists of the Secretary of Commerce as chairman, the Secretary of the Treasury, and the Secretary of War, is authorized under the

law to grant to public and private corporations the privilege of establishing foreign-trade zones in ports of entry.

The Bureau cooperated closely with the Treasury and War Departments in preparing the regulations under which the foreign-trade zones will be established and operated. Following the promulgation of these regulations on June 29, 1935, an application was filed by the municipality of New York for a grant to establish a foreign-trade zone. After investigation and a hearing by an examiner's committee, a grant was issued by the Board. A representative of the Bureau served as chairman of this committee. According to the terms of the grant, the New York foreign-trade zone must be in operation by November 1, 1936.

During the year the Bureau cooperated with a number of other port cities which were considering the possibility of filing applications for the establishment of foreign-trade zones. The executive secretary visited a number of domestic ports for the purpose of discussing the subject of foreign-trade zones with harbor officials.

In order to have complete information available relative to foreign free ports, the Bureau is undertaking a study along these lines. During the year it is planned to have a representative visit a number of European free ports for the purpose of obtaining data on the administration of such areas.

PARTICIPATION IN CONFERENCES AND EXPOSITIONS

The Conferences and Expositions Section of the Bureau of Foreign and Domestic Commerce, the functions of which include coordination of activities of all bureaus of the Department of Commerce in the furtherance of conferences, fairs, expositions, and related projects, has been occupied with an unusual number of undertakings during the fiscal year ended June 30, 1936. Close cooperation has been maintained not only with all units of the Department of Commerce but also with other Federal departments and nongovernmental organizations.

During the year the Department of Commerce took an active interest in approximately 25 conferences of international scope which took place in other countries. The agenda of these covered a broad field of commercial, educational, and scientific subjects. It also was interested in, and represented at, more than 90 conferences, conventions, and meetings held in the United States. Of these, not a few were meetings of scientific, trade, or other organizations in whose fields the Bureau of Foreign and Domestic Commerce is primarily interested and is equipped to render valuable service.

Among the projects handled during 1935-36 were three expositions of international scope, and many less important fairs and exhibitions. The international fairs, also commented on in the Chief Clerk section of this report, were the California Pacific International Exposition, February 12-September 9; the Texas Centennial Central Exposition, June 6-November 29; and the Great Lakes Exposition, June 27-October 4. At each of these the Bureau of Foreign and Domestic Commerce had a creditable exhibit attended by one or more representatives.

In this category were such meetings as the twenty-second National Foreign Trade Convention, held under the auspices of the National Foreign Trade Council, at Houston, Tex., from November 18 through

November 20, 1935. Because of the importance and highly representative nature of this occasion, the Bureau accepted an invitation to participate by sending delegates and installing an exhibit. An Assistant Director, several Foreign Commerce officers, and division chiefs were on the program as speakers. The Bureau delegates took part in the trade advisory sessions, and between formal sessions were available for consultation in a specially arranged conference room. The exhibit, so located as to command the attention of the hundreds of delegates, sought to emphasize, through numerous charts, posters, and special editions of the regular bulletins issued by the various Divisions, the nature and scope of the Bureau's services available to Americans doing business with foreign countries.

The Automotive-Aeronautics Trade Division took an active part in major trade shows relating to its industries. At the All American Aircraft Show and the American Road Builders Convention the Division maintained exhibits, and at the New York Automobile Show and the Automotive Service Industries Show members of the Division were present and consulted with manufacturers and exporters on their foreign-trade problems.

NATIONAL FOREIGN TRADE WEEK

At the invitation of the national sponsors, the Bureau cooperated extensively in the second observance of National Foreign Trade Week, which took place during the period of May 17 through 23, 1936. The purpose of this movement, which for a number of years has been carried forward in certain principal port cities and was placed on a national basis in 1935, is to inform the general public as to the real economic significance of foreign trade in the life of American citizens. It seemed particularly appropriate that the Bureau of Foreign and Domestic Commerce should lend its facilities to such an undertaking.

Under the guidance of a working committee appointed by the Director of the Bureau, a comprehensive program of participation was worked out. The district and cooperative offices played a conspicuous part in cooperating with the local sponsors, especially in coordinating the activities in their respective districts. The district and cooperative office managers and members of their staffs addressed Foreign Trade Week meetings, made numerous radio talks, and supplied various representatives with appropriate material for newspaper articles and for speeches.

From Washington arrangements were made for the speaking engagements and itineraries of officials from the Department of Commerce and other Government departments. The Director, Assistant Directors, and a number of division chiefs of this Bureau participated in these programs. The principal speeches were radio-broadcast throughout the country with short-wave relays, which permitted reception in certain foreign countries.

EDITORIAL AND PUBLICATION WORK

The authors of Bureau publications, as well as Division officials, have acknowledged the significant services performed during the fiscal year by the Editorial Division in endeavoring to insure an ef-

fective presentation of the material submitted for publication. This editorial work has involved an evaluation of the worth and usefulness of the subject matter, the consideration of questions of policy affecting the projected study, the maintenance of rigorous standards of accuracy in checking facts cited, the adherence to logical methods of arrangement, and the task of bringing the copy into conformity with the rules and principles that govern all official printing.

During the past year, the Editorial Division's services of this character have been concerned with such special publications as Industrial Property Protection Throughout the World; Market Research Sources (1936 edition); Review of American Machinery Industries; Confectionery Production and Distribution, 1935; Preparing Shipments to Cuba, and Preparing Shipments to Canada; Handbook of Foreign Currencies; Advertising Methods in Argentina, and a similar work on South Africa; Netherland Oilseed-Crushing Industry; Summary of United States Trade with the World, 1935; World Chemical Developments in 1935; Balance of International Payments of the United States in 1935; National Income in the United States, 1929-35; and numerous other special publications.

The customary attention has also been given to the regular Bureau periodicals, such as Commerce Reports; the Survey of Current Business; the World Economic Review; the Statistical Abstract of the United States; and Foreign Commerce and Navigation of the United States.

Most of the Bureau's periodical "processed" bulletins—conveying vital data to diverse elements in the business community—have been read and edited in the Editorial Division, with a resultant heightening of their uniformity and value.

CONCLUSION

During the fiscal year ended June 30, 1936, the dominant feature of the Bureau of Foreign and Domestic Commerce has been a greatly increased demand by the businessmen of the United States for information which this Bureau furnishes. In some instances an effort has been made to meet this increased demand by use of overtime employment. Thus a major problem facing the Bureau is how to meet the demands from business and from other departments of Government with the existing organization.

As indicated at the beginning of this report, the demand for sales-information reports pertaining to foreign trade increased 77 percent over the preceding year; and there has likewise been an increased demand for information pertaining to our domestic trade.

The funds available for carrying on the work of the Bureau as a whole during the year were increased about 10 percent, but this was obviously not sufficient to meet the much greater demand for its services.

This problem will become more acute during the coming year as increasing business activity brings with it increasing demands for information with regard both to foreign and to domestic markets; and during the coming year we shall have to decide which services shall be restricted, as the increase in the funds for carrying on the work of the Bureau during the fiscal year ending June 30, 1937, is limited to about 1 percent.

NATIONAL BUREAU OF STANDARDS

Certain typical examples of the work of the several divisions of the National Bureau of Standards during the fiscal year 1936 have been selected for rather complete description, followed by summaries only of other important developments—to give a better conception of the character and purpose of the Bureau's activities than could be obtained from an extremely brief mention of each of several hundred current projects.

GENERAL ACTIVITIES

Two new scientific sections were set up during the year to handle certain lines of research more effectively. A section on physical chemistry was added to the Chemistry Division and a section on organic plastics to the Division of Organic and Fibrous Materials.

Finances and personnel.—The appropriation for the Bureau for 1936 was \$1,802,500 (including \$88,274 for the 5-percent salary restoration), a total increase of \$365,592 over funds available for expenditure in 1935. The regular staff at the close of the year (including temporary employees) numbered 816. In addition 45 research associates supported by national engineering societies and trade associations were engaged on technical problems of mutual interest to the Government and industry. A survey of every position in the Bureau, conducted jointly by representatives of the Civil Service Commission and the Department of Commerce, was completed toward the close of the year. The net result was to reallocate a considerable number of positions to higher grades.

Testing.—The testing of supplies and material for the Federal Government, one of the important functions of the Bureau, again shows an increase over the preceding year. This work is of great value in insuring that the quality of the supplies purchased meets the requirements of the Federal specifications.

Publications.—The results of the year's work have been made available through 273 publications and articles. In addition, 45 letter circulars and notes on subjects of general interest have been prepared and distributed on request.

Visiting committee.—The members of this committee are: Morris E. Leeds, president of the Leeds & Northrup Co.; Dr. Karl T. Compton, president of the Massachusetts Institute of Technology; Gano Dunn, chairman of the J. G. White Engineering Corporation; Dr. William D. Coolidge, director of the research laboratories of the General Electric Co.; and Dr. Frank B. Jewett, president of the Bell Telephone Laboratories. The committee's advice proved of great value in outlining plans for future work, especially in relation to fundamental research.

International scientific relations.—The regular biennial meeting of the International Committee on Weights and Measures held at

Paris, October 1 to 8, 1935, was attended by Prof. A. E. Kennelly, American member of the committee, and E. C. Crittenden of the Bureau. At a meeting of the International Advisory Committee on Electricity, September 24 to 27, reports were received from various countries on the determinations of new values of the electrical units concordant with mechanical units. The National Bureau of Standards was the only laboratory which had published its determinations. The International Committee decided to establish new values of the units on the basis of measurements reported before the end of 1938, and to use the new units beginning January 1, 1940. An Advisory Committee on Photometry, of which the Bureau will be 1 of 10 members, was appointed with the hope of establishing a single system of photometric units in place of the diverse units and standards now used in various countries. The Bureau has proposed such a system, based on the black body or complete radiator operated at the freezing point of platinum, together with factors representing the visual effectiveness of radiation, as determined at the Bureau.

W. F. Meggers attended the fifth general assembly of the International Astronomical Union at Paris (July 10-17, 1935). He acted as secretary of the Commission on Standard Wave Lengths and Solar Spectrum Tables, and was named president of this Commission for the next term. The union adopted as secondary standards 20 neon lines and 20 krypton lines, believed to be correct to 1 part in 50 millions.

F. C. Breckenridge and M. G. Lloyd attended the ninth plenary session of the International Commission on Illumination at Berlin and Karlsruhe, Germany, July 2 to 10, 1935. The Commission adopted recommendations covering the use of lights as signals and for illumination both on aircraft and at airports.

Twenty-Sixth National Conference on Weights and Measures.—This meeting was attended by weights and measures officials from 27 States and the District of Columbia and representatives of 11 State associations of weights and measures. Among the many topics considered by the conference, two received special attention: Equipment for the adequate testing of motor-truck scales, and specialized equipment for the testing of vehicle tanks and large-capacity meters.

Cooperation with States in weights and measures administration.—A plan has been perfected under which the Bureau will assist State and local weights and measures organizations in securing adequate information regarding the accuracy of motor-truck scales. The Bureau is procuring a special truck and standard weights which will be sent into the States on request. Limited programs of cooperative tests will be conducted, the results of which may be used to determine the need for similar equipment in local service. Representatives of the Bureau attended meetings of weights and measures associations in 10 States, and 13 additional States were visited for conferences with the weights and measures authorities.

Public utilities.—The engineers of the utility commissions of the various States held their 14th annual conference at the Bureau on May 21-23, inclusive. Fifteen States and many Federal Government units were represented. Technical questions relating to public utilities were discussed.

Federal Fire Council.—Surveys were made of the White House, and of buildings occupied by the Reconstruction Finance Corporation, the Coast Guard, and the National Agricultural Research Center. The plans of the new Interior Department Building were reviewed and a report submitted on the fire exposure to this building from adjacent temporary buildings. By Executive Order No. 7397, issued June 20, 1936, the Federal Fire Council is established as an official advisory agency in matters relating to the protection of Federal employees and property from fire, with the heads of seven Government bureaus, including the Director of the National Bureau of Standards, designated as a governing body.

American Standards Association.—The Bureau has continued its active association with industry through the American Standards Association. It is represented on nearly 100 of the sectional committees of the association dealing with technical projects, and has primary responsibility as sponsor for more than a dozen of them. Continuity has been assured for the building-code work formerly carried on by the Department of Commerce Building Code Committee. For this purpose a building-code correlating committee has been set up under the procedure of the American Standards Association. The new committee is composed of representatives of 21 organizations having a broad interest in the subject and steps have been taken to organize a number of sectional committees dealing with specific questions, such as fire protection and light and ventilation for buildings. The Bureau is serving as a cosponsor for Sectional Committee A51 on Building Code Requirements for Fire Protection and Fire Resistance. Recommended plumbing regulations, formerly prepared at the Bureau by a subcommittee of the Department of Commerce Building Code Committee, will also be developed under the procedure of the American Standards Association, Sectional Committee A40 on Minimum Requirements of Plumbing and Standardization of Plumbing Equipment having been enlarged for this purpose. Two members of the staff of the American Standards Association are located at the Bureau to facilitate the cooperative work of the two organizations.

Federal specifications.—The Bureau, as usual, has been active in the development of purchase specifications for the Federal Government. The Director serves as chairman of the Federal Specifications Executive Committee, under the auspices of which 1,088 specifications have been prepared. Many investigations and tests are conducted as part of this work.

ELECTRICITY

The Bureau's first duty is to provide the foundation for measurements of such accuracy as may be needed in engineering, manufacturing, commerce, and scientific research. It is relatively easy to compare one standard with another of the same kind, but far more difficult to set up the original standard with the required accuracy. In electricity the present basic units were defined more than 40 years ago, and 25 years have elapsed since the reference standards by which those units are obtained in practice were established at the Bureau. It is known that these units differ by small amounts from

their intended values, so that electrical and mechanical units are not consistent. The differences are large enough to cause some confusion in scientific work, and the demands for greater accuracy of measurement in engineering applications also make it desirable to remove the discrepancies now. Consequently an international agreement has been made to reestablish the electrical units on an absolute basis, and the Bureau is one of the laboratories which are expected to furnish the new values.

The basic units for which values must be determined with the highest practicable accuracy are the ohm and the ampere. The program projected includes the eventual determination of each of these units by two independent methods. A determination of the ampere made by weighing the force exerted between coils carrying electrical currents was published last year. The current balance used in that work was originally designed to obtain an accuracy of 1 part in 10,000, and the coils are so constructed that it is difficult to obtain a greater certainty in the results. It is now considered necessary to know the units within a few parts in 100,000. Consequently coils of new design which can be measured more accurately have been made, and determinations with them are nearly completed.

A value for the ohm has been obtained by constructing three different coils of which the self-inductance can be very accurately calculated. The result is that the Bureau's present "international ohm" equals 1.000 45 absolute ohms. This value seems certain within 2 parts in 100,000, but in the light of the experience gained an improved inductance coil is being constructed. A determination of the ohm by means of mutual-inductance coils is also under way.

After correct values of the units are determined, they have to be maintained and transferred to other laboratories by means of working standards, such as wire resistance coils and the standard cells which represent the volt. The Bureau has recently constructed improved forms of both of these standards, and comparisons made during the year with laboratories abroad have confirmed the belief that the basic units can be transferred with an uncertainty of only a few parts in a million, thus making possible a high degree of uniformity between countries as well as within each country.

Further studies have been made of the conditions under which current transformers of large capacity will give correct measurements, and final adjustments are being made on a large electrometer which will give an independent check on values of voltage up to 100,000 as obtained heretofore by calibrated standard transformers; it is also capable of extending the range of precise measurement up to at least 300,000 volts. A complete and practical solution of the problem of eliminating the effect of temperature changes in electrical measuring instruments has also been worked out and is awaiting publication.

Another branch of the work in which revision of units is under way is the measurement of light. The Bureau has prepared new photometric standards in accordance with a plan which seems likely to find general acceptance, and sets of these lamps have been sent to the principal European Laboratories for comparison. Fortunately it appears likely that the adoption of the new international units will involve very little change from present American practice.

Radio.—In radio the Bureau's broadcasts of standard frequencies continued to find wider application. In addition to the three carrier frequencies of 5,000, 10,000, and 15,000 kilocycles previously furnished, a modulated emission of 1,000 cycles per second on each of the three carrier frequencies was provided 1 day each week. Successful experiments were also made with a modulation frequency of 440 cycles per second, the standard pitch used in music, looking forward to the provision of a regular service at this frequency. Special experiments were made for the Federal Bureau of Investigation on voice broadcasting to cover the United States from a single station. Preliminary results indicated that the proposed system would be a success.

Radio communication at long distances is possible only because electrically conducting layers in the upper atmosphere reflect the radio waves and so return them to earth instead of letting them go off into space. Recent systematic studies of these layers, in which the Bureau has taken a leading part, have given much information regarding the part played by each in determining the distances at which radio transmission can be obtained by using various frequencies at different times of day, different seasons, and even in different years. Many of the phenomena depend upon changes in the sun, as, for instance, the newly discovered complete fading out of all radio signals for a few minutes simultaneously throughout the illuminated hemisphere. In a number of cases this was found to occur at the same time as an eruption on the sun. Relations were also discovered between terrestrial magnetic disturbances and radio transmission.

WEIGHTS AND MEASURES

Research at the Bureau on dental materials originated in 1919 when the War Department, in connection with purchases, requested assistance in rating dental amalgam alloys, over 50 percent of which had proved defective. The Bureau recognized that precise linear measurements must form the basis of any research on the small dimensional changes which were believed to take place in these materials. The work was, therefore, assigned to the Weights and Measures Division. The Bureau completed these tests, reported its results, and called attention to the special-test equipment which it had developed.

Through the cooperation of a private laboratory from 1923 to 1928, and the American Dental Association from 1928 to the present time, the Bureau has been able to extend the research and to investigate practically all types of dental filling materials. Many of these were found to be seriously defective.

The Bureau's efforts were first directed toward securing data on the best grades of dental materials available from the manufacturers, then to a study of the needs of the dental profession, and finally to the development of specifications which would enable the dentists to secure satisfactory materials. This activity has encouraged and assisted the better manufacturers to produce materials of greatly improved quality. Prices have not increased by reason of this enhancement in quality. The recognition by the dental profession of these supplies of higher quality has given to the manufacturer an

effective sales protection against the inferior products which have always been sold on the basis of price, without regard to quality.

The fine service of groups of practicing dentists, selected by the American Dental Association, who have cooperated in this research and have advised the Bureau regarding their experiences with new or improved materials and the effectiveness of changes in technics which have been recommended, has made it possible to translate laboratory results into actual practice very quickly.

The research has been very favorably received in this country and has been recognized abroad. At the invitation of a group of Austrian dentists, the chief of the dental research laboratory will present a paper on part of the Bureau's work in this field at the International Dental Congress in Vienna during August 1936.

As a result of this work it is now possible for the dentist to use amalgam fillings that will not shrink and drop out, cements that will not dissolve, bridgework that is practically permanent, and gold inlays lasting from 20 to 40 years, instead of 3 to 5 years as was the case a short time ago. The cost of the research is insignificant in comparison with the potential savings to the public.

Other problems with which the Division has dealt, of direct interest to science and industry, include: Determinations of the thermal expansivity of industrial materials; the design and construction of a dividing engine for ruling diffraction gratings; the measurement of large volumes of gases; researches in the field of precise measurements of length, such as the design and use of precision length measuring apparatus; and the standardization, testing, and certification of limit gages for drill pipe, well casing, pumping, and other equipment used in the petroleum industry.

Testing track scales.—Eighteen master track scales are maintained by the railroads in different parts of the United States for use in standardizing the weights by means of which commercial track scales are tested and adjusted. The Bureau tested 13 of these during the year and they were found to be in excellent condition. All were well within the allowable maintenance tolerance of 0.02 percent and 10 were correct within 0.01 percent.

The Bureau also tested during the year, 1,237 commercial track scales situated on the lines of 139 railroads in 32 States. Of these, 73 percent were found to be within the permissible tolerance of 0.2 percent, as compared with 77.7 percent for the preceding year. The scales tested were divided about equally between those owned by railroads and by industrial concerns. Adjustments and the correction of faulty mechanical conditions were made on 152 scales at the time of test in order to reduce the magnitude of the weighing errors.

HEAT AND POWER

Some 15 years ago the demand for gasoline as motor fuel began to exceed the normal supply to such an extent that the quality of the product declined and several difficulties developed between the fuel and automotive industries, each industry attributing all the trouble to faults of the other.

This situation called for an intensive study of the technical factors involved which the Bureau undertook with the cooperation of both industries. The difficulties were analyzed, and their underlying

causes were determined and studied in detail. As a result, the more important of these difficulties were successively overcome.

First, it was determined that the amount of fuel used in ordinary traffic on the road is not much affected by the quality of the fuel. This permitted the industry to concentrate on producing from available crude oil as much satisfactory fuel as could be obtained. As a result the available supply of crude oil was conserved and the cost of motor fuel kept down. It was then found that the heavier fuels tended to contaminate the oils used for lubrication, causing excessive engine wear and bearing trouble. The industries developed a means for remedying this difficulty. Irregular operation with occasional stoppage of cars in hot weather was traced to the lighter portions of the fuels, a difficulty which was remedied by better control of gasoline quality by the producers and better designs of engines and fuel lines. Other features of the fuel were found to affect the general behavior of the vehicles, and as a result, these features were more accurately controlled. Finally, there arose a demand for fuels which would permit engines of higher power output, giving more speed and better performance of cars on the road. A long-time study of the knock characteristics of fuels has led to so wide a general understanding of this problem that greatly increased power is now obtained from engines without increasing their size, and progress is still being made.

This study of technical facts has likewise contributed to the recent development of fuels for military aircraft engines which greatly increase their power and performance and will, doubtless, also improve civil aircraft practice. Incidentally, motor fuels containing alcohol have been studied, with the result that the technical problems involved in the efficient use of such blended fuels are largely solved. The general program has called throughout not only for the establishment of facts affecting motor fuels but for the development of new and satisfactory laboratory test methods to see that they comply with the changing new requirements.

The foregoing broad project, with its many technical factors, is typical of the problems submitted to the Heat and Power Division for solution. These problems involve temperature measurements, thermal properties of pure substances, behavior of engineering materials and structures as related to heat, and problems in the field of automotive engineering.

Temperature measurements.—In addition to the usual testing (which has included about 140,000 clinical thermometers tested for Government agencies), investigations have been made of the reliability of clinical thermometers; of the accuracy and durability of base metal thermocouples, particularly iron-constantan couples; and of means for improving apparatus for resistance thermometry. Measurements of the melting points of several lots of iron having carbon contents of 0.01 percent and higher, have made possible a fairly good estimate of the melting point of pure iron. The precautions which are necessary in the preliminary treatment of nearly pure metals, in order that the temperature coefficient of resistance may become a reliable index of purity, have been determined for several metals.

Properties of pure materials.—Investigations in this field have included determinations of the heats of combustion of the normal

paraffin hydrocarbons from hexane to dodecane; the preparation for publication of the determinations of the properties of saturated steam and water from 100° to 374° C., and the beginning of an accurate series of measurements in the range from 0° to 100° C., and in the range of very low temperatures; and measurements of the vapor pressures of ortho and parahydrogen, and of hydrogen deuteride.

Engineering materials and construction.—Investigations have been begun on the durability of insulating materials. Much attention has been given to the problems of fire safety and fire resistance. Fire tests of light interior partitions and tests of automatic fire alarm systems have been made, and in cooperation with other Government agencies fire tests were conducted of bulkhead and deck constructions and linings for ships. Methods of flameproofing textiles and of testing them were studied.

Automotive engineering.—Fundamental research on the phenomena of combustion has been continued, but the greater part of the work has been concerned with matters of more immediate applicability, such as the stability of oils used for lubrication of aircraft engines, and the possibility of developing compounded oils which will be superior to the oils now in use. Numerous practical problems have been undertaken, such as temperature surveys of new types of airplanes to determine whether the cooling arrangements were adequate, and the development of ignition cable capable of withstanding high temperatures. The responsibility of the Bureau in certifying the standard materials used in knock rating of fuels has been met, and in connection with this work investigations have been made of the purity of the materials supplied and of the accuracy attainable in rating fuels.

OPTICS

Cooperating with the National Association of Hosiery Manufacturers, the Bureau has arranged to certify enamel standards designated as white, ivory, and cream in a form satisfactory for use in grading the color of raw silk. A short description of this project may serve to illustrate the practical value of the work of the optics division.

To dye hosiery successfully it is necessary to sort the raw silk into at least three classes, each of which may require different treatment. The basis for this sorting is color, and by sorting the raw silk according to whether it is white, ivory, or cream it is possible to reduce rejections because of two colors in the same stocking (called two-tone) to less than 10 percent. No other basis for sorting has been found as successful as this, and the National Association of Hosiery Manufacturers has selected three enamel plaques representing the colors (white, ivory, and cream) which they have found to be most useful in sorting; these three constitute the set of master standards.

The color differences between these master standards are quite small, particularly the differences between raw-silk ivory and raw-silk cream. Since small color differences are important, the master standards have been made to simulate the appearance of a skein of silk; they have been slightly curved and have been made with a carefully controlled gloss so that the high lights of the lustrous skeins are imitated and an accurate color comparison made possible.

It is necessary that the working duplicates shall represent closely the color, shape, and gloss of the corresponding master standard.

Because of the cylindrical shape of the standards and the high-precision colorimetry required, a special colorimeter has been designed and constructed. By means of this colorimeter and a photoelectric reflectometer also designed at the Bureau, the colors of the master standards have been measured and expressed on a fundamental colorimetric coordinate system. A method of expressing the tolerances which must not be exceeded by any satisfactory duplicates of the master standards has been worked out in this system and has been applied to more than 100 samples submitted as possible duplicates of the master standards. The gloss of the master standards has been determined on an arbitrary scale based on a gloss-inspection lamp developed at the Bureau; this lamp also has been used for the inspection of the samples submitted as possible duplicates of the master standards.

As a result of this research there now exist specifications of the master standards for raw-silk white, ivory, and cream, sufficiently exact to insure the making of satisfactory duplicates of them even if they were lost or destroyed. Several complete sets of standards have been certified for the industry and are now in use; and it is expected that virtually all users of raw silk (importers, throwsters, knitters, and weavers) will obtain sets of standards within a few months so that all can sort their raw silk on exactly the same basis.

Other investigations.—A 9-inch astrographic lens with housing camera was constructed and tried out in Siberia, in cooperation with the National Geographic Society, in photographing the sun's corona during the eclipse of June 18, 1936. Work on obtaining standard values of the refractive indices of water in the temperature range from 0° to 60° C. and wave length range 4,000 to 7,250 Å was completed. Secondary wave length standards in the ultraviolet from 3,500 to 2,100 Å were measured; and to place quantitative spectrum analysis on a firmer foundation, the sensitive spectral lines of 60 chemical elements diluted in pure silver are being correlated with information about atomic structure. In this connection new descriptions of vanadium and columbium spectra were prepared and additions to the data and term analyses of carbon, columbium, chlorine, chromium, hafnium, molybdenum, silicon, tantalum, vanadium, and xenon spectra were made.

A quartz mercury arc in special mounting was set up as a standard source of ultraviolet. A revised determination of the solar ultraviolet intensity was made.

In cooperation with the United States Weather Bureau, a project has been under way to develop a radiometeorograph for collecting upper air data by means of radio signals sent from meteorological instruments attached to sounding balloons. Records from altitudes up to 24 miles and distances of 100 miles have been successfully obtained.

New measurements on the refractive index of air, for use in interference metrology, have been made, and this required, among other things, a determination of the atmospheric compressibility of steel and fused quartz etalons.

The sensitometry of light-sensitive photographic materials under varying atmospheric conditions has revealed a measurable fading of latent image within a 15-minute interval between exposure and development.

To meet the increasing needs for standardization and safety codes arising from the increased excitation voltages—up to 1,000,000 volts—used in the X-ray treatment of cancer, the Bureau's laboratory has been expanded in equipment from its present limit of 200,000 volts up to 600,000 volts, which limit is imposed by the laboratory space available.

A Duboscq colorimeter with tungsten-filament light source and spectral filters for isolating wave lengths at 560 and 460 $m\mu$ has been adapted to the colorimetry of relatively pale sugar solutions. Twelve new crystalline compounds were prepared from the sugars; licenses for manufacture of calcium gluconate under United States Patent No. 1976731 were issued to several large concerns; and a patent assigned to the United States Government was granted the Bureau's expert for: "A process for crystallizing calcium salts of aldonic acids and products resulting therefrom."

In the crystallization of levulose on a semicommercial scale, excellent grain development has been attained by the accurate control of temperature depression.

Changes caused in the expansivity of borosilicate glasses by varying the annealing procedure are found to be greatly influenced by the ratio of the percentages of boric and sodium oxides present in the glasses. An instrument was developed for testing, with a satisfactory open scale, the hardness of glasses.

CHEMISTRY

Brief mention was made in last year's report of an investigation of the practice of diluting natural gas with incombustible gas in parts of Texas. This investigation, which has now been completed, was made at the joint request and with the active cooperation of the municipal governments of Dallas and Fort Worth, and was concerned with the effects on the operation of gas appliances of the practice of adding burned flue gas from a boiler plant to natural gas obtained from the large gas field southwest of Fort Worth. A field laboratory was established in Fort Worth for the purpose of the investigation, and full scientific equipment and the services of a group of four investigators were provided without charge to the cities, which paid traveling expenses and supplied locally available materials and personnel.

The results of the investigation showed clearly that the dilution of gas as practiced, although it was nominally conducted for the purpose of insuring the satisfactory performance of appliances supplied alternately with gases of different characteristics from different producing districts, had in reality the effect of making the differences in the properties of the gases much more detrimental to appliance operation than they would have been without dilution. As a result of this finding, the city of Fort Worth enacted an ordinance prohibiting the dilution of the gas supplied to that city. After extended legal proceedings, the ordinance was sustained in the Federal court.

The technical conclusions reached in the investigation are fully in accord with the results of an extensive research on the limits of variation of composition of gases which are possible without affecting the safety of appliances, made by the American Gas Association from 1927 to 1933. The results of the investigation by the association, which were obtained prior to the Bureau's investigation in Texas and covered the subject adequately, were available only to gas companies until introduced into the record of the Federal Trade Commission in January 1936.

Atomic weights.—A redetermination of the atomic weight of aluminum, based on the element to the oxide ratio, has been made, the value obtained being in close agreement with the present accepted value.

Methods of analysis.—Rapid methods were developed for determining silica and sulphuric anhydride in cements. In a study of the reaction between potassium permanganate and sodium oxalate in diluted sulphuric acid solution it was found that the procedure that has been generally used yields results that are in appreciable error, and that these can be largely avoided by simple modifications of the procedure. In connection with a survey of commercial metals for impurities that occur in small amounts (0.01 percent) a method was developed in which arsenic, antimony, and tin are separated by distilling under suitable conditions in all-glass apparatus.

Special attention has been given to the development of methods for the determination of small amounts of water in organic reagents, including ether, benzene, toluene, and acetone. A study of the compensating systems used in gas analysis has shown that failure to obtain complete saturation of compensators of certain forms is an important source of error in analyses of the greatest precision.

Accelerated weathering test of asphalts.—An investigation of asphalts developed the fact that, on exposure to light and oxygen, asphalts are gradually transformed into products that are largely soluble in water, and show the presence of acid and ketone groups.

Physical constants of pure substances.—In cooperation with the Committee on Physicochemical Data of the International Union of Chemistry a comparative method of measuring, with a precision of better than 1 part in 1,000,000, the difference in density between any two liquids, one of which serves as a reference standard, has been developed and applied to a number of liquid substances of high purity. In cooperation with the Polytechnic Institute of Warsaw, Poland, Dr. M. Wojeiechowski has prepared, at the Bureau, numerous organic liquids of high purity and has determined their boiling points and dp/dt ratios with greater accuracy than has been attained hitherto.

Thermochemistry.—The heat of combustion of ethylene has been determined, and calculations have been made of the atomic energies of formation of the gaseous normal aliphatic hydrocarbons and alcohols. Three additional hydrocarbons—*isopropyl benzene*, a *dimethylcyclohexane*, and an *isononane*—have been isolated from the gasoline fraction of petroleum. An apparatus for taking photomicrographs of hydrocarbon crystals at low temperatures has been developed.

Protective value of electroplated coatings.—Results of exposure tests of zinc and cadmium coatings on steel were published. Several thousand specimens of plated nonferrous metals were exposed in six locations and will be inspected at intervals. Laboratory tests will be made on similar specimens. Tests on the "chord" method of measuring the thickness of metal coatings showed that it is reliable for coatings of nickel, copper, zinc, cadmium, and silver. The "dropping" method, previously used for plated zinc coatings, was adapted to hot-dipped and sherardized zinc coatings.

Standard samples.—During the year the Bureau added standard thermoelectric samples of alumel and chromel to its stock of over 100 standards, and prepared renewal samples to replace exhausted stocks of open-hearth iron, chromium-molybdenum steel, and melting-point tin. The stock of standards now includes ores, ceramic materials, irons, steels, steel-making alloys, nonferrous alloys, and samples that are certified as to fineness, melting point, or their acid, oxidimetric, reducing, saccharimetric, calorimetric, or thermoelectric value. Approximately 7,200 of these standards were sold.

MECHANICS AND SOUND

Reports have been completed on four investigations contributing to the safety of the public as well as to economy in construction, which were made possible by the Bureau's hydraulic testing machine, with a capacity of 10,000,000 pounds, the largest testing machine in the world. The investigations were conducted in cooperation with the Bridge Department of the Port of New York Authority and the results were utilized in the design of the George Washington Bridge and the Bayonne (Kill van Kull) Bridge.

Alloy structural steels of high strength are being used more and more for large structures, but comparatively little information has been available as to the strength of large columns fabricated from plates and angles of these steels. The Bureau's tests showed plainly that short sturdy columns of silicon steel and carbon-manganese steel will support greater loads than columns of the same size made of the carbon steel used in the past and gave definite assurance that the columns used in the two bridges would carry the intended loads safely. In one investigation a definite improvement in design to prevent any chance of failure by buckling of the cover plates was made possible.

The published papers describe tests of steel tower columns for the George Washington Bridge (Research Paper 831), some tests of steel columns incased in concrete (Research Paper 873), tests of eight large H-shaped columns fabricated from carbon-manganese steel (Research Paper 896), and tests of steel chord members for the Bayonne Bridge (Research Paper 897).

Worn wire rope.—The results of the investigation of the strength of worn wire rope, conducted in cooperation with the Special Research Committee on Wire Rope of the American Society of Mechanical Engineers, have been prepared for publication. The data indicate that the strength of worn ropes may be determined with sufficient accuracy for deciding when the rope should be replaced by measuring the length of the worn spots on the outside wires and counting the number of broken wires.

Brinell testing.—The effect on the Brinell number of a given material of small variations in the conditions under which it is determined has been studied (Research Paper 903). A recommended test procedure is given which will lead to greater concordance in the Brinell numbers obtained by different observers using different Brinell machines.

National hydraulic laboratory.—Investigations undertaken at the request of the Geological Survey, the Bureau of Reclamation, the Forest Service, and the Treasury Department have included studies of methods of measuring flow in open channels, the erosion of stream beds by flowing water, loss of head at pipe bends, the decrease in carrying capacity with age of small pipes of various materials, the roughness of the surfaces of pipes and open channels, back-siphonage in plumbing systems, and the strength of spillway flashboard pins. In addition, the experimental facilities of the laboratory have been made available to the Geological Survey for studies of the characteristics of current meters when used in very shallow water; to the Soil Conservation Service for measurement of run-off and eroded soil from agricultural test plots; and to another section of the Bureau for measurements of the characteristics of pipe orifices and nozzles.

Semiannual bulletins on current hydraulic laboratory research and a revision of the bulletin describing the hydraulic laboratories in the United States have been distributed to interested services of the Federal and State Governments and to hydraulic laboratories in the United States and abroad.

Engineering instruments and appliances.—Approximately 1,300 engineering instruments were calibrated during the fiscal year. Investigations and tests were made of a large number of appliances, including fire-extinguishing equipment presented for the approval of the Bureau of Marine Inspection and Navigation for use on vessels; automatic mail-metering devices for the Post Office; elevator safety devices for the Federal and State Governments; and certain heating appliances for use on Government building projects. Considerable testing has been required in connection with awards by the Procurement Division for electric fans. Studies of various methods of testing large air-circulating fans are in progress.

Aerodynamic investigations.—A report entitled, "Air flow in the boundary layer near a plate", has been forwarded to the National Advisory Committee for Aeronautics for publication. Methods have been developed for measuring the scale of the turbulence in wind tunnels, and a study has been made of the relation between the intensity and the scale of the turbulence and the critical Reynolds number of spheres.

Aircraft instrument developments.—Instruments and equipment designed and constructed for the Bureau of Aeronautics, Navy Department, include improved oxygen regulators, an improved unit consisting of an oxygen-breathing mask and radio microphone, a fuel-gas volume indicator for an air-ship, and further development of aerograph test equipment for field use. Specifications for suction regulating valves and oxygen regulators were prepared. The development of a satisfactory lubricant for fine mechanisms has continued.

Reports on aircraft compass characteristics and carbon monoxide indicators were prepared for the National Advisory Committee for Aeronautics. An investigation of venturi tubes for operating gyro-

scopic instruments and of the effect of vibration on instruments is in progress for the committee.

Acoustics.—Interest continues in the two chief problems of building acoustics, namely, the production of soundproof partitions and the construction of auditoriums, offices, and other rooms with good acoustic qualities. A large Rayleigh disc chamber for the determination of sound intensity by absolute measurement and for the standardization of microphones is under construction. A considerable amount of time has been spent on tests of materials and engineering advice to Government agencies in connection with specifications for acoustic materials and for sound picture apparatus.

ORGANIC AND FIBROUS MATERIALS

Freshness is being stressed in current advertising literature as an important and valuable property of organic materials. The consumer knows that fresh foodstuffs are apt to spoil. When he finds that they have spoiled, he takes the blame himself; they were kept too long, or under improper conditions. On the other hand, consumers generally do not realize that all organic materials are subject to the same kind of deterioration; the process is slow, but continuous. When such an article is taken from storage, put to use, and fails to give good service, the consumer is apt to blame the manufacturer. It may be the manufacturer's fault if the article is not properly resistant to aging; it may be the consumer's fault if improper storage conditions were used. In general, it is nobody's fault, because the fundamental information is lacking upon which to establish the optimum quality of the article and optimum storage conditions.

To develop such information, an accelerated aging test is an essential tool, because the deterioration is not a question of days, as with foodstuffs, but of years or even centuries. With such a tool, one can study the effects of planned changes in the composition of the article or in the conditions of storage. Accelerated aging tests are not designed to predict how many years a sample will last; they indicate, rather, that one sample will probably last longer than another. They have found their way into numerous specifications, where they are used to protect both manufacturer and consumer against inferior goods. Incidentally, they provide some information about properties other than mere longevity.

The factors which normally cause deterioration are the composition of the article, the temperature and humidity of the air in which it is kept, and the contamination of the air by sulphur dioxide. Direct sunlight acts as a powerful accelerator to any deteriorative reaction.

There are now three accelerated aging tests available for rubber. The industry has taken advantage of them in developing antioxidants, the general use of which makes rubber goods last much longer than was formerly the case. Since all rubber is imported, this development has led to savings of hundreds of millions of dollars a year to the American people. The Bureau has assisted in the development of these test methods, and also in the evaluation of antioxidants.

The known rapid deterioration of weighted silk has led consumers to believe that if a little weighting is bad, more is worse. This is not so, as shown in a report on service tests of silk dresses, recently published by the Bureau. This material can be evaluated only by an accelerated aging test, which has just been developed and will be published shortly.

Overbleaching of wool may not cause any noticeable change in the material, but may at the same time make it susceptible to rapid deterioration under normal conditions of use. A test to determine this susceptibility has just been published. This test is a necessary tool, which is now being used in finding out how to prevent the overbleaching.

The heat test for paper, which was developed by the Bureau some years ago, has shown that the life of paper depends primarily upon its purity. While a rag paper is generally better, because purer, it can be spoiled in the manufacturing process; and a wood fiber stock can be sufficiently purified to produce paper which will have a very long life. The test has also made it possible to study the effects of storage conditions, so that librarians are now advised to remove sulphur dioxide from the air in the stacks, and to avoid exposure of their valuable charges to direct sunlight.

Motion-picture films are rapidly assuming importance as historical documents to be preserved for future generations. The Bureau has learned that the ordinary type of film is useless for this purpose, having a maximum life of perhaps 25 years. The "safety" film, however, seems to be satisfactory. The optimum storage conditions for both types of films are now being studied. For the safety film, the important factor seems to be humidity: the film must not be permitted to dry out too much.

The development of an accelerated aging test for leather has been started. Heretofore, reliance has been placed on natural aging, which means that an experiment could not be completed until at least 2 years after it was started. Results this year confirm those previously obtained: the life of leather is determined primarily by its acidity, whether this acidity is introduced during the manufacturing process or comes from storage in an atmosphere contaminated with sulphur dioxide. If the pH value (acidity) is not less than 3, the leather may be expected to have a normal life.

From the accomplishments in the field of organic and fibrous materials during the past year, the following items have been selected as of special interest: Measurement of the heat capacity, entropy, and free energy of rubber; measurement of the change of volume of rubber on stretching; publication of tables showing the relation between yarn twist and thread count and the properties of cotton fabrics made therefrom; report showing that misregister in color printing is caused primarily by variations in the moisture content of the paper; development of a wear test to predict the durability of paper currency; report of service test showing that chrome sole leather will outwear vegetable tanned leather; measurements of the relative abrasive resistance of floor coverings from concrete to cork; determination of the dissociation constants of malonic acid; measurements of the hygroscopicity of cotton; and publication of a circular describing the preparation, properties, and uses of organic plastics.

METALLURGY

About 8 years ago a new type of galvanized steel wire was introduced in the wire industry for suspension-bridge cables. The wire was characterized by high strength obtained by heat treatment rather than by the alternative conventional cold-drawing process. Shortly after its initial large-scale use for cables, the engineering profession was astounded by the inexplicable occurrence of failures of individual cable strand wires at or near the cable anchorage pins in two large bridges under construction. These failures were so serious and became so numerous that dismantling of the two bridges, which were well along toward completion, was considered the only safe course to follow. With the heat-treated cable wire replaced by conventional cold-drawn wire, the bridges were completed successfully. A detailed study of the unsatisfactory wire has been completed at the Bureau during the year and a report will soon be available.

The results of the study have failed to confirm numerous hypotheses advanced to explain the failures, such as defects inherent in heat treatment, spontaneous aging changes after installation, hydrogen embrittlement, failure of mill inspectors to detect defective wire, and others. In most respects, the physical properties of the heat-treated wire did not differ significantly from those of the replacement wire, which has been used with entire success for the same purpose. In two respects, however, differences were noted which, it is believed, have some significance. These are the greater number of surface defects in the heat-treated wire and its greater resistance to "giving" by plastic deformation under prolonged tensile or bending stresses.

The wire in a cable, looped around the anchor pin, does not normally fit the pin closely, and initial bending stresses, often of high magnitude, may exist. This is particularly true of the stiff heat-treated wire. As the spinning of the cable proceeds and advance in construction causes changes in loading conditions, the tensile stresses in the wire are fluctuating. A combination of this kind—fluctuating tensile stresses with superimposed elastic bending stresses—and no other combination, was found capable of producing fractures identical with those occurring in the cable wires. This condition is most serious when the bridge is under construction and the tensile stress is small, for when the tensile stress is great enough to hold the wire closely to the pin around which it is looped, the effect of the elastic bending stresses is negligible.

The greater susceptibility of the heat-treated wire to fracture under a stress combination of this character is to be associated with the high elastic properties which necessitated pre-forming the wire, often only approximately, to fit the anchor pin, with the lack of any tendency of this wire to "give" under load, and with the existence of more surface imperfections on the wire.

Metals at high temperatures.—In order to study the basic properties of metals at elevated temperature, single crystals have been prepared and new apparatus developed for testing them. As part of the study of the quality of tool steel, iron-carbon alloys as uncontaminated as possible are being prepared so that the influence of austenitic grain size on response to heat treatment can be determined.

Materials for housing.—Of interest to the housing industry are studies now in progress on condensation-corrosion of metal construction in enclosed spaces, and of soldered plumbing fittings under long-time loading.

Aircraft metals.—The study of aircraft metals, largely in cooperation with other Federal agencies, was, as usual, an important part of the Bureau's metallurgical work. Long-time tests were continued to show the weathering characteristics of light alloys and the durability of various coatings. The anodic process developed at this Bureau for magnesium was put into practice at the Naval Aircraft Factory. Possible detrimental changes in aluminum propeller alloys from continued high service stresses is a new problem; likewise, the elastic properties of high-strength steels and their behavior under prolonged and repeated loading. The investigation of the possible usefulness of chromium plating on welded steel propellers was continued. Tests at subzero temperatures (-109° F.) on the strength and impact resistance of a variety of aircraft metals have given reassuring results. The possibility of correlating those characteristics ordinarily used to indicate ductility and other important physical properties, as an aid in evaluating the suitability of a metal for a specific service, is receiving attention.

Foundry studies.—A report was issued describing an improved method for preparing cast-iron test bars for the transverse breaking test, which is being supplemented by a study of the elastic behavior of cast irons of various compositions and treatments under transverse loading. The Bureau, in cooperation with the Nonferrous Ingot Metals Institute, is continuing work on several problems of practical interest in connection with red brass, such as limits for impurities, and their effect on "skin" color, porosity, and other properties. Methods for evaluating molding sands were further investigated for the American Foundrymen's Association, and practical applications made in specifications for the Naval Gun Factory.

High-purity metals.—Attempts to prepare iron in extremely pure form have been continued. An adequate supply of very pure oxide, the basic material, is now on hand and a study of the reduction method which introduces the least contamination is progressing. Two reports summarizing available technical information on pure iron appeared during the year, a monograph, "The Metal—Iron", and Bureau Research Paper 860. Oxygen is a very common impurity in metals. The results of the international cooperative study of methods for determining oxygen in iron, their usefulness and limitations, involving 33 laboratories, are being summarized for publication. The fusion-in-vacuo method for oxygen in iron is being extended to alloy steels. A circular was issued during the year covering iron and steel for the ordinary user, and industrial and engineering applications of silver are covered in a circular now being printed. The first volume of a résumé of the basic properties of spring materials is nearly ready for publication.

CLAY AND SILICATE PRODUCTS

Although masonry walls of structural clay products usually perform their intended functions, failures at times do occur because of the penetration of rain water or the disintegration of the masonry under exposure to weathering. To avoid such troubles, the Bureau

has been conducting several investigations which have yielded valuable results.

Rates of penetration of moisture through masonry walls are being measured to determine what combinations of materials and types of construction are most resistant to leakage when exposed to rainfall; 114 walls, each approximately 40 inches long and 50 inches high, composed of 1, 2, or 3 wythes of brick, tile, or concrete block, used singly or in combination, are being tested. Each of the specimens differs from the others with respect to thickness, kind of building unit or mortar, and quality of workmanship. In one class of workmanship the joints are well filled with mortar, the method employed by the mason being similar to that described in specifications for high quality masonry; in another, the interior vertical joints are not filled, only enough mortar being used to produce walls of acceptable appearance.

The walls are tested first under conditions in which the water is drawn through the wall by the forces of gravity and of capillarity. After drying, the walls are retested under a combined exposure to water and air pressure, resembling exposure to a heavy rain accompanied by a strong wind. In both of these tests water is applied by means of a spray at the top of the wall, causing the formation of a continuous film of water on the exposed face. Some of the walls are being subjected to a third test in which water is applied at the rate of one-fourth inch depth an hour by means of atomizers, while a difference in pressure of 10 pounds per square foot is maintained between the exposed and unexposed faces of the wall. Observations of the performance of a wall under test include the time that dampness first appears on the unexposed face, the rate of leakage, and the amount of water absorbed.

With nearly nonabsorptive brick, moisture penetration by capillarity was more rapid in the mortar than in the brick, but with the more absorptive bricks the reverse was true. The permeability of the brick walls was affected to a minor degree by variations in the composition of the mortars, to a somewhat greater degree by the quality of the bricks, but to a very major degree by the quality of the workmanship. There was no consistent difference between the performance of walls with brick facings and a backing of brickwork, structural clay tile, or concrete masonry units. Finishes of portland cement stucco (especially those containing a small amount of a metallic soap) were quite effective in retarding the rate of penetration of moisture. Irrespective of the kind and arrangement of the units, the permeability of the walls depended, in part, upon the thickness of the walls, but was influenced more by the quality of the workmanship than by any of the other variable factors.

In order to obtain information concerning the internal structure of clay products, which may help manufacturers to make their products more durable, measurements are being made of the air-permeability, the porosity, and the water absorption of selected specimens. The average diameters of the pores are being estimated from these data. Measurements after repeated exposure to frost action indicate that the average diameter of pores increases with the number of exposures but tends to approach a constant value. Since differential expansion and contraction with changes in temperature may contribute to deterioration of masonry, the coefficients

of thermal expansion of clay bricks have been determined and have been found to range between three-millionths and seven-millionths per degree centigrade. The smallest value was obtained with a very dense and hard brick of fire clay, and the largest value with an under-fired, highly absorptive brick made of surface clay.

Ceramic problems.—Other research in ceramic materials covered the use of talc in whiteware bodies; the determination of phase equilibria in the system soda-silica-lead oxide and in the system lime-silica-boric oxide; studies in glass formation during the burning of whitewares; the thermal behavior of the clay minerals; the action of coal ashes on boiler-house refractories; the tensile properties of commercial refractories at normal and elevated temperatures; the rate of dimensional changes of fire brick of widely different compositions under continued load, both in tension and compression; the development of a test for reflectance of enamels; the "viscous" nature of vitreous enamels in the molten state; a method for determining the relative solubility of glass; tests of a large number of commercial safety glasses for automobiles, and further work on the relation of composition to the physical properties of glass.

Cement and concrete.—In the investigations of cement and concrete, papers have been published on the workability of concrete; the effect of prehydration of cement on its heat of hydration and resistance to aggressive salts; the phase equilibria in the system lime-magnesia-silica-alumina; the identification of the constituents in portland cement by means of etched polished sections and reflected light; the study of the chemical composition and heats of solution of fractions of cements of different grain size; and the physical properties of a group of 28 commercial high early strength cements. The investigations of the vibration of concrete and the development of a device for measuring the extent and frequency of vibration during commercial placement of concrete has been continued, as well as further work on magnesia in portland cement from the phase equilibria viewpoint; on the identification of the constituents of cement by means of etched surfaces; on the development of glass and its effect in portland cement; and on the development of a portable device for measuring the wear resistance of concrete surfaces.

The cooperative project of the American Society for Testing Materials and the Bureau, covering the inspection of equipment at cement-testing laboratories and the development of cement test procedures, has been continued. A fourth tour of inspection has been completed and a fifth is in progress. The fellowship maintained by the Portland Cement Association has continued its studies on the equilibria attained in portland-cement clinker, with particular reference to glass formation and how heat treatment may modify it. These data are being correlated with the properties of cement.

Branch laboratories.—The Bureau has established a laboratory at Seattle, Wash., for testing the cement being purchased for Grand Coulee Dam by the Bureau of Reclamation. The staff at the Bureau's laboratory at Denver has been increased to take care of the testing of cement for the Austin and Hamilton Dams being erected in Texas by the Colorado River Authority, and the Conchas Dam being constructed in New Mexico by the United States Corps of

Engineers. It has also been necessary to increase the staffs of the branch laboratories at Riverside, Calif., and Allentown, Pa., to take care of additional cement testing.

SIMPLIFIED PRACTICE

Industries are becoming convinced that it pays to eliminate superfluous sizes, types, and varieties of commodities as well as needless variations in business methods or practices, and they have found that Simplified Practice Recommendations prove beneficial to all concerned, especially when reviewed regularly and revised whenever necessary by a representative standing committee.

Continued activity in keeping a Simplified Practice Recommendation abreast of best practice is as important as the development of the initial schedule. Two of the oldest and best known recommendations reviewed this year concern asphalt and vitrified paving brick. These two programs present an interesting contrast in respect to change in industrial requirements.

The recommendation for paving asphalt, which effected originally a 90-percent reduction in the number of grades, as determined by penetration limits, remained unchanged for a period of 12 years. In 1936 this reliable guide for the highway builders was revised to include one more limit, and substitute a new limit for an old one. During the 12-year period the recommendation had been formally reaffirmed without change.

The recommendation for vitrified paving brick is unique as regards the frequency of revision, having been revised and reprinted 10 times in 15 years. The accredited standing committee conducts annually a precise survey of total shipments to determine the degree of adherence to the simplified list of sizes and the basis for revising the list. Any variety of paving brick which shows less than 2½ percent of total shipments for 3 successive years is eliminated, and those which show 5 or more percent of total shipments for 3 successive years are reinstated, or added to the recommendation. Personal opinion does not enter. As originally promulgated, this recommendation reduced the variety of vitrified paving brick, from 66 sizes and types to 11. The first revision carried the reduction to 7. Since that time, through a succession of revisions, the number of retained sizes and types has ranged from 7 to 4. The 1936 edition of this recommendation lists 4 sizes and types.

Of the newly developed recommendations, two are of particular interest, one because of its wide application and the other because of its special limited field. The first is the recommendation for mineral aggregates, which covers the sizes of crushed stone, gravel, and slag, and their spheres of use, such as water-bound macadam, bituminous road-mix, and railroad ballast. The suggested sizes have been widely used and are now the bases for specifications of the American Society for Testing Materials, American Concrete Institute, American Association of State Highway Officials, and the Federal Specifications Executive Committee. The Joint Committee of the Mineral Aggregates Associations, the sponsor of this program, believes the recommendation is fundamentally important to the industry.

The other recommendation is for the width of film used in micro-photography. Students, technicians, librarians, and others have found it practical to copy on photographic film miniature-size images of records, manuscripts, books, newspapers, fragile volumes, and rarely accessible documents of all sorts, for the purpose of future examination and study, at places remote from the location of the original data. Under conditions imposed by wide travel, copyists have found it convenient to adapt to their specialized use the readily available "movie" film. In consequence, cameras and reproduction devices are being used to an ever-increasing extent. Careful and accurate design of essential apparatus is indicated to insure an orderly advancement of this relatively new art. Consideration of the several aspects of the broad problem is being coordinated, to the end that necessary equipment may be designed, built, and distributed, with the assurance that abrupt changes in method or technique will not hamper the users.

Five new schedules were added during the year, making a total of 164 Simplified Practice Recommendations now effective. In the same period 33 of the existing recommendations were formally reaffirmed without change, and 9 others were revised and reissued.

TRADE STANDARDS

The Commercial Standard for Stoddard Solvent, CS3-28, in effect for 8 years and now under consideration for revision, may be properly appraised as a typical example of the value of a commercial standard to industry. In 1927 the dry-cleaning industry was having considerable difficulty with solvents. It was the practice of many cleaners to use ordinary motor gasoline for cleansing garments, and fires were frequent. At the request of the National Association of Dyers and Cleaners and with the cooperation of the refiners, a commercial standard was worked out and established for Stoddard solvent, which has a higher flash point than gasoline and is approximately equivalent to kerosene as regards fire hazard; it reduces drying time, leaves no residual odor in the garment, has no corrosive effect on ornaments, and otherwise suits the purpose of the dry cleaner.

Officials of the National Association Institute of Dyeing and Cleaning report that today practically no motor gasoline is used by any responsible dry cleaner; that fires are practically unheard of; that insurance rates are materially reduced; that, with certification by the seller of conformity to the standard as a part of the invoice, it is generally no longer necessary to pay State taxes on gasoline and apply for refunds later; that in fact the standard has surpassed the hopes of the proponents at the time of its formulation. It is believed that the standard has also stimulated the development of other solvents which are proving satisfactory.

Of the 59 commercial standards accepted and made effective by the industries concerned, 57 are now available in printed form. Additional uncompleted projects for the establishment of commercial standards make a total of 104 active projects of this type of voluntary self-government in industry. During the year, cooperation with the respective industries at their request resulted in the acceptance of commercial standards for mohair-pile fabrics, cast stone, hospital mattresses, institutional mattresses, book cloths, oak flooring, woven

elastic fabrics, and methods of testing woven dress fabrics. Revisions for two standards, namely, interchangeable ground-glass joints and staple vitreous-china plumbing fixtures, were similarly accepted. Twenty-seven conferences were held to pave the way for the establishment of standards for mohair-pile fabrics, dresses and shoulder garments, rock-drill bits, rayon underwear, rug cleaning, furniture, paper boards, nickel and chromium plating, heavy forgings, vegetable ivory buttons, hardwood lumber, felt, fuel oils, wool and part-wool fabrics, and woven elastic fabrics.

CODES AND SPECIFICATIONS

A movement inaugurated by the American Civic Association to bring about a greater degree of cooperation among the several housing agencies of the Federal Government led to the establishment of a Central Housing Committee to act as a clearing house of information and as a focus for cooperation. The Bureau is represented in the subcommittee on design and construction and in numerous other groups dealing with specific subjects. The Central Housing Committee has designated the Bureau as the appropriate agency for technical research in the field of housing and has recommended that sufficient funds be provided to enable it to proceed with necessary investigations. In preparing the program for the investigation of the properties of building materials (with special reference to the durability of materials for low-cost housing) all of the interested Federal housing agencies were consulted, and the program which was undertaken received the endorsement of these agencies singly as well as of the Central Housing Committee.

Information available at the Bureau on the general subject of building materials is being assembled and arranged in the form of brief digests, principally for the guidance of the architectural and engineering staffs of the various agencies in the selection of materials for use in low-cost housing. Eighteen digests have been issued and 30 more are in various stages of preparation. They have been distributed, upon specific requests, to Federal, State, and local governmental officials, trade associations, technical staffs of manufacturing firms, educational institutions, architects, engineers, and contractors.

Building and safety codes.—Members of the staff have participated actively in the work of the Building Code Correlating Committee and the Safety Code Correlating Committee of the American Standards Association, and of numerous committees carrying on building and safety code work. In the organization of sectional committees functioning under the Building Code Correlating Committee, the Bureau has been called upon continuously for advice and assistance, and has been able to take a leading part because of a background of over 15 years' experience in dealing with building codes. In connection with plumbing regulations, the Division of Codes and Specifications has been asked to participate in the details of organization of sectional committee work, and is assuming responsibility for liaison between the code activities and plumbing research at the Bureau.

During the year there was issued a printed report entitled, "Design and Construction of Building Exits", incorporating the results of extensive investigations by the Bureau in this field. A member

of the staff served as chairman of a special committee which completely redrafted the National Electrical Code. A staff member also served on the editorial committee which revised the Safety Code for Elevators, Dumbwaiters, and Escalators, of which the Bureau is a sponsor.

Facilitating the use of specifications.—The lists of sources of supply of commodities have been augmented by over 2,490 separate requests for listing from manufacturers willing to certify to compliance with 66 Federal specifications and 2 commercial standards, thereby increasing the total number of lists to 554 and the requests to more than 21,000. All of the completed lists have been brought up to date so that they may be used effectively in connection with the Index of Federal Specifications issued as a part of the Federal Standard Stock Catalog. About 3,100 copies of the lists of sources of supply have been distributed, upon request, to Federal, State, county, municipal, and other tax-supported purchasing agents.

Services to State and municipal agencies and to educational institutions.—Information concerning zoning, and building and plumbing codes was sent, upon request, to more than 20 State agencies and 100 municipal authorities. Information relating to building practices and specifications was supplied to approximately 120 schools and colleges and to 7 States and 35 municipalities. Material dealing with commodity standardization was sent, upon request, to more than 75 municipalities and to State agencies in about 20 States and to numerous educational institutions.

GENERAL FINANCIAL STATEMENT

The amounts and objects of each appropriation for the past fiscal year, together with disbursements, liabilities, and balance for each appropriation, are shown in the following table:

Disbursements, liabilities, etc., 1936, 1935, and 1934 appropriations

Appropriations	Total appropriations ¹	Disbursements	Liabilities	Balance
1936				
Operation and administration.....	\$263,660 00	\$255,179 61	\$7,262 00	\$698.39
Testing, inspection, and information.....	980,914 29	903,424 72	67,999 91	9,389 66
Research and development ²	675,418 10	660,814 46	13,627 73	975.91
Standards for commerce ³	116,696 03	106,764 97	1,627.53	2,363.53
Appropriations transferred from other departments which are available for the current year				
Air navigation facilities.....	26,783 67	25,125 52	38.44	1,599 71
Advisory Committee for Aeronautics.....	36,400 00	32,417.94	171 86	3,380 20
Engineering, Bureau of Engineering.....	1,500 00	1,304 60	117.96	77.44
General administration expenses: Treasury.....	4,000 00	2,890 88	1,081.27	27 85
Texas Centennial Exposition, 1935-37.....	1,500 00	1,515 48	1,100.09	1,884.43
Public Works Administration, 1935-37.....	69,996 97	64,600 87	5,336 40	
Appropriations transferred from other departments under the provision of the Legislative Act approved June 30, 1932. Working Fund.....	314,224 29	282,780.41	1,355.08	30,088.80
Total, 1936.....	2,487,353.35	2,337,169 16	99,738.27	50,425.92
Total, 1935⁴.....	1,972,325.52	1,953,986 74	717.69	17,621.09
Total, 1934.....	2,545,168 10	1,832,785 62	229.19	\$ 712,153.29

¹ Includes transfers from other departments and also reimbursements received and pending as shown under the following footnotes

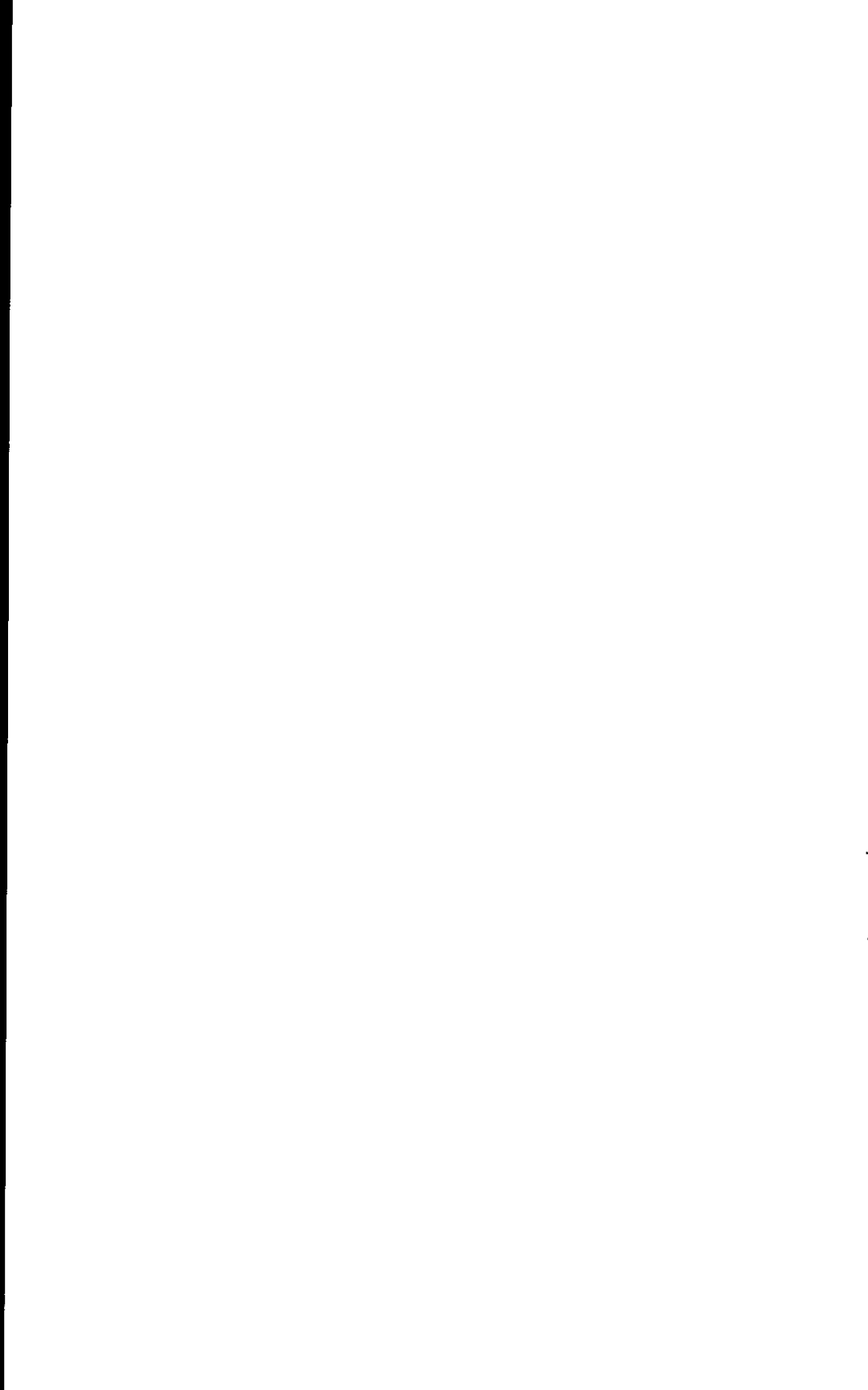
² \$222,814.29.

³ \$3,918.10.

⁴ \$696.03.

⁵ Transferred to Procurement Division, Treasury Department, \$8,100.

⁶ Includes, in addition to unobligated balances, impounded amounts and administrative savings of \$691,922.



BUREAU OF FISHERIES

Available statistics indicate greater activity in the fisheries and fishery industries during the calendar year 1935 than in any of the several immediately preceding years. This was not only true in the case of processed fishery products but also was evident in the markets for fresh and frozen (including packaged) fish. Average prices for the year advanced for some commodities; such advances were usually small and frequently prices were lower than in the preceding year. However, the industry appeared to be adjusting itself to existing price levels and to be in a generally healthier condition than for several years.

The domestic commercial fisheries are conducted on the high seas as well as in coastal waters and interior lakes and streams. Based upon available statistics for the calendar year 1934, when the most recent detailed catch surveys were made, there was a large increase in the catch as compared with the preceding calendar year. Statistics of the catch were collected for both 1933 and 1934 in the Chesapeake, Pacific, and Lake States, and in Alaska. When considering the combined catch in these sections alone, an increase of 50 percent in the volume and 33 percent in the value of the catch was indicated. While these increases were reflected in each of the four geographical sections and in many species, they were especially important in increased catches of pilchard, mackerel, and tuna and tunalike fishes in California.

Based on the most recent surveys, our commercial fisheries gave employment to about 123,000 fishermen, whose catch amounted to 3,950,779,000 pounds, valued at \$74,163,000. The output of canned fishery products in 1934 amounted to 700,157,000 pounds, valued at \$80,021,000, representing an increase of 31 percent in volume and 34 percent in value as compared with 1933; the output of byproducts was valued at \$22,668,000, representing an increase of 29 percent; and the production of frozen fishery products, excluding packaged products, amounted to 97,290,000 pounds, estimated to be valued at \$8,500,000.

Based upon the most recent surveys, the production of fresh and frozen packaged fish and shellfish amounted to 150,593,000 pounds, valued at \$20,678,000; and cured fish, 98,141,000 pounds, valued at \$13,047,000. It is estimated that about 650,000,000 pounds of fresh fishery products (excluding packaged fish and shellfish), valued at about \$52,000,000, were marketed during 1934. Thus, the total marketed value of all fishery products to domestic primary handlers in 1934 reached nearly \$200,000,000.

Imports of fishery products for consumption during the calendar year 1934 were valued at \$30,790,000, which is 1 percent more than in 1933, while exports were valued at \$13,822,000, or 66 percent more than in the previous year.

FISHERY ADVISORY COMMITTEE

During the past fiscal year the Fishery Advisory Committee for the Secretary of Commerce held meetings in the Commerce Department Building, Washington, D. C., on October 21 and 22, 1935, and January 13 and 14, 1936. These were under the chairmanship of E. B. McGovern, vice Bernarr Macfadden, resigned.

Both of the meetings were well attended by the members of the committee and others, who have been appointed from various branches of the fishery industry and related interests, including science, medicine, and transportation. The purpose of the committee is to give detailed consideration to the problems of the industry from a mutual standpoint and to offer recommendations for the promotion and development of the general welfare of the fishery industry.

The committee was especially active in promoting desirable Federal legislation to aid the industry along the line of market and economic research, and in conservation, and trade-practice matters. The work of the committee undoubtedly was largely instrumental in having Congress ratify the sockeye-salmon treaty with Canada which has been pending for several years, and which gives promise of restoring to former abundance the great sockeye-salmon fishery in the waters contiguous to the State of Washington and British Columbia.

PROTECTION OF SALMON IN THE COLUMBIA RIVER

The Columbia River supports one of the most important salmon fisheries on the Pacific coast. Owing to the intensive fishing near the mouth of the river and in adjacent areas at sea, the increase of agriculture and forestry, and the impending industrial development of the region, these valuable fisheries are being menaced by new conditions inimical to natural propagation of the fish. Hence the preservation of the fishery depends upon careful management, and the coordination of various demands on the Columbia waters to adjust the conflicting requirements. Complete management of the Columbia River fisheries includes (1) the regulation of the commercial fishery to permit adequate escapement of spawning fish, (2) the assurance of free access to their natural spawning areas, (3) the rehabilitation by natural or artificial propagation or transplantation of formerly productive spawning areas, (4) the exclusion of pollution from nursery areas, and (5) the assurance of free return of the young to the sea without loss from irrigation works or hydroelectric plants.

A comprehensive investigation of these various fields, started 2 years ago, involves a statistical study of the annual and seasonal fluctuation in the abundance of the important species of fish contributing to the commercial fisheries. Records since 1897 have been made available through the cooperation of the commercial fishery interests on the river, and these have been tabulated and partially analyzed during the year to provide evidence of suspected depletion of certain elements of the fish population.

A comprehensive program of stream survey has been continued, contributing information on (1) the total area of present and past spawning grounds in each tributary, (2) the location of areas now available, (3) the location of former spawning areas now destroyed

or rendered inaccessible, (4) the sources of pollution, (5) the number and location of irrigation canals and their effect on migratory fishes, (6) the location of natural and artificial obstructions and their effect as barriers to upstream migration, and (7) the general status of the salmon populations in the river system. Most of the tributaries of the Columbia River in eastern Washington and a few in the lower section have been surveyed during the year, totaling 1,100 miles of tributary streams.

In order to gage the size of populations of salmon that must be artificially propagated after their migration is finally barred by the Grand Coulee Dam, counting weirs have been established in two of the tributaries below the dam and observers have been stationed at the Rock Island Dam to count the fish passing these points. Through these studies it has become apparent that the two fish ladders at the Rock Island Dam are inadequate to provide free passageway without serious delay, and hence, on recommendation of the Bureau of Fisheries, a third fish ladder has been constructed in time to care for the summer migrants of 1936.

As a part of the entire program for the protection of the Columbia River salmon, but conducted as a separate project, the Bureau has been engaged for over 2 years in an intensive study of the requirements of fish protection at the Bonneville Dam on the lower Columbia River, working in cooperation with the United States engineers and the State fish and game departments. Detailed designs of fish protection works, embodying an improved type of gravity fish ladder and hydraulic lifts or locks, have been prepared and formal recommendations were submitted to the War Department in August 1934. After prolonged consideration, the War Department approved the plan for fishways that for the greater part followed the recommendations of the Bureau.

During the fiscal year just closed, in addition to completing detailed designs outlined in the general plan and rendering expert advice and supervision during their construction, the Bureau's staff has been mainly concerned with devising temporary fishways to afford free passage to migrating salmon during the period of construction of the main dam and powerhouse. In the course of this work many difficulties arose from unusual flood stages of the river, and plans have been altered frequently and temporarily expedients adopted. In general, however, adequate protection has been afforded the runs of migrating fish during the spring months, and more elaborate protective measures have been adopted by the United States engineers.

SOCKEYE-SALMON TREATY

After almost 40 years of consideration and discussion, a treaty for the protection of the sockeye salmon of Fraser River was ratified by the United States Senate on June 15, 1936, with certain reservations which are believed to be acceptable to Canadian interests. This treaty, signed in 1930 and ratified by Canada in the same year, provides for an international fisheries commission of six members, three on the part of the United States and three on the part of Canada. The commission is charged with the duty of making extensive investigations of the natural history of sockeye-salmon runs to Fraser

River and is granted authority to regulate the salmon fisheries in international and territorial waters through which Fraser River sockeye salmon pass on their spawning migration.

Although the reservations to this treaty completely nullify the regulatory authority of the commission for a period of 8 years, during which time scientific investigations shall be conducted, it is felt that a forward step has been taken to protect this resource, which has declined rapidly since 1913.

CONSTRUCTION ACTIVITIES

New construction during the year has been confined almost entirely to fish-cultural stations. During the early part of the year, the Works Progress Administration allotted funds for construction of new fish-cultural substations at Uvalde, Tex.; Santa Rosa, N. Mex.; and Smokemont, N. C., in the Great Smoky Mountain National Park. Active construction was initiated in November and the New Mexico project was completed by the close of the fiscal year. In North Carolina, the new hatchery was placed on a producing basis, but was not fully completed. In Texas, work progressed very favorably but much remained to be done at the end of the fiscal year.

In addition, the Bureau supervised the construction of hatchery facilities where the work was being performed by other agencies, with the intent of having the operation taken over by the Bureau upon completion. Such projects were located at Wallhalla, S. C., under sponsorship of the Forest Service, at Norris Dam, in cooperation with T. V. A. authorities, and at Hoffman, N. C., the site of a Resettlement Administration project. The last two units were nearly ready for operation at the close of the fiscal year. In addition to this, local W. P. A. agencies sponsored projects comprising the enlargement and improvement of several of the Bureau's hatcheries, including those at Rochester, Ind.; Natchitoches, La.; and Lake Mills, Wis.; and in the Upper Mississippi Wild Life and Fish Refuge.

Development work also continued at the York Pond, New Hampshire, brook trout station, labor and materials being furnished by the Emergency Conservation organization and the W. P. A. Minor improvements were effected at the Lamar, Pa., hatchery through the assignment of C. C. C. workers.

Comparatively little maintenance or improvement work could be performed under the regular appropriations, since it was necessary to devote these funds to the production of fish.

CONSERVATION OF WHALES

An act, to give effect to the Multilateral Convention for the Regulation of Whaling concluded at Geneva, September 24, 1931, signed on the part of the United States March 31, 1932, and which became effective January 16, 1935, was approved by the President on May 1, 1936. The administration of the act rests jointly with the Secretary of Treasury and the Secretary of Commerce, each of whom is charged with specific duties. Enforcement matters in general are to be carried on by the Coast Guard and Customs Service of the Treasury Department, and the licensing features and collection of statistical and biological data are to be performed by the Bureau of Fisheries of the Department of Commerce.

The whale fisheries by United States vessels are prosecuted mainly off the coasts of Alaska and California, with one vessel from New York conducting operations off the coast of Australia.

EXHIBITS AT EXPOSITIONS

During the past fiscal year the Bureau displayed exhibits depicting its activities at expositions in San Diego, Calif., Dallas, Tex., and Cleveland, Ohio. The main feature of the exhibits at the first two expositions included a painted background of an outdoor scene. The foreground consisted of rocks, bushes, and plants grouped around a pool of water stocked with warm-water fishes such as bass and bream. The main feature at the Cleveland Exposition was a mechanical diorama depicting the effect of thermal conditions in Lake Erie on the prosecution of the commercial fishery. These exhibits were financed by a portion of the special allotment granted to Federal agencies by Congress for participation in the expositions.

COOPERATION WITH STATE AND EDUCATIONAL INSTITUTIONS

In the conduct of its statistical research work, some form of cooperation is given the Bureau in almost every State where commercial fishing is prosecuted. This cooperation on statistical work has probably reached its greatest development in the Lake States, the Pacific Coast States, and in Maryland and Virginia.

In the technological work of the Bureau many State agencies have cooperated in placing at the Bureau's disposal their facilities and members of their scientific staffs for the conduct of these investigations. Among the institutions cooperating in this work are the State Medical College, Charleston, S. C.; Massachusetts State College, Amherst, Mass.; Massachusetts State Department of Agriculture, Boston, Mass.; George Washington University, Washington, D. C.; Cornell University, Ithaca, N. Y.; Washington State College, Pullman, Wash.; University of Washington, Seattle, Wash.; University of Maryland, and the Maryland State Agricultural Experiment Station, College Park, Md.; and Western Maryland College, Westminster, Md.

There are numerous informal agreements and arrangements in effect whereby the Bureau and the States cooperate in the operation of hatcheries, distribution of fish and related fields. Such an agreement covers the work at the York pond, New Hampshire station, located in the White Mountain National Forest, and also at the Bureau's Put in Bay, Ohio, hatchery.

The Bureau's White Sulphur Springs, W. Va., station has continued to be a source of raw material in the form of trout fry which are transferred to the State rearing projects.

Indiana and Ohio have again depended upon the Bureau for the limited number of trout required for the waters of those States. In the West, much of the cooperation is connected with the collection of trout eggs.

Review of Federal applications by State authorities and coordination of distribution is now such a routine matter as to require no special comment.

Field studies on fishing and stream conditions have been conducted in a number of widely separated localities. In New Hampshire the

legislature has established a series of test streams in which experimental plantings of various species of trout have been made and a careful check of the results of these plants has been obtained through a system of anglers' reports. A similar test stream has been under observation in Virginia to determine the production of rainbow trout in relation to the number of fish planted and the abundance of natural food. In California studies of a number of streams and lakes in the high Sierras and in the coastal region have been conducted in cooperation with the State authorities. Particular attention has been given to the management of runs of steelhead trout in coastal streams and to the proper stocking and management of mountain streams. Efforts have been directed toward the stocking of more heavily fished waters with fish larger than those commonly used, and a strain of nonmigratory rainbow trout is being developed at the experimental hatchery.

COOPERATION WITH OTHER FEDERAL AGENCIES

Various members of the technological, economic, and statistical staffs of the Bureau have assisted other Federal agencies where the work or studies of such agencies required information or advice concerning the fishery industry. The Bureau also has continued the collection of statistics of cold-storage holdings of fish in cooperation with the Bureau of Agricultural Economics, Department of Agriculture; the collection of data on landings at the Municipal Fish Wharf and Market in Washington, D. C., in cooperation with the District health authorities; and the collection of statistics on the quarterly production and holdings of fish oils for the Bureau of the Census. Studies were conducted in cooperation with the Bureau of Chemistry and Soils and the Food and Drug Administration, in connection with the development of standards for halibut-liver oil as required in the administration of the Federal Food and Drug Act.

Excellent cooperative relations have been maintained with Federal agencies concerned with the administration of wildlife or of areas supporting wildlife.

The Bureau has assisted the Tennessee Valley Authority in working out a general program of fisheries conservation and specifically has supervised the construction of a small hatchery at Norris Dam, supplementing this by allotting a number of consignments of fish from the Marion, Ala., hatchery.

The Resettlement Administration has constructed a first-class small hatchery at its Hoffman, N. C., project, and operating responsibility was being assumed by the Bureau at the close of the year.

Even closer contact has been developed with the Forest Service, and there has been an expansion in the number of fish-rearing units in national-forest holdings. Plans have been developed for the provision of fish-cultural facilities at the Bureau of Reclamation's Elephant Butte Reservoir, in Arizona.

The work of maintaining good fishing in national-park waters has been prosecuted vigorously with the sympathetic cooperation of the National Park Service.

Cooperation with the United States Forest Service in the management of fishing waters during the past year has been very effective

despite limited funds and personnel on the part of the Bureau. Under the terms of the cooperative agreement with the Forest Service the Bureau of Fisheries assumes responsibility for conducting research necessary for the development of a comprehensive program of fish management for waters of the national forests. The chief activities in this field have been concerned with the improvement of streams and with providing feeding and resting areas for trout. At the end of the last fiscal year the Bureau conducted a training school in Utah and North Carolina for stream technicians of the Forest Service. These technicians then undertook an extensive program of stream conditioning in the various national forests directing the efforts of the Civilian Conservation Corps in the removal of obstructions of various kinds that interfered with the movements of fish, the planting of shade trees to protect and beautify the streams, and the correction of the ravages of deforestation and erosion by installing dams and deflectors to control the water flow and to create resting pools for trout and improved feeding and spawning areas.

In view of urgent need for further information on the value of stream improvement and of other means of improving fishing conditions in the national forests, arrangements were made for a number of experimental projects to be carried on in cooperation with the Forest Service and in some cases with State conservation agencies. In addition to the establishment of test streams in Vermont, such projects have been established in the Pisgah National Forest of North Carolina and in the Big Levels Game Management Area of the George Washington National Forest of West Virginia.

ALASKA FISHERIES SERVICE

ADMINISTRATION OF FISHERY LAWS AND REGULATIONS

The control of commercial fishing in Alaska to assure the maintenance of the fisheries resources on a maximum scale of productivity was continued in accordance with the authority vested in the Secretary of Commerce by the act of June 6, 1924. Particular attention was given to securing an escapement of at least 50 percent of the salmon runs in all localities: a proportionately larger breeding reserve was required where evidences of depletion were apparent.

Because of the recurrent scarcity of red salmon in the important Bristol Bay region in calendar years divisible by five, the regulations issued for 1935 prohibited commercial fishing in that district. As the season advanced, however, larger runs appeared than had been anticipated, and certain waters were opened for limited fishing after July 3. A few other modifications of existing regulations were made during the season, among which was the curtailment of fall fishing in parts of southeast Alaska where there had been an inadequate escapement from the earlier runs of breeding salmon to the spawning grounds.

Under the revised regulations, issued on February 8, 1936, six fewer trap sites were open than in the preceding year, the salmon-fishing season was lengthened in several districts, additional localities were opened to gill nets, and in the Cook Inlet area there was a shortening of the required distance interval between gill nets. Greater pro-

tection was provided for the herring in southeast Alaska and for the crab fishery.

Twelve regular and 170 temporary employees, in addition to the crews of 14 vessels of the Bureau and 2 chartered vessels, participated in the patrol of the fishing grounds. Chartered airplanes were used for a supplementary patrol in southeast and central Alaska, chiefly during the weekly closed periods, and for inspection of the spawning grounds and general supervision of the Bureau's work.

Biological studies of the life histories of the Pacific salmon and herring were continued. Tagging experiments were conducted in southeast Alaska to develop additional information regarding migration routes of pink salmon and herring. Weirs for counting the escapement of spawning salmon were operated in 11 typical salmon streams as a means of determining the ratio of escape to catch and also to provide data needed in scientific investigations.

Insofar as practicable in connection with their patrol duties, stream guards removed log jams and other obstructions that hindered the passage of salmon to the spawning grounds. Further improvement in the natural propagation of salmon was accomplished in certain localities by the taking of predatory trout destructive to salmon eggs and fry. In addition to the appropriation by the Territorial legislature and contributions from local salmon packers for this purpose, an allotment was made by the Works Progress Administration from funds available under the Emergency Relief Appropriation Act of 1935, which permitted an extensive predatory-fish control program in the Bristol Bay district in the 1935-36 season. Funds were provided also by that administration for repairing the marine ways at Nakuek and for the construction of a fish ladder and other stream improvement in southeast Alaska. The total expenditures from the W. P. A. allotment amounted to approximately \$45,000.

The Commissioner of Fisheries was in Alaska during the greater part of August for personal observation of fishery activities. Earlier in the season Deputy Commissioner Jackson inspected the Bureau's operations in Alaska, both in respect to the fisheries and the Pribilof Islands fur-seal industry.

ALASKA SALMON HATCHERIES

Only one salmon hatchery was operated in Alaska during the year—at Hugh Smith Lake, in the southeastern district. A collection of 34,383,000 red-salmon eggs was made in 1935, from which 32,581,000 fry were produced and liberated in Alaska waters. At the rate of 40 cents for each 1,000 red or king salmon fry liberated, as provided by the Alaska Fisheries Act of June 26, 1906, the owners of this hatchery therefore were entitled to a rebate of \$13,012 on license fees and taxes on their catch and pack of salmon.

PRODUCTS OF THE FISHERIES

While the quantity of Alaska fishery products in 1935 was considerably less than the record output of the previous year, it compared favorably with the average level of production. A marked feature of the 1935 season was the exceptionally small pack of red salmon, owing to comparatively light runs of this species in several districts and especially to curtailment of operations in the Bristol

Bay area in an effort to stabilize the future yield in that locality. The suspension of operations for several weeks in the Copper River region as a result of price disagreements between packers and fishermen also was a factor in limiting the season's output of red salmon. The total number of canneries operated decreased from 110 in 1934 to 99 in 1935.

Salmon products comprised approximately 72 percent in quantity and 88 percent in value of the total output of the Alaska fisheries in 1935. About 94 percent of the salmon products consisted of canned salmon, the pack amounting to 5,133,122 cases, valued at \$25,768,136. Red salmon represented 16 percent and pinks 63 percent of the total pack of canned salmon, as compared with 35 percent and 51 percent, respectively, in 1934.

Operations in the herring industry were marked by a further expansion in the manufacture of meal and oil, a number of reduction plants having been opened for the first time in the Kodiak district. The production of Scotch-cured herring was more than twice that of 1934. Landings of halibut credited to the Alaska fleet in 1935 were considerably less than in the preceding year. Both the quantity and value of whale products increased, although fewer whales were taken than in 1934; there was also an increase in several of the minor fishery products, including clams and shrimp.

The total output of Alaska fishery products in 1935 was 366,351,000 pounds, valued at \$31,231,000, as compared with a yearly average of 376,193,000 pounds, valued at \$34,079,000 for the 5-year period from 1930 to 1934, inclusive. The value of the 1935 catch to the fishermen was approximately \$8,703,000, or about \$3,004,000 less than in the preceding year. There were 22,620 persons employed in the various branches of the fisheries, as against 26,190 in 1934.

ALASKA FUR-SEAL SERVICE

GENERAL ACTIVITIES

With the continued growth of the Pribilof Islands fur-seal herd under Government management the number of surplus male seals available for commercial use has gradually increased. In 1935 the take of sealskins was the largest in 46 years. A staff of Bureau employees directed sealing operations performed by natives of the Pribilofs and by approximately 80 temporary laborers from the Alaska Peninsula and Aleutian Islands. The Fouke Fur Co., of St. Louis, Mo., sent 23 of its men to assist with the work, particularly with the blubbering of sealskins on St. Paul Island. Most of the skins on the island are taken by the stripping process, which necessitates the removal of blubber before curing.

In 1935 the by-products plant on St. Paul Island was operated for the first time since it was reconditioned and equipped with modern machinery in 1931. About 78 tons of meal and 19,000 gallons of oil were produced, limited quantities of which were retained at the islands for fox feed. The bulk of the meal was shipped to the States for use as fish food at hatcheries of the Bureau, and the oil was sold in Seattle to the highest bidder.

Besides the usual upkeep and repair of buildings and equipment, a new schoolhouse on St. George Island was completed before the beginning of the fall term, and extensions of improved roads were

made on both islands to facilitate the hauling of sealskins from the killing fields to the curing stations.

The Navy Department detailed the U. S. S. *Sirius* to transport the annual supplies to the Pribilofs and to bring out the season's take of sealskins. Valuable cooperative service was performed also by the Coast Guard in maintaining a patrol for the protection of fur seals during their northward migration and at the Pribilof Islands.

Fifteen percent of the sealskins taken on the Pribilof Islands in 1935 were delivered to the Dominion of Canada, as provided by the North Pacific Sealing Convention of 1911. The Government of Japan also is entitled to 15 percent of the annual take but receives its share from the net proceeds after the processed skins are sold at public auction.

Two hundred and one sealskins taken by the Japanese Government on Robben Island in 1935 were allotted to the United States in accordance with treaty provisions. They were received by the Fouke Fur Co., selling agents of the Department, at St. Louis, Mo., on January 2, 1936.

SEAL HERD

As of August 10, 1935, the computed number of animals in the Pribilof Islands fur-seal herd was 1,550,913, an increase of 120,495, or 8.42 percent, over the corresponding figure for 1934.

TAKE OF SEALSKINS

In the calendar year 1935 there were taken on the Pribilof Islands 57,296 fur-seal skins, of which 45,824 were from St. Paul Island and 11,472 from St. George Island. This is an increase of 3,826 over the number taken in 1934.

SALE OF SEALSKINS

Two public auction sales of fur-seal skins taken on the Pribilof Islands were held at St. Louis, Mo., in the fiscal year 1936. On September 16, 1935, 11,869 black dyed, 11,831 Safari brown dyed, 650 logwood brown dyed, and 79 miscellaneous skins were sold for \$569,708.10. At the same time 125 Safari brown dyed and 75 raw salted Japanese fur-seal skins were sold for \$2,762.25, and 14 confiscated fur-seal skins, parchments, for \$69. The Japanese skins had been allotted to the United States as its share of such skins taken in 1934.

At the second sale, held on April 27, 1936, 9,721 black dyed, 12,154 Safari brown dyed, and 498 logwood brown dyed skins were sold for \$600,770.25. At the same time 171 Safari brown dyed, 1 washed and dried, and 29 unhaired and dressed Japanese fur-seal skins were sold for \$4,814.75. These 201 skins were the United States Government's share of sealskins taken by the Japanese Government on Robben Island in 1935. There was sold also 1 confiscated fur-seal skin, raw salted, for \$1.

Special sales of Pribilof Islands sealskins authorized by the Secretary of Commerce in the fiscal year 1936 consisted of 830 black dyed, 1,274 Safari brown dyed, and 25 exhibition skins, at a total of \$53,377.92.

FOXES

The herds of blue foxes on St. Paul and St. George Islands require little care and produce sizable yields of pelts each year. Salted seal meat and prepared rations are fed to the animals during the winter months when the supply of natural food is scarce.

In the 1935-36 season 220 blue and 9 white fox skins were taken on St. Paul Island and 799 blue and 6 white skins on St. George Island, a total of 1,034. Six foxes trapped on St. Paul Island and 116 on St. George Island were marked and released for breeding stock. The reserve includes also many animals that did not enter the traps.

The 983 blue and 19 white fox skins taken in the 1934-35 season were sold at public auction in the fiscal year 1936. The blue pelts brought \$24,952.50, and the white \$304, a total of \$25,256.50.

FUR-SEAL SKINS TAKEN BY NATIVES

Under the provisions of the North Pacific Sealing Convention of 1911, aborigines of the Pacific coast may take seals at sea by primitive methods. The sealskins thus obtained must be authenticated by Government officials before they can enter into commerce. The number of sealskins taken and authenticated in 1935 was 975, of which 59 were secured by natives of southeast Alaska, 75 by natives of Washington, and 841 by natives of British Columbia.

FUR-SEAL PATROL

A patrol for the protection of the Alaska fur-seal herd was maintained by vessels of the United States Coast Guard, supplemented in the spring by two of the Bureau's fishery patrol vessels.

PROTECTION OF SEA OTTERS, WALRUSES, AND SEA LIONS

Walruses and sea lions in Alaska may be taken under restricted conditions, but the killing of sea otters is prohibited at all times.

In 1935 four residents of the Kodiak Island region were tried at Valdez and convicted of illegal killing of sea otters in the previous year. Several sea-otter skins which they had taken were confiscated by the Bureau during the year for sale at public auction for Government account.

PROPAGATION AND DISTRIBUTION OF FOOD AND GAME FISHES

In listing an output of 8,120,000,000 eggs and fish from Federal hatcheries during the fiscal year 1936, there must be explanation as to the exact nature of this summary. The foregoing figure represents a maximum production from Federal hatcheries for any one year since their establishment. It is an increase of over 3 billion in excess of the 5 billion produced last year. However, the greater part of this increase is represented solely by eggs and fry of four marine species handled at three of the hatcheries in the New England area. In fact, 6¾ billion cod, haddock, pollock, and winter flounder were produced here. This work involves both the incubation of the eggs at the hatcheries and the planting of the fertilized eggs directly on the spawning grounds by spawn takers who have been placed aboard

the commercial fishing vessels for the purpose of salvaging such eggs as may be obtained from the commercial catch. This form of by-product recovery is a relatively inexpensive contribution to the maintenance of the important New England shore fisheries. However, increases in output were recorded for other varieties, particularly game fish.

Owing to the large total, the relative percentage of game fish produced at the Federal hatcheries will be lower than heretofore, but the actual number is in excess of the output of last year. This is reflected in an increase in the distribution of larger fish or fingerlings from 133,600,000 to 157,000,000. There was no deviation in the list of various species propagated. As heretofore, trout eggs were allotted to the States wherever there was a surplus beyond the requirements of the Bureau's hatcheries.

PROPAGATION OF COMMERCIAL SPECIES

Marine species, Atlantic coast.—There has been cited previously the record-breaking production of cod, haddock, pollock, and flounder, derived from the three hatcheries located at Boothbay Harbor, Maine; Gloucester, Mass.; and Woods Hole, Mass. Four and one-half billion eggs were planted on the spawning grounds, the balance being transported to the hatcheries to be incubated and distributed as fry. The Woods Hole, Mass., station handled a limited number of mackerel in addition to the species mentioned above.

Pacific salmon.—Hatchery operations with the salmon of the Pacific coast were somewhat more successful than during 1935. A most gratifying increase was achieved in the production of chinook salmon, due to the excellent egg collections in the Columbia River territory. Also, the distribution of 17½ million sockeye salmon brought the output of this species up to normal. A few more silver salmon were handled; but there was a regression in the production of the chum salmon, which, however, is the least valuable of the five species.

Anadromous species, Atlantic coast.—An output of 12 million shad fry was substantially the same as the output of the previous year. Distribution of a million and one-half Atlantic salmon was a notable increase for this valuable species, which is making a gradual comeback in the State of Maine. Yellow perch fry were produced in large numbers at the Potomac River hatchery, though fewer than those produced the previous year. Effort was made to hatch shad at a new pond-fish hatchery at Harrison Lake, Va., but conditions were unfavorable. Shad cultural operations in South Carolina, in cooperation with the State, failed to reach the usual magnitude, owing to extremely adverse weather conditions.

Commercial species, interior waters.—This type of fish culture is prosecuted on a relatively limited scale at the present time. Slightly over 5 million whitefish fry were planted and less than a million lake trout and a limited number of lake herring were distributed. It has become extremely difficult for the Cape Vincent, N. Y., station to obtain a supply of eggs of these species and the Duluth, Minn., station is only able to obtain scattering quantities during the regular fishing season. The two Michigan hatcheries, closed during 1934, have remained inactive. At the Put in Bay, Ohio, station, work is

conducted on a joint basis with the State. The Bureau assists in the collection of eggs which are incubated at the State hatchery and the distribution records therefore do not figure in the Bureau's summary. The Federal hatchery at Put in Bay hatched over 500 million pike perch during the spring months, however.

Game species.—The legion of sportsmen throughout the country will be glad to know that the Federal hatchery system provided a larger number of several of the more popular varieties. The fisherman of 2 or 3 years hence will benefit by an increase in the distribution of steelhead salmon, rainbow trout, and particularly largemouth and smallmouth black bass. Production of the latter was brought to more than 5½ million, which is still inadequate in view of the tremendous demand for the premier warm-water game fish. The lesser varieties of pond fish, such as crappie, sunfish, etc., were also distributed in increased numbers. A problem which is intensifying the need for greater hatchery production of game fish is the culmination of several years of effort in the building of artificial lakes for recreation, power, flood control, and water storage. These new potential fishing areas presented a new demand for hatchery stock at a time when production was already insufficient to meet the normal requirements.

RESCUE OPERATIONS

In connection with the administration of fisheries matters in the Upper Mississippi Wildlife Refuge, the usual rescue or salvage work was carried on in the sloughs during the late summer and early fall. Forty-three million seven hundred thousand fish were handled. While this was a decline of almost 4 million under the figures of the previous year, it approximates the normal average extent of this work.

The construction of the 9-foot channel in the Mississippi River through this area is affecting the rescue operations to some extent and ultimately will render such work unnecessary or impossible. As heretofore, the great majority of the fish rescued were returned directly to the river. Most of the shipments to other sections are being made from fish specially propagated in controlled ponds located at advantageous points in the refuge.

FISHERY INDUSTRIES

ECONOMIC AND MARKETING INVESTIGATIONS

Manual for economic fishery surveys.—A manual was prepared during the year to aid fishery management officials, teachers of economics, and others in making studies of fishery economics. This consists of schedules for obtaining primary market information, instructions for making surveys, sample forms for use in tabulating the data, and instructions for tabulating.

Survey of fish hatchery foods and feeding practices.—A survey made by the Bureau during the year showed that fish-hatchery operators used 11,455,000 pounds of fish food, valued at about \$608,000, during 1934. Three-fourths of the volume consisted of such packing-house products as animal livers, hearts, and other animal organs. However, fishery products comprised a large portion of

the fish foods used by commercial hatcheries, since they were available at about one-third the cost of meat and dairy products.

The oyster and oyster industry.—A popular publication on oysters was prepared by the Bureau during the fiscal year. It covered such salient factors as the biology of the oyster, methods of capture and handling, its food value, and recipes for preparing it for the table.

Cooperative marketing.—Under authority of an act authorizing associations of producers of aquatic products, approved June 25, 1934, a cooperative marketing unit was established in the Bureau of Fisheries in October 1935. This unit has conducted studies on the prevalence of fishery cooperatives in the country, State legislation pertaining to such associations, the nature and extent of existing fishery cooperatives, and cooperative activities in foreign countries. A publication outlining the methods for organizing and incorporating fishery cooperative marketing associations also was prepared for dissemination to interested parties.

STATISTICAL INVESTIGATIONS

FISHERIES OF THE UNITED STATES, CALENDAR YEAR, 1934

New England States.—No complete statistical survey of the commercial fisheries of this area was made for 1934. The total landings of fish, however, by American fishing vessels at Boston and Gloucester, Mass., and Portland, Maine, amounted to 299,916,000 pounds, valued at \$7,882,000—an increase of 18 percent in volume and 21 percent in value, as compared with the preceding year.

Middle Atlantic States.—No complete survey was made in this area for 1934. A survey made of the shad fishery of the Hudson River for 1934 showed 322 fishermen engaged and a catch of 438,000 pounds of shad, valued at \$36,000—a decrease of 16 percent in volume and 12 percent in value as compared with 1933.

Chesapeake Bay States.—During 1934 the commercial fisheries of Maryland and Virginia employed 20,591 fishermen. Their catch amounted to 289,011,000 pounds, valued at \$5,943,000—an increase of 6 percent in volume and 17 percent in value as compared with the previous year. The shad and alewife fisheries of the Potomac River were prosecuted by 564 fishermen, who caught 567,000 pounds of shad, valued at \$48,000, and 2,028,000 pounds of alewives, valued at \$16,000.

South Atlantic and Gulf States.—The commercial fisheries of North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas during 1934 employed 24,898 fishermen. Their catch amounted to 447,914,000 pounds, valued at \$9,994,000—an increase of 49 percent in volume and 55 percent in value as compared with 1932 which is the most recent previous year for which a survey was made in this section.

Pacific Coast States.—The commercial fisheries of Washington, Oregon, and California in 1934 employed 19,232 fishermen. Their catch amounted to 1,546,102,000 pounds, valued at \$19,950,000—an increase of 80 percent in volume and 43 percent in value, as compared with 1933. The total catch of halibut by United States and Canadian vessels amounted to 46,018,000 pounds, valued at \$2.-

963,000—an increase of less than one-half of 1 percent in volume and 15 percent in value, as compared with the preceding year.

Lake States.—In 1934 the Lake fisheries (Lakes Ontario, Erie, Huron, Michigan, and Superior, Namakan and Rainy Lakes and Lake of the Woods of the United States and Canada) produced 124,148,000 pounds of fishery products. Of the total the United States accounted for 96,411,000 pounds, valued at \$5,124,000—an increase of 29 percent in volume and 26 percent in value as compared with the United States catch in the previous year. The Lake fisheries of the United States gave employment to 7,579 fishermen in 1934.

Mississippi River and tributaries.—No complete survey of the commercial fisheries of the Mississippi River and tributaries was made for 1934. The catch of Lake Pepin and Lake Keokuk and the Mississippi River between these two lakes in 1934 amounted to 5,604,000 pounds, valued at \$207,000—a decrease of 3 percent in volume and 11 percent in value as compared with the yield of the same waters in 1933.

MANUFACTURED PRODUCTS OF THE UNITED STATES AND ALASKA, CALENDAR YEAR 1934

Fresh and frozen packaged fishery products.—Based on the most recent available data, the domestic production of fresh and frozen packaged fishery products amounted to 150,593,000 pounds, valued at \$20,678,000. Important commodities in this group were fresh-shucked oysters, 6,207,000 gallons, valued at \$7,772,000; packaged haddock, 36,666,000 pounds, valued at \$3,801,000; and fresh-cooked crab-meat, 5,574,000 pounds, valued at \$1,904,000.

Frozen products.—The production of frozen fishery products in 1934 amounted to 133,494,000 pounds, estimated to be valued at about \$12,000,000. The volume of the production was 39 percent greater than in 1933; the most important products frozen were ground fish, halibut, salmon, mackerel, and whiting.

Cured products.—Based on the most recent data available, the domestic production of cured fishery products amounted to 98,141,000 pounds, valued at \$13,047,000. Important products in this group were smoked salmon, 8,321,000 pounds, valued at \$2,348,000; mild-cured salmon, 9,829,000 pounds, valued at \$1,841,000; and boneless cod, 8,993,000 pounds, valued at \$1,637,000.

Canned products.—Canned fishery products produced in 1934 amounted to 700,157,000 pounds, valued at \$80,021,000—an increase of 31 percent in volume and 34 percent in value as compared with 1933. Canned salmon alone amounted to 402,386,000 pounds, valued at \$45,818,000. Other important canned products were tuna and tuna-like fishes, sardines, shrimp, mackerel, clam products, and oysters.

Byproducts.—During 1934 the value of the production of fishery byproducts amounted to \$22,608,000—an increase of 29 percent as compared with the preceding year. Important products in this group were marine-animal oils and meals, and aquatic shell products.

TECHNOLOGICAL INVESTIGATIONS

Technological research in the fisheries covers a broad field which necessarily involves the sciences of chemistry, engineering, bacteri-

ology, pharmacology, and general food technology toward the development of new processes and methods, the salvage of waste products, and toward the more complete utilization of the fishery harvest. Such investigations by the Bureau's technological staff have included the study of many problems in connection with the preservation of fishery products for food, in determining the role of bacteria in preservation and decomposition, in pharmacological studies of the metabolism of the mineral constituents of fishery products, in the preservation of fishery byproducts, in the nutritive value of aquatic products, and in fish cookery.

Preservation of fishery products for food.—Studies in this field include an expansion of the knowledge of the chemistry of fish preservation and spoilage, the development of electrometric tests for determining the freshness of various fish, methods for smoking fish, studies of rancidity in fish, the chemical composition of fish proteins, and the development of methods for canning aquatic foods. The problem of the rancidity of the oil or fat in such fatty fish as mackerel has been an acute one wherever it has been necessary to store these fish for any substantial period of time. Various harmless antioxidants are being tested to determine their possible value in preventing or retarding the rancidity which develops in these fish under commercial storage conditions. This work has not progressed to a point where definite recommendations can be made as yet. The electrometric test for determining the relative freshness of fish has been published for haddock and has been worked out for cod and pollock. The importance of fish proteins in the diet is determined by the kinds and amounts of amino acids which make up the chemical composition of such proteins. This work is of fundamental importance and it is hoped that sufficient progress will be made for the issuance of a publication by next year. During the past year the Bureau has published a report on the canning of aquatic foods.

Bacteriological studies.—These investigations include the development of disinfectants for sponges for household use, bacteriological examinations of experimentally canned fishery products, and studies of the role of bacteria in the preservation and decomposition of fish.

Pharmacological studies.—This is a new and extremely interesting investigational field as far as fishery products are concerned. It includes a study of the role of the mineral constituents of fishery products in the metabolism of man and his domestic animals. Several publications on this work have been issued by the Bureau during the past year, covering the metabolism of arsenic and copper as they occur naturally in fish and shellfish.

Preservation of fishery byproducts.—The Bureau's technological investigations in this field have been of great value to the agricultural industry, as such fishery byproducts as fish oil and fish meal are unexcelled animal feedstuffs. Fish oils and fish-liver oils are not only vitally important as a source of vitamins for use in medicine and human nutrition but are essential to the poultry industry as a source of vitamin D to replace the inadequacy of sunshine. Fish meal is a splendid protein concentrate used in mixed feeds for various farm animals. This product also is used in fertilizers. The work during the past year in this field has consisted in the improvement of methods for manufacturing these products and in the development of new products.

Nutritive value of aquatic products.—Studies in this connection have included determination of the vitamin potency of various fish-liver oils, of the development of menhaden fish oil for poultry feed, menhaden fish meal in cattle feed, studies of the nutritive value of mackerel, the biological value and digestibility of fish proteins, and studies of the mineral constituents in fishery products. Publications have been issued on these various products.

Fish cookery.—Work in fish cookery has consisted in the development and testing of a variety of recipes for preparing fish and shellfish. There is a great need for work in this field as the average housewife knows little concerning the possible varieties in the cooking of fishery products. A new cook book, published by the Bureau about a year ago, proved very popular and over 60,000 copies of this publication have been distributed, in cooperation with the fishery industry.

BIOLOGICAL FISHERY INVESTIGATIONS

Biological investigations of the fishery resources form the foundation of all conservation policies and recommendations of the Bureau of Fisheries. When the Bureau was first established, such investigations to discover the conditions and trend of the important fisheries, the causes for a decline in the supply of some which had been noted, and the devising of corrective measures were the sole functions of the organization; and these activities still constitute one of the most important branches of its work. During recent years investigations, organized on a continuing basis, are concerned primarily with (1) the tracing or foretelling of natural fluctuations in abundance of the important commercial species, (2) the management of interior waters including the stocking of lakes and streams with the most desirable food and game fishes at a rate consistent with the productive capacity of the various waters, with environmental control to increase productive capacity and with regulation of the catch to assure maximum production, and (3) the development of modern methods of water farming as applied to the shellfish industry.

INVESTIGATIONS OF COMMERCIAL FISHES

North and Middle Atlantic fishery investigations.—In the North and Middle Atlantic, haddock, mackerel, *squeteague* or weakfish, and the flounder, scup, sea bass, and related species taken in the shore fishery and in the Southern winter trawl fishery, are the subject of study. With the upturn of fish prices during 1935, activity in the fishing business in the North Atlantic section has reawakened. Vessels tied up during the previous years have been placed in service and new ones are being built, while the efficiency of smaller vessels has been increased by additional motorization. Species hitherto neglected or regarded as trash fish, such as the rosefish and the sea robin, are being marketed in rapidly increasing quantities.

Observations on the condition of the resource during the past year indicate that the supply of haddock, the most valuable and important species in the North Atlantic fishery, generally remains low as compared with the abundance prevailing 10 to 15 years ago, although the stock of Georges Bank and of the South Channel, which are the most productive grounds, apparently has increased somewhat over

the previous year. Grounds for apprehension concerning the future of the resource still exist, as the production from areas nearer American ports has suffered a disastrous decline. Moreover, the distance from ports to grounds now most productive increases the cost of production.

The analysis of the commercial landings of the haddock fishery during recent years, based on personal interviews with captains, and size and age analysis of the population sampled by the commercial fishery, yield qualitative data regarding a change in the supply. Hampered by a lack of adequate personnel or sufficient funds, it has been impossible heretofore to study these changes quantitatively. It is essential to discover changes in the rate of natural reproduction and to evaluate as early as possible the abundance of young haddock year classes below marketable size as well as the natural rate of mortality. During the past 2 years the Bureau has had no vessel capable of making observations on the fishing grounds; hence one of the most urgent requirements of effective study of the commercial fishery in this and other regions is a sea-going research vessel, the construction of which was authorized by Congress in 1934 but for which no appropriations have been provided.

Mackerel in the North Atlantic area is at a high level of abundance, mainly as a result of the unusually productive spawning seasons of 1930, 1931, and 1933. Progress has been made in discovering the annual variations in natural reproduction which determine the number of mackerel in the sea and hence the success of the commercial fishery. Predictions of the yield for the following year have been issued with increasing accuracy at the beginning of each season for the past 9 years, and a comprehensive account of the major features of the biology of the mackerel that explains its startling variations in yield has been prepared for publication.

During 1935 the commercial yield of mackerel reached 53 million pounds, the record for the present century. However, during the decade ending 1935, the average annual yield was 41 million pounds, which contrasts poorly with the average of 80 million pounds produced during the decade ending 1885. Investigations have shown that these remarkable changes in yield are caused mainly by changes in abundance of mackerel and only secondarily by variations in the rate of fishing or by extensive migrations of the fish. Further, it has been learned that the changes in abundance are due to great differences from one year to another in the number of young mackerel that survive to reach commercial size.

Investigations of the fisheries of the Middle Atlantic States are intended to provide a rational basis for more efficient utilization of the fishery resources from southern New England to North Carolina. The fisheries of this region are very productive and extremely diverse. If the fisheries are to be protected and at the same time utilized fully, two requirements must be met: (1) The life history and conservation needs of all important species must be known and, (2) some provision must eventually be made for unified administration which is essential because of the migratory habits and the interstate traffic in the production of the fishery.

A comprehensive study of the more important features of the life history of squeteague or weakfish has been completed during the

year and the preparation of a report is nearing completion. The outstanding feature is the fact that the squeteague spawn in inshore waters from Massachusetts to North Carolina in late spring and early summer. There is, however, uncertain survival of those spawned in northern waters. Those produced south of Delaware Bay spend their first year in the South and migrate northward as 2-year-old or older fish.

The fishery in southern waters, particularly in North Carolina, is unusually destructive to considerable numbers of young squeteague; but, because of the relatively slower rate of growth in southern than in northern waters, it is uncertain whether the restriction of fishing in the South would greatly augment the supply. It is apparent, therefore, that the problem of conservation presents quite different aspects according to the point of view from which it is examined. From the national rather than from the sectional point of view it is desirable to determine whether sufficient benefit would result from curtailment of the southern catch of yearlings to compensate for the resulting losses.

Similar destruction of immature scup, particularly in the newly developed winter trawl fishery off the Chesapeake capes, has been noted. This fishery, which developed rapidly into a major branch of the industry, has been subjected to study each winter since its origin and the effects of increasing exploitation of the scup have been observed.

Shrimp investigations on the South Atlantic and Gulf coasts.—The most important fishery of the region from North Carolina to Texas depends upon the common shrimp, which yields on the average 100 million pounds annually. Investigations of this fishery in co-operation with the various States has proceeded during the past year. Experience has shown that the shrimp supply fluctuates considerably from year to year in the different localities. These fluctuations indicate that definite changes in the population of shrimp occur, and that for a complete understanding of the fishery the nature of these causes must be determined. Consequently, the Bureau's investigations have been directed toward the discovery of the life history of the species.

During the year studies of sexual maturity and spawning indicate that, contrary to former beliefs, the shrimp in some localities may survive through two winters and spawn a second time. The character of food, which explains the concentration of shrimp generally about the mouths of rivers, has been ascertained, and studies of growth and larval development have been completed. Studies of migration during the year have shown that extensive and well-defined movements northerly and southerly occurred, particularly along the Georgia-Florida and the Texas coasts.

To test the intensity of the fishery, methods of tagging shrimp have been developed and applied. A total of 3,800 shrimp were tagged along the Georgia and Florida coast during the fall of last year, and the intensity of the fishery is evidenced by the fact that almost one-fourth of the tagged shrimp had been retaken by the fishermen and returned to investigators by December. During the coming year tagging operations will be extended throughout the entire area of the South Atlantic shrimp fishery.

During the fall and winter the majority of the larger shrimp disappear from their usual grounds, probably moving off-shore to deeper and warmer waters of the Gulf. Plans have been developed, therefore, through additional appropriations made by the last Congress, to equip the Bureau's motor ship *Pelican* for off-shore experimental fishing. It should be possible to determine whether this deep-water concentration occurs, and whether or not the shrimp congregate in sufficient quantities in these areas to make a commercial fishery feasible.

Pacific coast and Alaska fishery investigations.—Commercial fishery investigations on the Pacific coast and Alaska are confined mainly to the salmon and the herring. In the Pacific Northwest States the studies directed toward the management and conservation of the diminishing runs of sockeye salmon in Puget Sound and the Fraser River area and the runs of all species of salmon in the Columbia River (discussed previously) were continued; and in Alaska continued observations were made on the success of reproduction of red salmon in the Karluk River and the pink salmon and herring in southeastern Alaska. In addition a new and much needed investigation to measure variations in yield in the salmon fisheries of Alaska, dealing with the collection and analysis of daily catch records for the various types of fishing gear, was carried out during the past year.

In Puget Sound special attention has been given to a study of the sockeye salmon population spawning in the Fraser River and the coho salmon, the most important game fish in the Pacific Northwest. The trend of the sockeye salmon fishery at sea and in the sound has been studied by the collection and analysis of records of the commercial catch since 1915. This study will establish a solid foundation for active management of the fishery by the commission to be formed under the authority of the recently approved treaty between the United States and Canada. Observations on the life history of the coho salmon in Puget Sound have been conducted to determine changes in abundance and their underlying causes and to develop methods of rehabilitation of populations in streams now barren or depleted. Experiments have been conducted to determine the strength of the homing instinct by transplanting hatchery reared fish. Observations on rate of growth of fingerlings have also been made in different tributaries and extensive records have been obtained from both the commercial and sports fisheries to indicate the drain on the resource by these fisheries.

In Alaska the extensive series of observations over many years on the red salmon runs of the Karluk River on Kodiak Island have been continued to discover factors influencing the success of natural propagation in an attempt to forecast future runs more accurately. Another marking experiment was initiated in which nearly 50,000 fingerlings were marked by the amputation of a combination of fins. The commercial catch of the region was carefully observed to obtain records of marked adults returning from previous experiments. During the year complete returns from the 1929 spawning year were obtained. The escapement was 900,519 which bore a ratio to the spawning population of that year of 1.6:1 as compared with 2.2:1 for the 1928 escapement, and 1.8:1 for the 1927 escapement. This

indicates a progressive decline in natural productivity, the returns being below normal.

From the marking experiments it is apparent that mortality from the seaward migrant stage to adult stage is about 75 percent. Mortality during the fresh-water period from eggs to seaward migrants is calculated to be 99.5 percent, hence the determination of the factors causing this extensive mortality during fresh-water existence is of great importance since any material increase in survival during this period would have the greatest effect in increasing the commercial runs.

Similar studies on the supply of pink salmon, the most valuable species in southeastern Alaska, were continued during the year. Pink salmon were also studied in cooperation with the National Cannery Association from the standpoint of physical and chemical changes that occurred in the body during their spawning and migration from the sea. The results provide information relative to the seasonal changes in the market quality that is of primary importance in the canning industry.

During the past 2 years a statistical study of the commercial salmon fishery in southeastern Alaska has been under way involving the collection, compilation, and biometrical analysis of the daily catch records of various types of fishing gear employed in the Alaska salmon fishery. These records provide the basic data for studies on changes in the abundance and character of the salmon runs and competition between the various types of fishing gear, as well as information for the future delimitation of the fishing districts and the establishment of closed seasons for fishing in the region.

During previous years investigations of the herring fisheries in Alaska have demonstrated the existence of a considerable number of distinct races of herring, each inhabiting a restricted area. In some of these areas serious overfishing that has resulted in virtual destruction of the industry has occurred. Investigations have been conducted during the past year to delineate more accurately the areas inhabited by the separate races. Notable results include the perfection of a new method of tagging herring to trace their migrations and to secure the return of tagged fish.

Great Lakes fisheries investigations.—It is generally conceded that certain important fisheries in the Great Lakes have been depleted or are undergoing depletion from overfishing. The virtual disappearance of the cisco in Lake Erie since 1926 has been so dramatic that the fact of depletion brooks no argument, and the decline of the whitefish yield in the lake system in general and its rapid disappearance from formerly productive grounds in more recent years is well known. The valuable fisheries in the Great Lakes, however, are being maintained at only moderately reduced levels, chiefly by increasing dependence on other species such as the pike-perch, the yellow perch, the lake trout, and the various species of herrings and suckers. In order to measure the annual fluctuations in the abundance of these species, to discover the need for protection and to determine the value of fishery regulations, an analysis of the catch statistics gathered by the State of Michigan in Lake Erie, Lake Huron, and Lake Michigan has been undertaken as a major project. The basic tabulations have now been completed for all Great Lakes

waters under the jurisdiction of the State of Michigan for the 6-year period.

In addition to the statistical studies reports dealing with the life history and racial affinities of the several species of pike-perches have been completed. The remainder of the investigative program includes the preparation of seven reports covering major investigations completed in the field during the past several years.

POLLUTION INVESTIGATIONS

The growing menace of pollution in the fresh waters of the United States by erosion and by municipal and industrial wastes has been accepted by many as inevitable because the basic facts—chemical, physical, and biological—concerning stream pollution generally have not been available. The menace is spreading not only throughout the various river systems but into the impounded waters as well, and threatens at various points the waters of the public domain and of the national playgrounds. Consequently remedial and corrective measures compatible with the interest of fisheries and with economic necessities have not been easy to define.

To meet this situation the Bureau of Fisheries has been conducting for some time investigations to ascertain (1) the natural conditions favorable for fish and other aquatic life in unpolluted waters, so that a polluted stream can be defined with fairness to all concerned; (2) the specific effects on fish and other aquatic life, and on the aquatic environment itself, of the various types of effluents which are being released into the fresh waters of the United States.

Much effort has been given to devising suitable tests that could be applied practically in the field in order to determine the extent of stream pollution. A set of water standards has been defined based upon the results of thousands of tests and analyses made in all of the major river systems of the United States. From these studies it has been possible to make definite recommendations for practical remedial measures in various cases of stream pollution; and a comprehensive report embodying the findings of this investigation has been completed for early publication.

AQUICULTURAL INVESTIGATIONS

Researches in the field of aquiculture, or water farming, as applied to food and game fish in interior waters are intended to increase the efficiency of hatchery practices by stopping the loss from hatchery diseases; by greater economy in operation through the development of less expensive and more effective diets; by the rearing of fish to larger sizes so that they are better able to survive after planting; by the selective breeding of superior stocks of fishes with more rapid growth, greater egg production, and increased resistance to disease; by environmental control to improve the productive capacity of streams and lakes; and by the development of a more effective policy of stocking to assure the best distribution of the hatchery products in waters where the highest survival can be expected and the planting of fish in proper numbers and in proper localities to assure the greatest supply. In previous years research has been directed primarily toward proper hatchery technique and combating

diseases; but during the past year great emphasis was placed on field studies since it is impossible to use the production of our hatcheries to the best advantage until we learn more about the various factors that affect fish in natural waters. Our lack of information of these fundamental factors is the greatest obstacle at present in developing a scientific policy of fish management.

In pond-fish culture for bass and other warm-water fishes conducted on the basis of natural food production in ponds, previous experiments have determined the most satisfactory fertilizers to maintain food production. During the past year the quantities of fertilizers and the periods that reveal the limitations of productive capacity of the ponds and the maximum fish production have been determined.

More elaborate studies have been conducted on trout culture. Feeding experiments conducted at two of the Bureau's experimental hatcheries have involved the testing of various artificially prepared commercial diets and the substitution of cheaper foods for the standard diet of beef liver. Detailed researches conducted in cooperation with the State of New York and Cornell University have been developed along three lines: (1) continuation of the study of growth of four species of trout fed similar diets and maintained under similar conditions to determine the efficiency of food utilization; (2) the determination of the amount of food required per unit of weight to obtain the most economical production; and (3) chemical balance studies to determine the amount of phosphorus and calcium needed by growing trout.

Selective breeding studies have been conducted; and in addition to increased rate of growth and higher disease resistance previously developed, a strain of trout has been selected with high egg production and higher fertility of eggs.

As in previous years, the study of fish diseases was largely confined to investigations of epidemics in hatcheries and the development of better methods of control. The establishment of a pathological laboratory at Seattle, Wash., has made it possible to devote more attention to the diseases prevalent in the Intermountain region and the Pacific Coast States. Additional information regarding the causes and control of two relatively new diseases has been obtained; and a free clinic or disease service has been established and greatly expanded during the year for the examination of specimens of diseased fish sent in by hatchery superintendents for diagnosis, and for the furnishing of advice for treatment and prophylaxis.

SHELLFISH INVESTIGATIONS

The scope of shellfish investigations previously conducted by the Bureau was greatly enlarged last year by the special appropriation of \$100,000 for the study of oyster pests and the development of practical methods for their control in the Atlantic and Gulf States. In addition limited investigations of oyster and hard clam culture were continued in the waters of New England, the South Atlantic States and in Puget Sound. A special allotment of \$20,000 was provided by the Public Works Administration for studies of the failure of oyster culture in York River, Va., allegedly caused by pulp mill wastes. All of this work has been carried out by the regular staff

of the Bureau augmented by 20 temporary investigators and 50 assistants whose period of employment varied from 3 to 9 months. Excellent cooperation was received from the various States, the Works Progress Administration, and the Transient Rehabilitation Camps which supplied about 110 relief laborers for the field investigations.

The oyster pest investigation was directed toward the control of three major organisms destructive of oysters: (1) the starfish infesting the waters of New England and the North Atlantic States; (2) the drill in the Delaware and lower Chesapeake Bays and extending as far south as Texas; and (3) the so-called "leech", the recent outbreak of which has destroyed extensive areas of oyster-producing bottoms in Florida. The problems of the destruction of oysters caused by the boring sponge and the conch, although of lesser importance, were also included in the project. Practical methods that can be used by the oyster industry for the control of these pests must be based on a thorough knowledge of their life histories and an understanding of their habits and activities.

Oyster pest investigations were also undertaken in the in-shore waters of Florida, Alabama, and Texas. Previous surveys showed that the most destructive pests of this section are the borer and the "leech" or flat worm. Other pests associated with these, but whose relations as commensals or enemies are undetermined, are the boring sponge, boring clam, barnacles, and mussels.

During the summer of 1935 the oyster bottoms of the Texas coast were surveyed to discover the kinds and numbers of oyster pests present and to devise methods of control. Approximately 800 miles of coast line were examined between Corpus Christi Bay and Galveston Bay, examinations being made of commercial reefs to determine the condition of oysters, salinity, temperature, character of the bottom, and abundance of oyster pests. The most common organism infesting oysters is the boring clam. The borer, the common conch, and the boring sponge are also present in moderate numbers. In addition to pests, however, it was found that the greatest danger to oyster beds in this section is from occasional floods from the rivers of the coastal plain. Recommendations were offered to assist oyster growers in meeting these conditions and in managing their holdings.

Because of the increased activity in connection with the oyster pest control investigations, the regular studies for improving and promoting oyster culture were greatly curtailed. A study of the seasonal changes in the mineral content of oyster meats and its relations to environmental changes was conducted and completed during the year. In Long Island Sound variations in the quantities of copper, iron, zinc, and manganese of great nutritional and therapeutic value in the human diet were traced to aid in the producing and marketing of oysters of standard quality. Technical direction was also afforded to State officers in Alabama and the Works Progress Administration in their project of developing oyster-producing grounds.

On the Pacific coast a 5-year study of problems concerned in the cultivation of Olympia oysters in Puget Sound was brought to a conclusion. The purpose of this investigation was to determine factors influencing the spawning and setting of Olympia oysters in order to develop a system whereby oyster growers can be assured annually of an abundant supply of seed. Spawning habits, life and attachment

of the larvae, and the relations of spawning to physical conditions have been thoroughly investigated, with the result that practical guidance has been afforded the oyster growers in planting cultch at the proper time in relation to tidal cycles to assure an abundance of seed oysters.

As previously noted, an investigation was started at Yorktown, Va., to determine the effects, if any, of pulp mill wastes discharged in the York River on the oysters of this region. Formerly a productive ground noted for oysters of superior quality, production in the York River has in recent years dwindled alarmingly and oysters produced have been very poor quality. Preliminary experiments show that the effluent from the pulp mill is not sufficiently toxic to kill the oysters immediately, nor apparently is it responsible for a reduction in the quantity of plankton food available. Whether it exerts an influence interfering with the nutrition of the oyster or whether other physiological processes are involved will require careful experimentation; and, if it is found that wastes from the sulphate pulp process are harmful, corrective measures must be found. The work had not progressed far enough at the close of the year to afford positive evidence of these obscure points.

In addition to studies of oyster culture, investigations of the life cycle of the quahog clam were carried on at the experimental field laboratory at Milford, Conn. Spawning, growth, feeding, reactions to temperature and water salinity have been determined as a foundation for more practical studies on artificial propagation and farming of clams in the New England region.

BLACK BASS AND ANGLERS DIVISION

Evidence of violations of the black-bass law was obtained in a number of cases, three of which were referred to the Solicitor for prosecution in Federal court. Seizures of black bass illegally transported inter-state were made in a number of instances. Information showing violations of State laws was obtained in a number of investigations and turned over to the State authorities for attention.

While only a small number of State legislatures (11) met in regular session in 1936, some progress in black-bass legislation was made. There are still, however, seven States where there is no closed season on black bass, six States where black bass may be sold if imported from other States, and four States where the sale is restricted only during short periods of the year or from certain waters. Thirty-eight States now absolutely prohibit the sale of black bass at all times regardless of where they have been taken.

Among the advances made in State legislation during the fiscal year 1936, either by legislative enactment or regulation, may be mentioned the fact that four States adopted the part-time angler's license, two States reduced their daily limits, and three increased protection by lengthening the closed season. These improvements are in line with the Bureau's policies.

Generally speaking, black-bass protection materially advanced during the year. From reports received from deputy black-bass law inspectors and others it is believed black bass have increased in the past year, and fishing at the close of the fiscal year was much improved, excepting in those waters affected by drought.

Several of the Division's publications were revised. They cover such subjects as enforcement, books on angling, how, when, and where to fish, list of State officials, and tourist's licenses. Requests for information on these subjects reached the Division in ever-increasing numbers. More persons are interested in angling than ever before; the last tabulation by the Bureau of the number of anglers licenses issued by the States showed an increase of 265,375 over the previous issue.

Fishery Circular No. 20, containing the Federal black-bass law, and a synopsis of the State laws, published the first part of the fiscal year, was exhausted during the close of the year necessitating an early publication of a new issue which will be revised to include the latest changes.

LIBRARY

The library of the Bureau, although housed with the Department of Commerce Library, is maintained as a separate unit by the Bureau. It is one of the finest collections of scientific works concerning the fisheries in the world. As such it attracts attention from students and scientists all over the country, and many foreign scientists avail themselves of its services. The Bureau's staff, of course, finds it invaluable as it serves both the Washington office and the field force.

The library at present consists of 43,036 volumes, 1,500 pamphlets, and 199 monthly periodicals.

AQUARIUM

The past 12 months proved most conclusively the popularity of the aquarium located under the main lobby of the Department of Commerce Building. This consists of 50 aquaria and 3 center pools. The outstanding individual exhibit, maintained during the winter until late spring, was a miniature hatchery demonstration. Eggs of Lake Erie whitefish, Potomac River yellow perch and shad, brook trout, rainbow trout, and silver salmon were hatched. Biology classes visited the exhibit frequently to observe the progress of development.

Specimens and eggs were also supplied to other public aquaria as a means of mutual cooperation. Experimental work on the efficacy of permanganate of potash, in treatment of parasites and bacteria in aquaria, is proving effective.

The aquarium population varies in season, averaging about 55 species and 1,480 individuals during 1936.

VESSELS

Fifteen vessels of the Alaska service cruised about 120,000 nautical miles in the fiscal year 1936, as compared with 118,000 miles by 13 vessels in the preceding year. The *Penguin* logged the greatest distance, with approximately 27,000 miles. The *Brant* covered about 14,500 miles, the *Eider* 11,000 miles, and the *Crane*, *Teal*, and *Scoter* each about 10,000 miles.

The *Penguin* made five round-trip voyages between Seattle and the Pribilof Islands, transporting personnel and emergency supplies. Inter-island service also was performed, and native workmen from

the Alaska Peninsula were transported to the Pribilof Islands to assist with the season's sealing activities.

The *Auklet*, *Kittiwake*, *Merganser*, *Scoter*, and *Widgeon* were engaged in fishery protective work in southeast Alaska during the 1935 season. The *Murre* operated in the Seward-Katalla district, and the *Eider* in the Kodiak area. The *Teal* was on Cook Inlet until the end of August and then was transferred to southeast Alaska for the fall patrol. The *Ibis* was at Chignik, the *Crane* and *Red Wing* in the Alaska Peninsula area, and the *Coot* on the Yukon River. The *Blue Wing* patrolled the Bristol Bay area until the latter part of July, after which it was on duty in the Kodiak area.

The *Brant* was used for general supervisory work, cruising as far as the Pribilof Islands in Bering Sea, and also assisted with the patrol and survey of salmon-spawning streams in southeast Alaska.

In the spring of 1936 the *Brant* and *Crane* assisted with the fur-seal patrol in the vicinity of Neah Bay, Wash., and the *Kittiwake* performed similar duty near Sitka, Alaska. The last-named vessel was used also in herring-tagging operations. From February to April 1936 the *Eider* was assigned to the Works Progress Administration project of stream improvement in southeast Alaska.

APPROPRIATIONS

Appropriations for the Bureau for the fiscal year aggregated \$1,565 920 as follows:

Salaries, Commissioner's office.....	\$156, 420
Propagation of food fishes.....	667, 000
Maintenance of vessels.....	160, 000
Inquiry respecting food fishes.....	172, 000
Fishery industries.....	62, 000
Protecting seal and salmon fisheries of Alaska.....	278, 000
Upper Mississippi Wild Life and Fish Refuge.....	18, 000
Enforcement of black-bass law.....	15, 000
Fisheries Cooperative Marketing Act.....	12, 500
Shellfisheries investigation.....	25, 000
Total.....	1, 565, 920



LIGHTHOUSE SERVICE

Pursuant alike to long-established policy of careful regard to the welfare of the personnel of the Lighthouse Service and to recent advances in general legislation and progress in the arts and sciences, some increases in the personnel of the Service are urgently necessary upon both administrative and humanitarian grounds. The crews of some vessels will require augmentation in order to perform effectively necessary functions with due regard to statutory requirements as to hours of labor, leave of absence, etc., and in some areas additional vessels are needed. Certain isolated light stations, notably those on wave-swept sites, should have their personnel augmented on humanitarian grounds. The proper servicing of the greatly increased and still increasing mechanical equipment of the Service, particularly the radio and other signal apparatus, requires some increase in the field technical personnel, and necessary compliance with statutory requirements of both direct and indirect effect urgently demands a moderate augmentation of the field administrative and supervisory personnel, especially in clerical lines, to meet the increment of work so imposed.

The rapid and comprehensive improvement of the navigational channels of the Mississippi River system on a vast scale requires further attention to the facilities and methods for servicing the necessary aids to navigation, which are required to serve the types of channels and character of traffic resulting from these improvements. In 1933 the Department approved the consolidation of three river districts of the Lighthouse Service into a single district with headquarters at St. Louis. This action has proved effective and economical, but the very great increase in buoyage, coupled with the progressive replacement of kerosene lights by the more-efficient battery-operated electric lights, points to the need of augmenting the lighthouse tender equipment of this district by smaller and more mobile vessels. The Congress has provided funds for the construction of one such vessel, which will be used on the Missouri River. The degree of economy and efficiency which may be demonstrated by this vessel will furnish the evidence necessary to determine the rapidity with which the provision of other vessels of similar type will be justifiable, to supplement or to replace existing lighthouse tenders in this district.

The Lighthouse Service is perhaps the most extensively decentralized agency of the Federal Government, less than 1 percent of a total personnel of about 5,000 persons being located at the seat of government. This policy is believed wise and necessary to efficient and prompt administrative action, but requires for best operation an intimate familiarity with field conditions by administrative officers in Washington and an understanding of administrative pro-

cedure at headquarters by responsible field officers. Such mutual understanding would be promoted by more frequently interchanging duty between the field offices and headquarters in Washington, and this in turn would be facilitated by a consolidation of the appropriations from which these two classes of employees are paid. It is strongly recommended such consolidation be made of the appropriations, salaries, Bureau of Lighthouses, and salaries, Lighthouse Service, with proper limitation upon the proportion of the combined amount available for expenditure in the District of Columbia.

The internal-combustion engine is having an effect on water transportation correlative to the revolution in land transportation brought about by motor transport and improvement in public roads. On the water it involves a great volume of local commercial traffic, the motorizing of the seafood industry and the development of a type of recreation healthful to the spirits and the bodies of the people, and fostering the national interest in all maritime affairs. This development is also the basis upon which is founded an important quantity production industry involving aggregate investments of many millions of dollars widely distributed among the people. Adequate safeguarding of life and property at sea requires that this class of waterborne traffic be facilitated by aids to navigation in proportion to its very rapid development. The projects involved will not be individually large, except where they are pursuant to extensive interior waterway improvements. The aggregate demand on the facilities and funds of the Lighthouse Service will, however, require the provision of a moderate increase in the maintenance appropriations for the Service. Such an increase has been included in the estimates submitted for the fiscal year 1938.

From the maintenance and operation standpoint, the need for the resumption of a program of vessel construction upon a well-distributed and evenly progressing schedule is paramount. The total tonnage of the necessary vessel fleet of the Lighthouse Service, including both lighthouse tenders and lightships, aggregates 66,103 tons as of June 30, 1936. The average age of these vessels is 21 years, and based on an average economical life of not to exceed 40 years, not less than about 2,300 tons should be laid down annually, including a small annual increment to provide vessels adequate to service needs under present conditions. Recent legislative enactments affecting hours of labor and other personnel conditions, as well as the extensive development of ports and waterways by the Federal Government, require that as vessels become obsolete or worn out they be replaced by abler and more efficient and commodious units. Lighthouse Service vessels are necessarily designed with especial view to their fitness for the unique requirements of their duty, and the present fleet and rate of replacement in recent years are both believed to be below a proper margin of safety for the efficient conduct of this vital function of governmental activity.

Good progress has been made during the year in the systematic improvement of aids to navigation along several lines. All lightships not heretofore equipped with radiobeacons are being so equipped; this program is expected to be completed by October 1, 1936. The synchronizing of radiobeacons with sound signals for distance-finding purposes is proceeding rapidly at all most suitably

located stations, and a fairly complete system involving 81 stations will have been put in effect by October 1936.

Following a conference in 1935 between officers of the United States and Canadian Lighthouse administrations, identical principles of radiobeacon operation have been adopted by both, principles which have now been made completely effective as regards these aids in United States waters. These principles have provided for added operation so that nearly all stations now operate during two periods each hour in clear weather and continuously in fog. There has resulted a standardization of characteristics and distance-finding methods and there has also been a restudy of frequency assignments which has simplified the system and reduced possibilities of interference.

Important progress has been made in the modernization of radiobeacon equipment of stations and vessels and in the extension of radiotelephone communication. This character of equipment is developing so rapidly that the present minimum requirements of performance are far beyond the possibilities of apparatus constructed only a few years ago. Modern transmitters were installed at some 25 stations during the year to replace those which were obsolete; this work of replacement will be continued steadily.

The improved administrative control and the advantages to personnel in remote locations through the use of radiotelephone communication have been well demonstrated, this facility having been made available during the year to 26 stations and vessels, bringing the total of such installations to 55 at the close of the year.

A further matter in connection with the radiobeacon system which has been given much attention is the provision of monitoring stations within the districts, operated by existing keeper personnel, and keeping daily checks on all stations as to adherence to schedule, frequency, fidelity of transmission, adequacy of power, etc. These methods have been brought to such a stage now that the prompt detection and correction of defects is possible where monitoring is fully effective. Necessary extension of monitoring to complete this important function will be made during the coming year. Eight additional radiobeacon stations were established during the year, making a total of 116 now in operation.

Systematic revision of buoy light characteristics to bring their significance into accord with that of the shape and color characteristics is being accomplished, with a view to publication in the light lists for the calendar year 1937.

It is intended to undertake during the coming year a program of systematic improvement of secondary fog signals both ashore and afloat. There still remain in use in this Service about 140 fog bells at light stations, which are struck by gravity-driven clockwork mechanisms. Most of these were established many years ago before the availability of suitable internal-combustion engines. A considerable proportion of these bells should be replaced by more effective compressed-air signals, and sound signals on many buoys in sheltered waters should be improved by installation of apparatus not dependent on wave action.

During the year just closed the construction program, accomplished with funds allotted from the appropriation National Indus-

trial Recovery Act in the amount of \$5,620,334 and from Works Progress Administration in the amount of \$20,000, has been substantially completed. No funds from either of these emergency appropriations remain available for prosecution of further construction work in the Lighthouse Service, except for the final completion of two projects heretofore undertaken and nearing completion.

At the close of the year 19 developmental projects were under way, involving signaling apparatus and methods which are described in a subsequent section of this report.

The total number of aids to navigation maintained by the Lighthouse Service at the close of the fiscal year was 26,660, an increase of 2,201 over the previous year. A large proportion of these new aids are small buoys and minor lights in inland waters. An important change is the increase in the number of lights using electricity from 2,440 in 1935 to 2,697 in 1936. There has been a decrease in the number of incandescent oil vapor lights, particularly through the electrification of several of the more important coastwise lights. There has also been a continued increase in the number of flashing or occulting lights, there now being approximately 300 more flashing lights than last year and 1,530 more flashing lights than fixed lights. Four of the eight new radiobeacon installations have been on Atlantic coast lightships, two at shore stations on the Great Lakes, one at a shore station in Alaska, and one at an Oregon shore station. In addition to these, 9 other stations have been authorized, which will bring the total number of radiobeacons to 125.

The retirement of former commissioner George R. Putnam brought about several important changes in the Bureau personnel. On recommendation of the Secretary of Commerce, the President appointed former Deputy Commissioner H. D. King as Commissioner of Lighthouses. Following this, C. A. Park was promoted from the post of chief engineer to that of Deputy Commissioner, and R. R. Tinkham, the former superintendent of the seventeenth lighthouse district, was made chief engineer.

A description of the following important engineering projects completed during the year will be found under the heading "Description of important works completed":

New Orleans Depot, La.
East Charity Shoal, N. Y.
Minneapolis Shoal, Mich.

Peshtigo Reef, Wis.
Green Bay Harbor Entrance, Wis.
Five Finger Light Station, Alaska.

IMPROVEMENTS IN APPARATUS AND EQUIPMENT

The application of electricity has been extended, improving the candlepower and effectiveness of both the coastal landfall lights and those of lesser candlepower, as well as the living conditions in the quarters of the keepers. A number of lighted buoys have been equipped for electric operation, dry-cell packs supplying the current for the light and for the operation of the lamp changers and motor-driven flashing mechanisms. As the lanterns of such buoys require no ventilation, they are especially adapted to locations where submergence is a contingency. High-powered flashing lights, produced by electrically equipped beacon lenses, are being used for better penetration of moderate fog and haze and to aid navigation under poor visibility during hours of daylight as well as darkness.

Lights of relatively high power have been provided at unattended light stations by the installation of low voltage electric lamps operated from primary cell batteries, all vital parts of the apparatus being provided in duplicate.

A high candlepower acetylene lighting unit, of the mantle exchanger type, used in a 300-millimeter lantern, has been placed in service at the unattended light station at Laau Point, Hawaiian Islands.

A battery-operated foghorn for use on a buoy, pierhead or other fixed structure, has been improved in ruggedness and in the design of its contacting device, and further tests of the signal are being made. Frequencies of 210 and 240 cycles per second have been used, the current being 3 amperes at 14 volts. Development work is still under way.

Lighthouse Service radio engineers have designed and constructed improved radiobeacon equipment, including new types of transmitters and transmitter exciters for modernizing older type radiobeacons.

Remote radio control of one offshore light station and one lightship on the Great Lakes has been continued with success. In addition, Peshtigo Reef Light Station, in Green Bay, Wis., on a submarine foundation, has been placed in commission, replacing a lightship which formerly marked this point. The new station is unattended, its fog signal being remotely controlled by radio by the keepers of Sherwood Point Light Station, 8 miles away.

To increase the efficiency of radiobeacon signals, a vertical-tower radiator (antenna) has been designed and an installation completed at Cape Cod Light Station, Mass. This radiator is equipped with an outdoor type antenna tuning house, and an appreciable increase in signal strength has been achieved. A vertical tower radiator, with indoor antenna tuning house, is planned for the new Grays Reef Light Station, in Lake Michigan. A simple, inexpensive vertical tower radiator has also been purchased for trial at Eagle Harbor Radiobeacon Station, in Lake Superior. Antenna improvements are being carried out on lightships, and, where necessary to improve signal strength, tripod masts are being erected over the lantern galleries. These tripod masts carry the antenna at a greater elevation, and thus increase the length of the downlead to the transmitter.

Simplified signal timers, to replace the older synchronizers and signal controllers at a considerable saving in costs, have been designed and are in successful operation at several stations. These timers are clock-controlled and are self-correcting. They control the timing of the main light, the fog signal, and the radiobeacon, and provide for the synchronization of the radiobeacon and the sound-in-air signals for distance-finding purposes.

A large type of lighted whistle buoy has been fitted with a superstructure of aluminum alloys. The reduction in weight permitted by the use of aluminum has made it possible to increase the height of the superstructure, giving greater elevation and range of visibility to the light. This buoy is being tested at a point off Charleston, S. C.

A test installation of remote control of fog-signal equipment by means of a light beam has been successful in the seventeenth district

on the Pacific coast, and similar equipment has also been developed for test at Old Point Comfort, Va. The electric solenoid-operated bell striker has been improved in efficiency, and is being installed at two stations for trial. The use of gasoline and Diesel engine driven generating plants, with storage batteries full floated on the line, has been extended, with economy in size of power plant, maintenance cost, and with added power reserve for peak loads, close voltage regulation, etc.

The installation of more efficient types of fog-signaling equipment has been accomplished at both shore and ship stations. A two-way valve has been designed and installed on several lightships to connect two diaphones to one vertical resonator, thus saving the expense and top weight of a duplicate resonator. Tests of these valves, and of various types of resonators, have been made at the Cape Henry fog-signal testing laboratory, where air consumption, frequency, and other data were obtained.

ADMINISTRATION

Appropriations for the maintenance of the Lighthouse Service totaled \$9,451,000 for the fiscal year 1936. There were no additional allotments by the Public Works Administration during the fiscal year 1936 for special works, but the work previously provided for was continued from allotments made during 1934. As previously stated, the Works Progress Administration allotted \$20,000 to the Lighthouse Service. Allotments from the Public Works Administration, which totaled \$5,620,334 at the beginning of the fiscal year, were reduced by the withdrawal of \$8,328. Of the balance, \$76,482 was unexpended on June 30. A few unfinished projects undertaken under these allotments are nearing completion and it is expected that the entire program will have been terminated by the end of the present calendar year. There were also allotted from the 1936 Department appropriations, for contingent expenses, \$4,500; and for printing and binding, \$26,355.

There were received and deposited in the Treasury the following: From sale of Government property, \$30,761.62; rent of buildings, \$1,790.30; forfeitures by contractors, \$300.15; reimbursement for property destroyed or damaged, \$329,419.29; work done for private interests, \$2,745.16; commissions received on telephones, \$15.04; miscellaneous, \$153.62; total, \$365,185.18.

Items of special legislation affecting the Lighthouse Service becoming effective during the year included that for the transfer of a part of the Anastasia Island Lighthouse reservation to the city of St. Augustine, Fla.; for the transfer of a part of the lighthouse reservation at Grand Haven, Mich., to the city of Grand Haven; for the transfer of the retired lightship *No. 82* to the U. S. Ship Constitution Post Number 3339, Veterans of Foreign Wars.

The following changes in the officers in charge of the various lighthouse districts were made during the fiscal year: G. B. Skimmer was transferred from the Bureau to become superintendent of the twelfth district, with headquarters at Milwaukee, Wis., succeeding C. H. Hubbard, retired; Walter G. Will, formerly assistant superintendent in the eleventh district, became superintendent of the fifteenth district, with headquarters at St. Louis, Mo., succeeding Irving L. Gill, de-

tailed to the Bureau as signal engineer; Edward C. Merrill was promoted from assistant superintendent to superintendent of the seventeenth district, at Portland, Oreg., succeeding Frank C. Muth, who died on January 31, 1936. Mr. Muth had taken over his duties on November 29, 1935, succeeding R. R. Tinkham, detailed to the Bureau as chief engineer.

The abnormal severity of the winter of 1935-36 was reflected in extensive ice and flood damage done to aids to navigation in the north Atlantic districts. Ice damage was serious from Maine to the Virginia Capes, the greatest amount occurring in Chesapeake Bay and its tributaries. The loss of equipment in Chesapeake Bay was largely attributable to the great number of aids used in marking the various channels and less rugged types of structures designed for these waters where serious ice damage is rare. During the breaking-up of the ice it was necessary to evacuate temporarily several light stations in Chesapeake Bay, as they were in imminent danger of complete destruction. In the more northerly districts damage was caused by the shove of ice fields, moved by tidal currents and winds. Boatways, seawalls, wharves, and riprap protection for light structures, were in many places seriously displaced and damaged. Loss from ice damage amounted to \$390,000. Losses due to flood damage in the Connecticut, Hudson, and Ohio Rivers, totaled \$91,500. Appropriations to restore the aids damaged were made in the act approved May 15, 1936 (\$390,000) and the act approved June 24, 1936 (\$91,500), respectively.

Extensive damage was done to navigational aids by the hurricane which struck the Florida coast on September 2, 1935. Practically the entire coast line of the seventh lighthouse district was within the area affected, an unusual occurrence despite the frequency with which hurricanes are experienced in the vicinity. Many minor lights and beacons were either entirely destroyed or seriously damaged. Alligator Reef Light Station, which received the full force of the storm, was out of commission for several hours and was considerably damaged. Immediately following the storm the entire district office, depot, and vessel personnel of the district were engaged in the restoration of the aids to navigation and in the relief of stricken persons and communities. Damage to Lighthouse Service property was estimated at \$79,000.

Lighthouses and floating aids were considerably damaged by the severe storm which struck the New England coast on November 16-18. Pollock Rip Light-ship, directly in the path of the storm, was blown off station. The area in which navigational aids were damaged extended from Boston Harbor through Long Island Sound and along the south shore of Long Island to Sandy Hook, N. J.

During January and February several groups of lighthouse keepers were assigned to depots, tenders, and light stations in the eleventh lighthouse district for special work and instruction in lighthouse subjects. A total of 62 keepers were given this training. The subjects covered included the overhaul and maintenance of boats and vessels, care of fog signal machinery, illuminating apparatus, radiobeacons, direction finders, and other matters of special value to lighthouse keepers. Excellent results have been shown. A similar plan was carried out to a limited extent in the tenth district.

During the year the Lighthouse Service organized displays illustrative of its functions for six expositions. Material shown at the Ketchikan Industrial Fair, Ketchikan, Alaska, was assembled by the sixteenth lighthouse district. The seventeenth lighthouse district assembled apparatus, etc., which was shown at the Pacific International Livestock Exposition, at Portland, Oreg.; and the third lighthouse district supplied material for display at the Second Annual Marine Exposition, held at New York, N. Y. This Bureau, cooperating with other branches of the Department of Commerce, provided an effective display which was sent to the Texas Centennial Central Exposition, at Dallas. The three lighthouse districts covering the Great Lakes combined in assembling material which was shown at the Great Lakes Exposition, Cleveland, Ohio; and the fourth lighthouse district installed an exhibit at the Philadelphia Exposition.

PERSONNEL

During the fiscal year there was a net increase of five in the authorized personnel for the operation and maintenance of the Service. The total number of employees as of June 30, 1936, was 5,046, including 1,168 lightkeepers and assistants; 1,804 officers and members of the crews of lightships and tenders; 103 bureau officers, engineers, and draftsmen, district superintendents, and technical assistants; 177 clerks, messengers, janitors, and office laborers; 135 depot keepers and assistants, including laborers; 1,193 laborers, etc., mostly part-time employees; and 462 persons in the field force employed on construction and repair work.

In addition to their regular duties, a number of employees rendered aid to those in distress. During the fiscal year about 99 instances of the saving of life and property or rendering other valuable aid were reported. Since many of these acts were performed at great personal risk, and in some cases were considered especially meritorious, the employees were commended by the Secretary of Commerce.

During the year there was received from the Treasury Department a silver life-saving medal for transmission to Thomas J. Steinbise, keeper of Seven-Foot Knoll Light Station, in Chesapeake Bay, Md., for his service in rescuing five men from drowning on August 21, 1933. During a severe storm that night the tug *Point Breeze* sank near the light station. The keeper set out promptly in the station boat, despite the fact that seas breaking over the boat made it difficult to keep the engine running. Five men were saved and a sixth man was taken into the boat but found to be dead.

LIGHTHOUSE TENDERS

At the end of the year 58 tenders were in commission, including 1 laid up in reserve. Of these, 31 are fitted with direction finders, 30 have radio communication, and 10 have radiotelephones.

The following tenders have been extensively overhauled during the year: *Camellia*, *Acacia*, *Cypress*, *Magnolia*, *Sunflower*, and *Hibiscus*.

It is expected the following tenders will be extensively overhauled or reconditioned during the coming year: *Lotus*, *Tulip*, *Ivy*, and *Larkspur*.

The following were the numbers of tenders in commission on June 30 of the years specified, small vessels not having regular crews being omitted: 1910, 51; 1920, 55; 1930, 55; 1935, 59; 1936, 58.

The tender *Camellia* has been converted from steam to Diesel propulsion. The tender *Rose* has been lengthened 10 feet. The tender *Larch* was sold on October 28, 1935, being beyond economical repair.

LIGHTSHIPS

At the close of the year lightships were maintained on 32 stations, and 48 lightships were in service, of which 8 were regular relief ships and 8 were in reserve.

Lightships *No. 78*, *No. 87*, *No. 95*, and *No. 102* have been reconditioned.

The lightship stations at Eleven Foot Shoal and Peshtigo Reef on the Great Lakes have been discontinued, having been replaced with permanent fixed structures.

Grays Reef station will be discontinued during the year and replaced with a fixed structure.

It is probable that lightship *No. 69* will be condemned and sold during the next year since it is beyond economical repair. Lightship *No. 112*, Nantucket, was completed and will be placed on station in the near future.

Lightships *No. 53*, *No. 81*, *No. 85*, *No. 91*, *No. 96*, and *No. 94* are to be reconditioned. Lightship *No. 82* was transferred from the twelfth district to the second district on August 27, 1935, and by act of Congress of June 22, 1936, its transfer to the Veterans of Foreign Wars was authorized.

OPERATION AND CONSTRUCTION, LIGHTHOUSE SERVICE, FISCAL YEAR 1936

PROGRESS OF VESSELS UNDER CONSTRUCTION OR COMPLETED

Lightship *No. 112*, built specially for the Nantucket station, was completed and delivered during the year. It is now being fitted out and will be placed on station early in the coming year. The sinking of lightship *No. 117* on the Nantucket station on May 15, 1934, by an ocean liner was followed at once by the planning of a new vessel, involving a thorough restudy of all the hazards of the lightship service. The new vessel, it is believed, embodies every reasonable safeguard for both crew and vessel. An extremely high degree of protection has been secured by subdividing the hull into a large number of water- and oil-tight compartments, a number very unusual in a vessel of this small size. Not only do collision bulkheads provide reserve stability in the event of the severe crushing of either bow or stern, but the three largest compartments, forward hold, fire room, and engine room, are protected by continuous longitudinal bulkheads forming the inner sides of the oil and water tanks. A further feature of safety is the subdivision of the main deck spaces into a number of watertight compartments. To provide for the prompt escape of the crew in the event of an accident, interior passageways give access to six different exits to the upper deck. The selection of a combined steam and Diesel power plant for the new ship is an arrangement well adapted to the requirements of this station. For propulsion to and from station and for maneuvering during storms, the ship is equipped with an unusually powerful steam plant, which also provides for the heating of the vessel. For signaling purposes, and for maintenance on station, the ship depends entirely upon Diesel power. Signal equipment is comprehensive and of the latest type. The ship will have a high-power radiobeacon, a special warning radiobeacon, a compressed-air fog signal, a powerful masthead light, and a submarine signal.

It will also be fitted with radiotelegraph, radiotelephone, and a radio direction finder. Both the compressed-air fog signal and the submarine oscillator are synchronized with the radiobeacon for distance finding.

Tender "Hollyhock."—The contract for the construction of this tender has been awarded to the Defoe Boat & Motor Works, Bay City, Mich., the contract price being \$347,800. This tender, for use on Lake Michigan to replace the *Sumac*, is to be an all-steel vessel, 174 feet long, steam propelled, with oil burning boilers and engines of 1,000 horsepower. The two main engines are to be of the vertical inverted type, triple expansion, with cylinders 11½, 19, and 32 inches by 24-inch stroke. Steam will be generated by oil burning water-tube boilers designed for a working pressure of 200 pounds. The tender will have a displacement of about 825 tons on a draft of 10 feet 7 inches. The lifting gear, designed specially for the handling of buoys, etc., will have a capacity of 20 tons. The vessel will be fitted with a gyro compass and repeaters, and with radiotelephone communication. On June 30 the tender was approximately 12 percent completed.

PROGRESS OF SPECIAL WORKS UNDER CONSTRUCTION OR COMPLETED

Southwest Harbor, Maine.—See annual report 1935, page 122. The depot buildings as originally planned have been completed at a cost of \$26,895, permitting the abandonment of Bear Island depot, which was on an island and inaccessible except by water transportation. The wharf at the latter station will continue to be utilized to some extent.

First district.—Automatic lights have been established at Green Island and on Croich Island Beacon, in addition to several new lighted buoys. Radiotelephones were installed on Portland Lightship and at the Portland depot.

Cape Cod Canal Lights, Mass.—A contract for four light structures to mark the east side of the new dredged channel has been let. Contract price \$7,993. Work had not been started at the close of the fiscal year.

Amisquam River Beacons, Mass.—A contract was let for replacing seven old beacons with new steel-sheet pile structures. Contract price, \$7,975. Work 30 percent completed.

Cape Cod Light Station, Mass.—The radiobeacon was improved by the erection of a new vertical radiator antenna at a cost of \$5,449.

General Lighthouse Depot, N. Y.—The inner basin was dredged to a depth of 18 feet and the outer basin to a depth of 22 feet. Cost, \$6,069. Project completed.

Delaware River Ranges, N. J. and Penn.—Channel changes have made necessary either moving or erecting 19 new structures. Work is in progress, estimated cost \$22,000. Expended to June 30, \$8,000.

Ocean City and Sinepungent Bay, Md.—The dredging of a new channel made necessary the establishment of 10 minor lighted aids and 19 day beacons. Cost, \$6,218. Estimated 85 percent completed.

Core Sound, N. C.—Erect minor lights to mark new channel. Material and apparatus purchased. Work under way. Estimated 50 percent completed. Obligated to June 30, \$5,537.

Fifth district, ice damage.—During February–March 1936, buoyage was extensively damaged and over 250 minor light structures and unlighted daymarks destroyed by ice. James Island Light Station was completely destroyed and other attended stations on submarine sites damaged. Estimated amount of damage, \$237,000. The work of replacement is in progress and estimated 40 percent completed.

Cape Hatteras, N. C.—See annual report 1935, page 123. The new tower and powerhouse have been completed and light exhibited from the new tower, completing this project. Total cost, \$7,472.

Intracoastal Waterway, Fla.—See annual report 1935, page 123. The establishment of minor lights, insofar as contemplated by this project, and the purchase of a depot site at Fort Pierce, Fla., has been completed. Total cost, \$19,482.

Intracoastal Waterway, S. C. and Ga.—The newly dredged intracoastal channels in these States are being marked with minor aids to navigation. Eleven lights and 17 daybeacons have been established. The installation of other lights for which equipment has been purchased is in progress. Expenditure to June 30, \$36,175.

Palaski Shoal Light, Fla.—See annual report 1935, page 12. Establish unattended light. Project completed. Total cost, \$15,177.

Miami Harbor Lights, Fla.—See annual report 1935, page 123. All work completed, except the erection of two structures delayed on account of dredging. Cost to June 30, \$15,232.

Intracoastal Waterway, north of Miami, Fla.—Establish 20 minor lights and change buoyage. Material and equipment purchased. Cost to June 30, \$5,024. Estimated 50 percent completed.

Seventh district hurricane damage.—In hurricanes of September 2-3 and 28 and November 4, 1935, Alligator Reef Light was severely damaged and 37 minor lights and 82 daybeacons destroyed or damaged. The work of restoration is in progress. Cost to June 30, \$18,974. Estimated 80 percent completed.

New Orleans, La., depot.—See annual report 1935, page 123. The erection of an adequate brick storehouse and wharf, with the necessary dredging, was practically completed. Additional work of paving and fencing remains to be done. Cost to June 30, \$151,954. See description of important works completed.

East Charity Shoal, N. Y.—See annual report 1935, page 124. The tower and lantern have been erected and the permanent light placed in commission, completing the project. Total cost, \$93,124. See description of important work completed.

Tenth district.—Revision of aids to navigation. Huron, Ohio, light moved to end of new breakwater; Conneaut, Ohio, lights on ends of breakwaters rebuilt; Ashtabula, Ohio, lights on breakwaters rebuilt and relocated; Fairport, Ohio, new light established on west breakwater. Work completed. Cost, \$58,190.

South Buffalo, N. Y.—See annual report 1935, page 124. Project completed. Cost, \$13,900.

Cleveland and Toledo, Ohio.—See annual report 1935, page 124. Project completed. Cost, \$20,415.

Grand Marais, Minn.—See annual report 1935, page 125. Electrify and improve fog signal. Project completed. Cost, \$6,357.

St. Marys River, Mich.—Beacons. See annual report 1935, page 125. Project completed. Cost, \$28,211.

St. Clair Flats, Mich.—See annual report 1935, page 125. All work completed except keeper's dwelling which is under construction. Cost to June 30, \$26 026. Estimated 80 percent completed.

Detroit River Light Station, Mich.—Improve fog signal by replacing obsolete equipment. Modernize the station by installing heating, water supply, and sanitary system. Cost to June 30, \$1,350. Estimated 25 percent completed.

Minneapolis Shoal Light Station, Mich.—See annual report 1935, page 125. The remainder of the steelwork was completed and living quarters furnished. The fog signal and lighting equipment were installed. The station was placed in commission, and thus the project was completed. Total cost, \$170,356. See description of important works completed.

Peshigo Reef, Wis.—See annual report 1935, page 125. The project was completed with the erection of the steel tower and the installation of lighting equipment. Total cost, \$80 710. See description of important works completed.

Green Bay Harbor entrance, Wis.—See annual report 1935, page 125. The steelwork was completed and all equipment installed; thus the project was completed. Total cost, \$108,447. See description of important works completed.

Grays Reef Light Station, Mich.—See annual report 1935, page 125. Due to construction difficulties experienced by the contractor, this station is still in the process of construction and will require the remainder of this working season for completion. Cost to June 30, \$205 305.

Indiana Harbor, Ind.—See annual report 1935, page 126. The new tower on the outer end of the breakwater extension was completed. The light and fog signal are controlled by cable connection from the old station. Total cost, \$44,938.

Calumet Harbor south breakwater, Ill.—Construct light and fog signal on southerly end of south breakwater and connect by cable to Calumet Harbor Light Station. Work is in progress. The tower and fog-signal house have been moved from Holland, Mich. Cost to June 30, \$1,132. Estimated 50 percent completed.

Five Finger Light Station, Alaska.—See annual report 1935, page 126. All concrete work was completed and the living quarters finished. With the installation of the fog signal machinery and lighting equipment the project was completed. Total cost, \$92,997. See description of important works completed.

Sixteenth district, Alaska.—Establish minor aids to navigation. Apparatus has been ordered at a cost of \$15,099. Estimated 10 percent completed. Estimated cost, \$0,000.

Puget Sound, Wash.—Establish automatic lights and fog signals at Olympia Shoal and Chinook Dike. Equipment has been purchased and contract let for the structures, which are under construction. Cost to June 30, \$7,704. Estimated 70 percent completed.

New Dungeness Light Station, Wash.—Provide shore protection and rebuild wharf and tramway. Completion expected by October 1, 1936. Estimated cost, \$12,500.

Seventeenth district, storm damage.—Storms in the fall of 1935 damaged buoyage considerably and made extensive repairs necessary at Grays Harbor and Point Chehalis range. New buoys are being purchased and repairs are under way. Obligated to June 30, \$7,769.

Patos Island, Wash.—Establish class C radiobeacon. Equipment has been purchased and is ready for installation. Obligated to June 30, \$7,834.

Columbia River entrance, Oreg. and Wash.—Establish a class C radiobeacon at Cape Disappointment Light Station, and change Peacock Spit buoy 7 to a lighted bell buoy. Material and equipment have been purchased. Obligation to June 30, \$6,120.

Eighteenth district.—Road repairs. Extensive repairs and improvements were made on the roads within the lighthouse reservations at Humbolt Bay and Point Sur. The project has been completed. Cost, \$11,562.

San Diego and Newport Bay lights, Calif.—Establish nine new lights and one fog signal. Work in Newport Bay substantially completed. The work in San Diego Bay will be deferred until completion of dredging, about December 1936. Cost to June 30, \$7,769.

Makapuu Point Light Station, Hawaii.—The radiobeacon was improved by the installation of a new generating set and fuel supply tank, and a telephone was installed at the station. Project completed. Cost, \$5,650.

Hawaii, minor aids to navigation and buoys.—The landing at Kauna Point Light Station was improved and new lights and buoys established at Port Allen Harbor. Honolulu Channel Light 6 was under construction, and improvements at Laau Point Light Station were under way. Cost to June 30, \$11,422.

DESCRIPTION OF IMPORTANT WORKS COMPLETED

New Orleans (La.) Lighthouse depot.—New Orleans is the headquarters of the eighth lighthouse district in which two sea-going tenders and four small tenders are in commission for the maintenance of aids to navigation, with one sea-going tender in reserve. The intracoastal waterway along the Gulf is now under extensive improvements and joining the river in this locality makes this location desirable as a base for a considerable portion of the operations of the small tenders particularly.

To meet this need and others incident to the maintenance of the district, the establishment of a lighthouse depot at New Orleans was authorized under this project for which funds were provided by the Public Works Administration. A site, with water frontage of 750 feet, on the Innerharbor Navigation Canal was obtained by a 99-year lease from the board of port commissioners in 1934 under congressional authorization, and a suitable wharf, together with the necessary depot building, has been constructed.

The wharf is 30 feet wide by 448 feet long, supported on wooden creosoted piles and decked with a reinforced-concrete slab. Fire baffle walls are provided and a sprinkler system for fire protection has been built into the wharf. Connection was made to adjoining railroad track by a spur which leads over the levee and directly onto the wharf so that delivery from rail to lighthouse tenders may be conveniently made. The depot building is two stories of brick and steel construction, 62 by 112 feet, supported on concrete piers which are in turn carried on clusters of wood-bearing piles capped with a reinforced-concrete grillage. The floors of the building are reinforced concrete. The roof is carried on steel trusses and purlins, and the building is lighted throughout by metal sash. One side of the building is on the grade of the concrete wharf and on the other side is parallel to a delivery drive in such a way that deliveries may be made directly from truck level to the floor of the building.

In addition to storage space, the building provides accommodations for the depot keeper and his records as well as for boat repair and machine work, insofar as it is necessary to carry on the latter at the lighthouse depot. Estab-

ishment of this depot has permitted the discontinuance of the less conveniently located Port Leads Depot which is about 100 miles below New Orleans, and the transfer of the material from that depot has been completed. The depot is in use, and there remains for its entire completion only the finishing of certain grading work, road construction, the placing of a derrick, and fencing. The total cost of the completed project will be \$166,953.89.

East Charity Shoal Light Station, N. Y.—The site of this light is in the eastern end of Lake Ontario and on the direct course of vessels proceeding to and from the St. Lawrence River. Its purpose is to guide vessels clear of East Charity Shoal.

A timber crib 50 feet square and from 11 to 14 feet high, so constructed as to fit the bottom was built in an inverted position on shore, launched, righted, and towed to the site, to be sunk by heavy precast interlocking blocks of concrete placed over the outer row of pockets, and by filling the center pockets with stone. The crib was protected at the water line on the three exposed sides with a heavy steel flash plate lapping well down over the upper timbers and extending upward above water level to the top of the precast concrete blocks. Provision was made for bolting the form work for the pier proper to these steel ice plates.

The outside pockets, 6 feet in width, were filled with concrete placed by tremie. Holes were provided in the precast blocks through which the tremie pipe could be inserted for filling the outer pockets with concrete. The stone filling of the inside of the crib extended up to the top of the precast blocks and a mat of reinforced concrete was placed over the entire area, the outer walls being carried up to a height of 18 feet above deck and a reinforced concrete deck slab provided over the entire pier. Space within the pier was provided for storage purposes and a deckhouse of reinforced concrete in octagon form, one story in height, was constructed to support a cast iron tower enclosing the stairway leading to the lantern, which is of the fourth order. The illuminant is acetylene and the illuminating apparatus is a fourth-order fixed lens with the focal plane height 52 feet above low water depth. A flashing white light of 1,300 candlepower is shown. The foundation crib is protected on three sides by heavy riprap stone. The total cost of the project was \$95,125.

Peshigo Reef Light Station, Green Bay, Wis.—This station constructed near the outer end of Peshigo Reef in 10-foot depth and placed in full commission on May 6, 1936, replaces Peshigo Reef Lightship which has been discontinued, resulting in a material decrease in maintenance cost as well as providing a more effective aid to navigation.

The pier supporting the superstructure is cylindrical, 50 feet in diameter and constructed of interlocking sheet-steel piling braced at the water line by a circumferential girder which is in turn braced by cross ties and by rods anchoring it back to five cylindrical piers within the enclosure which support the lighthouse proper. These five inner piers are 6 feet in diameter and are supported on wood bearing piles.

Inside of the ring of sheet piling, steel-encased H-beam bearing piles have been driven spaced at approximately 9-foot intervals and supporting the outer edge of the basement floor and the outer edge of the deck of the pier, which is of reinforced concrete. The pier itself is filled with stone ballast and a thin mat of riprap extends for some distance around the pier to prevent erosion.

The outer portion of the basement is utilized for storage, etc., and the inner portion under the tower proper is a machinery room, lighted through ports built into the circular tower base, which is of concrete and which projects above the deck level. Where the basement joins the sheet pile wall, the latter is backed up with hollow-tile masonry.

The superstructure consists of a cylindrical steel tower, the first story of which is 25 feet in diameter, providing living quarters for keepers. The remainder of the tower is conical, housing the compressed-air diaphragm type of fog signal and supporting a special lantern of the helical-bar type in which is housed the illuminating equipment. A fixed white electric light of 20,000 candlepower shines from a fourth-order lens.

The station power plant, consisting of two gasoline-driven 5-kilowatt generators and storage batteries, supplies power to the light and electric air compressors which supply air for the diaphragm fog signal. Current is also supplied to a fog bell which is operated continuously.

While this station has accommodations for keepers suitable for use in emergency, it is not operated as an attended station but is remotely controlled

by radio from the Sherwood Point Light Station some $8\frac{1}{2}$ miles distant. The light operates automatically by time switch, but the electric generators are started and stopped at will from the shore station through radio control. The continuous operation of the fog bell is an insurance against any interruption of the radio control, and the latter is installed complete in duplicate, using a separate wavelength for each complete control channel. The method of control used is that which has been in successful operation at Fourteen-Foot Shoal Light Station for a number of years and for the last 2 years has been in service controlling Lake St. Clair Lightship.

A radiotelephone transmitter at Sherwood Point provides the control and a similar transmitter at the Peshtigo Reef Station provides communication with the shore when attendance or tests are in progress. The two keepers of Sherwood Point Station visit the Peshtigo Station at periodical intervals for a general check-up on the mechanical equipment of the station. The total cost of the station was \$80,710.17.

Minneapolis Shoal Light Station, Wis.—This new light station located on Minneapolis Shoal was placed in full commission at the opening of navigation, 1936, with the exception of the radiobeacon. It takes the place of Eleven Foot Shoal Lightship, long maintained on the opposite side of the channel, marking a turn in the course of vessels bound for the port of Escanaba, Mich. The discontinuance of the lightship effects material saving in maintenance costs, and there is the further advantage of the fixed station in the service rendered to navigation in the late fall and early spring when ice conditions do not permit the maintenance of floating aids to navigation on station.

The structure stands on hard bottom in 21 feet. The substructure consists of a timber crib 64 feet square, heavily constructed and divided by cross timbers in 49 pockets. The crib was floated to the site and sunk in position, the inner pockets being filled with stone ballast to 1 foot below water level. The outer pockets were then filled with tremie placed concrete. A steel plate 10 feet in width, extending around the entire crib and overlapping its timber to a depth of $5\frac{1}{2}$ feet, provides protection of both the crib and concrete superstructure against ice scour. Over the timber crib, a 6-foot mat of reinforced concrete is placed upon which rises the superstructure pier and the lighthouse proper. The pier is of reinforced concrete extending to a height of 21 feet above water and finished with a concrete deck joining to the lighthouse structure proper.

The lighthouse itself is of steel construction, the supporting members being carried directly on the timber crib and extending upward through the mat of reinforced concrete. Space within the pier itself is divided off and utilized for various storage purposes. The machinery required for the operation of the station is placed on the first floor which is depressed below the level of the pier proper although lighted by windows in the superstructure. The main structure is 32 feet square and over the machinery room living quarters for the keepers are provided. From this structure there rises the square steel tower supporting a fourth-order lens at a height of $82\frac{1}{2}$ feet above water to the focal plane. The machinery room, the living quarters, and the fog signal room on the first floor of the tower are lined against the steel structure with hollow-tile masonry. The exterior walls and the roof are insulated. The living quarters and machinery space are heated by an oil heater and the building is provided with modern plumbing and lighting facilities.

The illuminating apparatus consists of a flashing fourth-order lens showing a white flash of 20,000 candlepower, 4 seconds duration every 6 seconds. The illuminant is electrically generated at the station; the lens is revolved electrically.

The fog signal is a type F diaphone with its horn projecting from the first story of the tower proper and supplied with compressed air from a Diesel-engine-driven compressing plant in the engine room. The fog signal is synchronized with the radiobeacon at the station for distance finding.

The radiobeacon is of low power adequate to the locality and is supplied with current from the generators and batteries at the station. The compressors and generators at the station are Diesel-engine driven and the entire installation of signaling equipment and machinery is in duplicate. Air hoists are provided, together with two cranes on diagonally opposite corners of the pier for hoisting boats and other material to the deck.

The pier is protected by heavy riprap and the total cost of the station complete was \$170,600.30.

Green Bay Harbor entrance, Wis.—This station is located in about 24 feet depth to mark the west side of the entrance to the newly dredged channel leading into Green Bay City, Wis.

The pier is circular, 50 feet in diameter, consisting of a 3-foot reinforced-concrete steel-protected wall surrounding a heavy timber crib and supported on timber grillage which rests on site prepared by dredging off the soft material; the interior is filled with stone to 1 foot below water level. The timber crib, together with the form for the circular concrete wall, was constructed in sheltered waters and towed to position and sunk. A grillage of 12 by 12 timbers, 24 inches deep and octagonal in form, was built on shore and launched. On top of this, steel forms for the 3-foot concrete wall were assembled to a height of 10 feet and the timber crib constructed, this being followed by two additional lifts of 10 feet each so that the steel plating forming the outer-wall form extended well up above the water line to serve as ice protection for the concrete pier when sunk in position.

After the pier was towed to position, the crib pockets were filled with stone, settling the pier firmly to position when the outer-wall pockets were unwatered and filled with concrete placed in the dry. Over the entire pier area at the water line a 2-foot 6-inch slab of reinforced concrete was placed and above this the pier superstructure completed, rising to a height of 18 feet and providing within its enclosure machinery space and various storage spaces. From the top of the reinforced-concrete mat to the basement floor, gravel fill was added for ballast.

The superstructure of the lighthouse is circular, consisting of a low concrete base within which port lights are placed for lighting the basement story within the pier. Above this concrete base a one-story steel structure is erected, from which rises a conical-shaped steel tower supporting a special lantern with focal plane at a height of 72 feet, on top of which is erected a slender radio mast for attaching the radiobeacon antenna. The first story of the steel structure is lined with masonry and both walls and ceiling are insulated.

The light is fixed red of 6,000 candlepower, shown from a fourth-order lens. The illuminant is electricity.

The fog signal at the station is of the diaphragm compressed-air type of large size, the resonator being mounted within the conical portion of the pier tower and supplied with compressed air from oil-engine-driven compressors in the machinery room.

Electricity for operating the station is provided by Diesel-engine-driven generators coupled to a bank of storage batteries, this power plant furnishing current for the radiobeacon and for lighting the station proper, as well as for the main light. A crane operated by compressed air is provided for handling the station boat and other materials. Because of the severe ice action experienced in this locality, the station was protected by heavy riprap stone. Total cost of this station was \$108,447.

Five Finger Light Station, Alaska.—A new reinforced-concrete light station housing all equipment and furnishing quarters for three men was constructed at this station to replace an old frame structure destroyed by fire in December 1933.

The building consists of a reinforced-concrete structure one story high with a three-quarter basement; a 13-foot square tower extends up from the center of the building and supports a fourth-order lantern with focal plane at a height of 81 feet. The building is 40 feet square. The basement includes space for engine generators, storage battery, motor compressors, air receivers, coal room, boiler room, and a storage room. The basement doors open out onto a new concrete wharf which is so constructed that the walls form a 7,600-gallon circulating-water cistern, a 5,200-gallon Diesel oil-tank cistern, and three other tank cisterns for lubricating and fuel oils, totaling 5,200 gallons. The main floor of the building contains three large bedrooms with roomy closets for three keepers, and one spare bedroom, radio room, combination living room and kitchen, and storage closets. The main floor opens out onto a porch which is level with the upper side of the island. The air from the receivers in the basement is piped to the fourth-floor landing of the tower where the diaphones and timing mechanism are installed. The signaling equipment at the station consists of a compressed-air diaphone fog signal, a radiobeacon, and an electric light. The light is of 7,100 candlepower, group flashing white every 10 seconds, shown from a fourth-order lens. The sound fog signal and radiobeacon are synchronized for distance-finding purposes. The station was completed and placed in commission in December 1935. The total cost of the completed project was \$92,966.66.



COAST AND GEODETIC SURVEY

REVIEW OF THE YEAR

The Coast and Geodetic Survey was considerably handicapped during the fiscal year 1936 by lack of funds required to enable it to meet all needs for the services it renders. The annual appropriations to the Survey during recent years have been materially reduced while at the same time there has been a continual and substantial increase in the demands of governmental agencies and the public for all products and related data which are derived from the various branches of the Bureau's operations.

This situation may be illustrated by comparing present conditions with those existing in 1932, the last year of normal operation prior to the depression. At that time the Bureau's annual appropriation was \$3,075,933, an amount fixed after careful study as the minimum sum required for the satisfactory accomplishment of the essential projects which should be carried on at an approximately uniform yearly rate. The appropriation for 1936 was \$2,360,900, a reduction of 23 percent. This amount, however, was augmented by certain allotments described in a subsequent section of this report.

On the other hand, although the publication of new charts has been confined to those most urgently needed, the number of different nautical charts now published is 775, as compared with 738 in 1932. The average issue of all nautical charts for 1935 and 1936 was 292,783 as compared with 276,994 in 1932. Individual surveys, received annually for compilation and revision of charts, increased from 2,329 to 3,049. Hand corrections required to correct charts between dates of printing and issue increased from about 1½ millions to 2 millions per year. The Bureau's Chart Division now has about 4 months' work laid out ahead, as compared with 1.3 months' work in 1932. Special requests for geodetic data for purposes other than mapping have more than doubled, and requests which cannot be supplied at present have now accumulated to a total of about 3,000 cases.

For several years prior to 1936 the operations of the United States Coast and Geodetic Survey were expanded considerably through allotments of emergency funds, granted primarily for the relief of unemployment. Until these funds became exhausted, early in 1936, it was possible to utilize them where necessary to supplement the regular appropriations, so that the present deficiency in the latter was not felt until 1936. An increase in the annual appropriations for the Bureau's operations during 1937 has been granted by the Congress and will provide a partial remedy for the situation existing during 1936. It is hoped, as conditions improve, that it will be pos-

sible to restore fully the Bureau's activities to a normal basis in the near future.

Another matter, mentioned in last year's report, continues to cause concern—the lack of funds with which to complete the office processing of data from field operations, carried on during the fiscal years 1933, 1934, and 1935 with emergency funds. Approximately 40 per cent of this office work remains to be done. Without this essential final step, required to make the results of field surveys available for use, a corresponding part of the expenditures for these surveys will have been wasted. Efforts to secure funds for this purpose during the past year were unsuccessful.

To the extent permitted by the funds at its disposal, however, the Coast and Geodetic Survey made good progress during 1936 in all branches of its work.

Improved methods of hydrographic surveying, notably echo sounding and radioacoustic position finding, continued as extremely important factors in increasing the efficiency and reducing the costs of this class of work. More detailed surveys of several submarine valleys, previously inadequately charted, and the discovery of new features of this nature provided the mariner with additional opportunities to ascertain his position and course by means of soundings. Of special interest are the encouraging results which have attended the efforts of the Bureau to develop an automatic buoy to replace the much more expensive station ships now used for radioacoustic position finding. Wire-drag surveys on the Pacific coast further safeguarded shipping by the discovery of a number of rocks dangerous to navigation.

The appropriation for geodetic surveys permitted the accomplishment of only a very small amount of this work but the Bureau was able to render considerable assistance in this class of operations by executing several special surveys required by other governmental agencies which supplied the funds required.

Special tide and current surveys, providing essential navigational information, were completed on the coast of the State of Washington and in Los Angeles Harbor and San Pedro Channel, Calif.

The Bureau's program of earthquake investigation continued to supply data of great value for governmental and private building operations. The work of measuring strong earth motions resulting from severe earthquakes, heretofore carried on chiefly in California, was extended to Montana following the destructive earthquakes which occurred at Helena on October 18 and 31, 1935.

Emergency funds continued to be available for aeronautical charting and excellent progress was made in this class of work. These and other operations of the Bureau are discussed more fully in subsequent sections of this report.

IMPROVEMENTS IN METHODS AND EQUIPMENT

A considerable amount of development work was accomplished in the Instrument Division during the year. As a result of studies and experiments with various color filters for level and theodolite telescopes, a number of instruments were equipped with improved filters, which increase definition and reduce the "boiling" effect of heated air over roadways.

Gravity pendulums were redesigned to accommodate a new style of agate knife-edge bearing, free from strain.

An entirely new form of recording element for strong-motion seismometers was designed and several units were built. Trial of these new recorders, which may be used anywhere where photographic recording is desired, whether seismographic or not, demonstrates the uniformity of the records obtained, "chatter" of the record sheet having been entirely eliminated. The setting and adjustment has been decidedly simplified over that of previous recorders.

An instrument was designed to facilitate the delicate operation of mounting fine cross wires in telescopes. These fibers are usually of spider-web or spun-glass and are from one to three ten-thousandths of an inch in diameter. The instrument rigidly controls all movements and measures any desired spacing of the wires. Uniform tension is applied to the material while mounting, practically all hand work being eliminated.

Compass declinometers were improved by the addition of a new type of telescope which materially increases the closeness with which the instrument may be pointed and permits sighting at high angles. In addition, a variety of improvements and economies were made, including the construction of a special high-speed tide gage for the study of peculiar local tidal phenomena in Los Angeles Harbor; the construction of a special plate rack; a new sounding engraving machine; a new chronograph for the gravity apparatus; and other elements of lesser importance.

The Division of Hydrography and Topography developed a new gasoline-driven sounding machine for use in verifying echo soundings and obtaining bottom samples in deep water. Several new hydrographic launches of improved efficiency were designed, secured under contract, and placed in operation.

An electrical laboratory maintained by the Division continued its work of maintaining and improving the Bureau's echo-sounding and radioacoustic equipment. An outstanding accomplishment of this laboratory was the development of a "sono-radio" buoy, an entirely new and completely automatic item of radioacoustic equipment designed to receive underwater sound and thereupon to transmit an instantaneous radio signal. Several of these buoys were constructed and placed in operation for surveys on the Atlantic and Gulf coasts. While still in the experimental stage, the results achieved to date warrant the belief that they can be used, at least to a considerable extent, to replace the station ships now used in radioacoustic position finding and thus further increase the economy of this type of surveying.

Improvements in reproduction methods employed by the Chart Division have reduced the amount of labor involved in the Division's activities. Without such economies in time and cost, the Bureau would have been unable to handle the increased volume of work while preserving the requirements of accuracy.

The copper engraver is now furnished with intaglio etchings on zinc in order that he may secure sharper outline and fuller body in the impressions of his transfer of chart compilations to the copper.

The use of type on copper-engraved charts has entirely replaced hand engraving, after a thorough test proved that the high Bureau standards were maintained by the new method.

A method was found to bleach to a paper whiteness the aluminum plates used in the reproduction of charts which required extensive changes in lettering. The method permits superseded lettering to be painted out, new type stuck up on the bleached plates, and duplicates of the former negatives plus the changes required in lettering to be obtained, all of which results in a minimum amount of engraving on the glass negatives.

Standardized symbols for aids to navigation, such as lights, beacons, and buoys, are now provided on gummed paper for use on both copper and lithographic engraved charts.

COOPERATION WITH OTHER AGENCIES

Cooperation in carrying out various projects was extended to practically every bureau in this Department and with many other governmental and private agencies.

The Bureau cooperated with the Lighthouse Service in preparing the Weekly Notice to Mariners and made numerous specialized charts and graphs for the Bureau of Air Commerce, the Lighthouse Service, and the Bureau of Foreign and Domestic Commerce of this Department and for various other agencies, including the Command and General Staff School, Fort Leavenworth, Kans.; United States Engineers; Navy Department; United States Marine Corps; United States Weather Bureau; United States Biological Survey; Bureau of Agricultural Economics; National Archives; National Capital Park and Planning Commission; Division of Airways and Airports of the Works Progress Administration; Social Security Board; and others. This special work often required that hydrographic surveys and air-photo compilations be verified and reviewed ahead of schedule in order to furnish advance prints to interested Federal agencies.

A cooperative arrangement with the Lighthouse Service which promises valuable results was inaugurated during the year. This consists of an exchange of officers between the two bureaus, in order that each may become more familiar with the closely related work of the other service. An officer of the Survey also was assigned to the headquarters of the Charleston, S. C., lighthouse district, where, by maintaining close contact with the superintendent of the district and the United States Engineers, the Bureau obtained much valuable chart information at a nominal cost. It is believed that this plan will further tend toward standard practices in matters of mutual benefit.

A representative of this Bureau also continued on intermittent duty with the Post Office Department as a member of a board conducting speed trials of vessels holding ocean-mail contracts.

Of popular interest was the detail of two officers, who were successful in helping to find, by the use of the Bureau's wire-drag equipment, an airplane and crew lost in Great Salt Lake, Utah.

The following geodetic projects were handled on a cooperative basis for the organizations named:

District of Columbia-Virginia Boundary Commission: Arc of second-order triangulation along a portion of the Potomac River.

Senate Oil Investigation Committee of California: Lines of levels and traverse along the coast in the vicinity of Huntington Beach, Calif., to determine the position of the high-water line.

Soil Conservation Service: Second-order triangulation in the Papago, Hualapai, and Mescalero Indian Reservations, for use in controlled mosaics from air photos. Similar work was begun near the close of the year in reservations in South Dakota, Utah, Washington, and Wyoming.

Internal Improvement Board of Florida: Establishment of 20 gravity stations.

Tennessee Valley Authority: Strengthening of level lines and connections with local leveling.

Galveston District Engineer, Corps of Engineers, United States Army: Some 250 miles of leveling in the vicinity of Galveston Bay, including connections made with an intricate system of leveling along the Houston Canal, to establish bench marks for the use of the Corps of Engineers in its local activities.

Seismologists of the University of Montana, with funds allotted by the Public Works Administration: Rerunning of old lines of levels and new leveling extended in Helena, Mont., and vicinity.

Florida mapping project, under the auspices of the Works Progress Administration and the United States Engineers at Jacksonville: Extension of triangulation from Orlando to Titusville and from Orlando to Lake Okeechobee.

Works Progress Administration project of King County, Wash.: Detail of an officer to assist in air-photo mapping and extending necessary triangulation.

The Bureau continued serving in an advisory capacity with 14 States in carrying on horizontal and vertical control surveys, as part of the Works Progress Administration program on surveys continued as projects initiated by this Bureau in November 1933 under the Civil Works Administration.

There was assigned to each of the computing offices of the State geodetic survey projects in Arkansas, Connecticut, and Oklahoma, an officer to organize and instruct the personnel, paid by the Works Progress Administration, in geodetic computations. Computing machines and logarithm tables were loaned and computing forms supplied.

The activities of the Division of Tides and Currents included the establishment of tide stations for the United States Engineers, in order to supply important data for use in connection with the Passamaquoddy tidal power project; a study of the tides in Barnegat Bay, to determine with precision the relations between local datum planes in that body of water, for the New Jersey Board of Commerce and Navigation; and a tide and current survey, including a special study of seiche and surge, of Los Angeles Harbor, for the harbor department of Los Angeles.

Cooperation with the Carnegie Institution of Washington, which carries on several activities closely related to those of the Bureau, has been noteworthy. In terrestrial magnetism there has been joint effort in development and test of instruments, maintenance of magnetic standards, and interloan of instruments, which have all been of mutual benefit. The joint activity has resulted in the operation of a cosmic ray meter at Cheltenham and of atmospheric electric and earth current instruments at Tucson, the last with the added

cooperation of the Mountain States Telephone & Telegraph Co. At the request of the committee on seismology of the Carnegie Institution of Washington, additional level lines were run in California and there was cooperation with the seismological research laboratory at Pasadena, which is operated jointly by that institution and the California Institute of Technology.

In seismological work there is so much cooperation that only a few examples can be mentioned. The Weather Bureau and University of California aid especially in the collection of earthquake information. Organized groups of engineers and architects in California and State educational institutions, especially the California Institute of Technology and Stanford University, have taken an active part in strong-motion work and related activities and in utilization of results. In immediate location of earthquake epicenters there is close cooperation with Science Service and the Jesuit Seismological Association.

The inability of the Bureau to find much time for interpretation of its results is partly compensated for by studies in radio based on its records by the National Bureau of Standards, Naval Research Laboratory, National Broadcasting Co., and others, and in basic research in magnetism by the Carnegie Institution of Washington.

MISCELLANEOUS

There were but 1,335 employees on duty in the Bureau on June 30, 1936, shown in the table following, as compared with 2,024 and 3,582, respectively, on the last day of the fiscal years 1934 and 1935.

Staffs	Com-mis-sioned	Civilian				Staff totals		Total
		Clas-sified	Unclassified			Wash-ington	Field	
			La-borers	Seamen	Hands			
Regular appropriations:								
Washington office.....	14	266	5			275		275
Field service.....	163	73		1 503	1 287		1, 026	1, 026
Total.....	177	329	5	503	287	275	1, 026	1, 301
Public Works funds:								
Washington office.....		12				12		12
Field service.....		1			21		22	22
Total.....		13			21	12	22	34
Grand total.....	177	342	5	503	308	287	1, 048	1, 335

¹ Includes 51 civilian employees on duty at the Manila field station and 50 members of the crew of the ship *Futcher*, paid by the Philippine insular government but under the jurisdiction of this Bureau.

The library and archives acquired during the year 231 hydrographic and 324 topographic sheets, representing new Bureau surveys. Other additions were 939 blueprints (mostly surveys by Army engineers); 2,588 maps; 3,319 charts; 14,960 field, office, and observatory records; 276 negatives; 378 prints; 231 lantern slides; 673 books; and 3,940 periodicals.

As heretofore stated, the regular appropriations for the year totaled \$2,360,900. These were supplemented by allotments of \$37,450 from Air Navigation Facilities, 1936; \$360,300 from National Industrial Recovery, 1933-37; \$28,000 from Public Works Administration (allotment to Commerce), 1935-37; \$5,000 from Texas Centennial Exposition; \$1,000 from trust fund, topographic survey of United States, contributions; \$25,000 from Public Works Administration (allotment to Interior and transferred to Commerce, Soil Erosion Prevention), 1935-37; and \$22,300 from Salaries and Expenses, Soil Conservation Service (transfer to Commerce), 1936. In addition to these sums, there were available small unexpended balances on account of appropriations and allotments for the fiscal year 1935.

Collections on account of the sale of nautical charts and other publications and miscellaneous Government property, deposited in the Treasury Department to the account of miscellaneous receipts, totaled \$95,589.74, as compared with \$75,575.14 during the preceding year, an increase of approximately 25 percent.

Disbursements during the year ended June 30, 1936, totaled \$3,625,895.61, distributed among the various appropriations as follows:

Pay and allowances, commissioned officers, 1935.....	\$61,089.31
Party expenses, 1935.....	123,377.59
Repairs of vessels, 1935.....	7,188.30
General expenses, 1935.....	7,468.43
Pay, etc., officers and men, vessels, 1935.....	101,530.40
Air navigation facilities, 1935.....	343.85
Pay and allowances, commissioned officers, 1936.....	698,031.22
Salaries, 1936.....	544,038.59
Party expenses, 1936.....	362,567.56
Repairs of vessels, 1936.....	51,707.85
General expenses, 1936.....	29,914.07
Pay, etc., officers and men, vessels, 1936.....	388,259.67
Air navigation facilities, 1936.....	34,499.66
National Industrial Recovery, 1933-37.....	1,100,743.94
Public Works Administration, allotment to Commerce, Bureau of Air Commerce, 1935-37.....	102,873.08
Chicago World's Fair centennial celebration.....	39.22
California Pacific International Exposition.....	63.24
Texas Centennial Exposition.....	1,971.93
Trust fund, topographic survey of United States, contributions.....	999.75
Salaries and expenses, Soil Conservation Service (transfer to Commerce, C. and G. Survey, act of Apr. 27, 1935), 1936.....	192.95
Total.....	3,625,895.61

CHARTS

As alterations and natural changes are constantly occurring, many nautical charts become obsolete within a few months after their publication. Constant revision of existing charts therefore is essential to the safety of navigation, and during the past year new editions for 130 charts were printed for this purpose.

Extension of detailed field surveys made possible the construction of 17 new charts, as listed below, showing the latest marine improve-

ments on scales larger than those which had been previously printed of the same localities.

MASSACHUSETTS: Wellfleet Harbor and approaches from Cape Cod Bay.

MARYLAND: Herring Bay to Magothy River, Chesapeake Bay.

NORTH CAROLINA:

New River Inlet to Southport.¹

Westward from Southport.²

SOUTH CAROLINA: Wadmalaw River to Port Royal Sound.¹

FLORIDA:

Miami Harbor and entrance channel.

Mosquito River to Eau Gallie.¹

Eau Gallie to Walton.¹

Walton to Delray.²

LOUISIANA:

Calcasieu Lake and Pass from the Gulf.

Calcasieu River and Canal, Lake Charles to Sabine River.

CALIFORNIA:

Santa Catalina Island and adjacent waters.

San Nicolas Island and adjacent waters.

Sacramento River, from Sacramento to Andrus Island.

ALASKA:

Portland Canal, north of Hattie Island.

Coast, from Coronation Island to Lisianski Strait.

Kodiak Island, Cliniak Bay to Dangerous Cape.

¹ Intracoastal Waterway charts.

In the above list there are included six of the proposed series of charts covering the new Intracoastal Waterway from Norfolk, Va., to Miami, Fla., published on a scale showing clearly all the essential information and depths required for convenient use of the waterways, with sufficient land area adjacent to them to identify the general locality and nature of the country traversed. This series will meet a popular demand not only for pleasure boats cruising the entire waterway but by barge tows engaged in local freighting between various communities on inland waters along the South Atlantic coast.

Distribution of nautical and aeronautical charts and related publications during the year is shown by the following table:

Item	1936	1935	1934	1933
Nautical charts ¹	275, 800	309, 765	293, 889	241, 804
Aeronautical charts ¹	178, 973	61, 268	38, 313	17, 839
Strip maps.....	12, 186	9, 210	11, 804	20, 919
Computation sheets.....	4, 236	2, 907	558	.....
Miscellaneous maps.....	2, 857	2, 192	1, 339	2, 992
United States coast pilots.....	6, 117	6, 077	7, 646	4, 116
Intracoastal waterway pilots.....	1, 022	943	1, 027	1, 399
Distances between United States ports.....	429	588	1, 435	330
Tide tables.....	24, 184	21, 084	24, 851	24, 879
Current tables.....	9, 002	7, 588	7, 652	6, 730
Tidal current charts.....	1, 607	1, 705	701	958
Practical air navigation.....	8, 167	.....	.....	.....
Total.....	521, 630	424, 227	388, 115	322, 106

¹ Annual reports prior to 1936 did not include charts withdrawn from sale because of the issue of revised editions.

The year 1936 saw the greatest increase in the compilation, reproduction, and issue of aeronautical charts of any year since this Bureau began their compiling and printing. More copies were issued in 1936 than in the 5 preceding years, and as many new sectional charts were completed in 1936 as in the 4 preceding years. Nearly three times as many copies were issued in 1936 as in 1935.

This increase was occasioned by three main factors: Many new charts were completed and made available; the Air Corps of the military services discarded the use of the old strip maps and made greater use of the new sectional charts; and these charts are now better known and of more value to the public than when the adjoining sections were not available.

Forty-one new aeronautical charts were printed, including two regional charts of the proposed new series covering a much larger area on a smaller scale than that of the series of sectional charts. In addition to the production of these new charts, 66 new editions of existing charts were printed. The safety of the air navigator requires accurate data of conditions existing at the time of his flight. This service is perhaps the most essential feature of chart production to the aviator and confronts the Bureau with the never-ending task of collecting and revising information. It is therefore necessary to declare obsolete older editions when the accumulation of extensive changes in topographic and aeronautical information make the use of them unsafe.

HYDROGRAPHY AND TOPOGRAPHY

Hydrographic and topographic survey work which had been accelerated for the preceding 2 years by emergency funds was reduced during the period of this report to the output obtainable under regular appropriations. Early in the fiscal year 14 shore parties operating on the Atlantic, Gulf, and Pacific coasts were disbanded when emergency funds were exhausted. While, unfortunately, not all of these projects were brought to a state of completion, a large amount of work was done which helped fill a serious need for new and adequate inland waterways charts. Although a great amount of similar work yet needs to be done in other areas, the surveys have been made to cover most of the important regions and bring up to date many charts which for years were based on very old surveys, inadequate for present-day use.

On the Atlantic coast the two large vessels, *Oceanographer* and *Lydonia*, and the tenders *Gilbert* and *Welker*, continued surveys of the continental shelf, together with inshore hydrographic work and necessary control surveys on the Virginia coast, for revising the inshore and offshore charts of this region. In May 1936 these ships took up the work of modernizing the charts of the approaches to New York Harbor, where the outer submerged valley of the Hudson River was surveyed accurately for the first time by the use of echo sounding and radioacoustic ranging.

Such submarine valleys are of great navigational importance to merchant vessels equipped with echo-sounding apparatus, especially when they lie along main shipping routes. In addition to the value to navigation, the discovery of those valleys undoubtedly will be of wide influence in the science of geology and may change the fundamental concepts of the geology of our Atlantic coast. Much interest has been shown by geologists in all of these new offshore surveys, including those of 1933-35 which disclosed numerous other valleys in the coastal shelf off Delaware and Chesapeake Bays. These modern detailed surveys, made possible by methods developed in this Bureau, furnish a wealth of detail heretofore unavailable.

In the Gulf of Mexico the ship *Hydrographer*, with the tenders *Paris* and *Pratt*, continued surveys between the shore and the approximate 100-fathom curve west of the Mississippi Delta. This party also found a submerged valley, assumed to be the ancient course of the Mississippi River, lying about 100 miles west of the present mouth of the river.

Coastal triangulation data (Atlantic and Gulf coasts), accumulated from the work of the expanded units during the past 2 years, including descriptions and positions together with index sketches, were assembled and lithographed in temporary form to satisfy requests for these data from Bureau parties and other engineers. A compilation of datum differences between the 1927 North American datum and the old North American datum was also made and published in lithographic form to aid hydrographic and topographic surveys using this control.

In the Pacific, offshore areas were surveyed on the California and Oregon coasts by the ships *Guide* and *Pioneer*. Wire-drag surveys of many important areas along the coastwise traffic lanes again demonstrated the efficiency of this method of finding dangers which in certain areas remain undisclosed by the usual hydrographic surveys. A particular instance was at Chetco Cove, Oreg., where an extensive lumbering project is being carried on. Owing to a vessel touching on an uncharted pinnacle rock in this cove, other shipmasters refused to go into the loading berth, anchoring some distance offshore without shelter from prevailing northwesterly winds and thereby slowing up loading and increasing the cost of operation. A party detailed from the *Guide* swept the area with a wire drag and found four other rocks with less than 30 feet of water over them in addition to the rock on which the vessel struck. A safe passage for approaching the cove was found and an unobstructed area in sheltered waters charted for a loading berth. The manager of the timber company, in expressing his appreciation for this valuable work, stated that by virtue of this survey a whole community, dependent on these loading operations, had been maintained in a self-supporting status during the summer.

The *Explorer* spent the year on coastal triangulation and surveys for chart revision in Puget Sound.

In Alaska, the *Surveyor* and *Discoverer*, with tenders *Westdahl*, *Wildcat*, and *Helianthus*, continued surveys in the Aleutian Islands westward from Unimak Pass, as part of the program of charting the entire Aleutian chain to enable ships sailing between Puget Sound and the Orient to use the great-circle route through Unimak Pass and the Bering Sea. This route is not used because more than 800 nautical miles of uncharted water lie between Unimak Pass and Cape Wrangel in the Bering Sea. Bogoslof Island, an active volcanic island in the Bering Sea lying near this proposed route, was surveyed accurately for the first time and the surrounding region charted. In the spring of 1936 the *Westdahl* took up surveys in the vicinity of Juneau, and also triangulation up the Chilkat and the Skagway Rivers in cooperation with the International Boundary Commission.

In the Philippine Islands the *Pathfinder* remained in a decommissioned status and the *Fathomer*, working under Philippine Civil Government funds, continued surveys in the vicinity of Balabac Island and Eastern Luzon.

The 13 United States Coast Pilot volumes published by the Bureau contain a wide variety of important information supplemental to that shown on the chart, such as a description of the coast and information concerning waterways as well as maritime data for all the ports of the United States and possessions. It is essential that these pilots be kept up to date, and this is done by annual supplements and revisions based on field examinations. During the year nine supplements were published and three new editions were written. One of these new editions, United States Coast Pilot, Gulf Coast, Key West to the Rio Grande, contains the former Inside Route Pilot, Key West to the Rio Grande.

Two field examinations were made, one of the section of the Atlantic coast from Sandy Hook to Cape Henry, including Chesapeake and Delaware Bays, and the other of the New Jersey Inland Waterway.

The base topographic maps compiled from aerial photographs of coastal areas have found wide popularity among many engineering and private surveying organizations. This most economical method of surveying inaccessible regions has made accurate surveys on a large scale available for many important sections.

Hydrography, topography, and coastal triangulation

Locality	Hydrography			Topography		Coastal triangulation		
	Sound- ing lines	Area	Sound- ings	Shore line	Area	Length of scheme	Area	Geo- graphic posi- tions
Buzzards Bay to New Haven, Mass- achusetts, Rhode Island, and Con- necticut.....	Miles 438	Square miles 7	Number 15, 193	Miles 144	Square miles 84	Miles 25	Square miles 230	Number 101
Approaches to New York Harbor, New York and New Jersey coasts... Vicinity of New York City and New Jersey coast.....	5, 855	4, 274	48, 616	942	189			
Metedeconk Neck to Cape May, N. J.....	878	8	37, 711	422	160	34	151	55
Delaware River, New Jersey and Pennsylvania.....				24	187	6	6	40
Chesapeake Bay, Md.....				218	123	4	13	7
Approaches to Chesapeake Bay, Va... Norfolk to North Landing River, Va... Alligator River to Neuse River, N. C.....	6, 783	3, 134	79, 531	164	85			
St. Johns River, Fla.....	2, 690	113	93, 542	685	542	68	54	80
Fort Lauderdale to Key West, Fla.....	482	23	34, 343	369	48	35	100	34
Apalachee Bay, Fla.....	1, 388	243	47, 723	200	132			1
Louisiana coast, offshore.....	354	23	13, 114	26		3	25	6
Louisiana coast, Morgan City, La.....	9, 471	5, 276	93, 807					
Coast of southern California.....	926	118	22, 103	41	10			1
Coast of northern California.....	7, 410	11, 181	43, 894	11	5	2	6	2
Columbia River, Oregon and Wash- ington.....	3, 056	936	47, 692	52	24			10
Puget Sound, Wash.....	643	30	23, 869	91	2	30	84	35
Aleutian Islands, Alaska.....	2, 485	115	71, 660	270	61	86	93	223
Southeastern Alaska.....	11, 221	17, 710	109, 481	270	423	172	1, 472	154
Philippine Islands.....	136	4	7, 049	17	2	24	137	18
	1, 987	217	50, 580	134	255	33	72	33
Total.....	56, 203	43, 418	839, 908	4, 079	2, 332	524	2, 443	800

GEODESY

Geodetic operations, consisting principally of triangulation and leveling, furnishing the fundamental control for all maps and charts, were largely curtailed shortly after the beginning of the fiscal year, with the exhaustion of emergency funds. On account of lack of funds for office processing, much needed data that could be derived from field work already done cannot be made available for other Government bureaus and private engineers. These data are essential prerequisites in any national mapping plan adopted by the Government, as the bases for topographic mapping and for the extension of additional arcs of triangulation and lines of levels. Until the office computing has been completed the mapping cannot go forward nor can other triangulation and leveling be extended since all depend upon geographic positions and elevations to be fixed by the preceding work.

During the year, 2,720 miles of first- and second-order triangulation and 6,924 miles of first- and second-order leveling were completed. All of this work was directed toward the plan to provide a triangulation station and a bench mark within 10 to 15 miles of every point in the United States.

Two astronomic parties and a base-line party conducted field operations for the establishment of Laplace stations and base lines to control the directions and lengths in the arcs of triangulation.

A gravity party was in operation during most of the fiscal year establishing stations in Connecticut, Florida, Massachusetts, New York, Pennsylvania, and Rhode Island. Two new sets of the Brown gravity apparatus and a new gravity chronograph have been completed in the Instrument Division of the Bureau.

In August 1935 a gravity apparatus of the Holweck-Lejay type was purchased from the inventor and manufacturer, whose headquarters are in Paris, France. This apparatus has not been placed in field use due to necessary adjustments and replacements of some parts. It is very rapid in operation and will probably give more than double the number of stations obtainable with the Brown apparatus. The latter, however, is capable of greater accuracy and it is expected that the fundamental stations will continue to be established by it.

The variation of latitude stations at Ukiah, Calif., and Gaithersburg, Md., were in continuous operation. These are two of a group of five stations established around the world on the parallel of latitude $39^{\circ}08'$ north, operated with a view to keeping a record of the changes of latitude, which are due mainly to the change of the instantaneous pole of rotation in the body of the earth. The results are essential to practically all astronomical observatories where work is done in the astronomy of position and are also of importance in various geophysical investigations.

Geodetic triangulations, base lines, reconnaissance, and leveling, and astronomical and gravity observations

Locality	Length of scheme	Area	Locality	Length of scheme	Area
TRIANGULATION, FIRST ORDER			RECONNAISSANCE, FIRST ORDER TRIANGULATION—continued		
Watertown, S. Dak., to Cedar Lake, Minn.	Miles 155	Square miles 1,550	Gunnison, Colo., to Walcott, Wyo.	Miles 240	Square miles 3,360
Lancaster, Pa., to Elkton, Md.	45	720	Longmont to Youchal, Colo.	185	2,275
Zion City, Ill., to Sinsinawa, Wis.	130	1,300	Elkhart to Alexandria, Ind.	105	945
Guttenberg to Waverly, Iowa.	65	656	Muncie to Holton, Ind.	80	720
Rothsay to Frazee, Minn.	35	420	Tuscarora, Nev., to King Hill, Idaho.	110	1,100
Delfast to Hornell, N. Y.	30	300	Norheim to Columbus, Mont.	205	3,075
Harrisburg to Boalsburg, Pa.	70	700	Tigerville to Douglass, S. C.	70	840
Watertown to Gettysburg, S. Dak.	145	1,450	Spokane to Seattle, Wash.	230	3,220
Buena Vista to Antonito, Colo.	110	1,400	Durkee, Oreg., to Cloverland, Wash.	140	1,680
Parks, Nebr., to Longmont, Colo.	160	2,400	Bloomington to Michigan City, Ind.	170	1,700
Hackettstown, N. J., to Staten Island, N. Y.	95	900	Fulaski to North Manchester, Ind.	45	450
Featherville to King Hill, Idaho.	20	300	Stitesville to Rushville, Ind.	60	480
Missoula to Charlo, Mont.; Missoula, Mont., to Headquarters, Idaho; Grave Peak to Lookout Mountain, Idaho.	175	3,500	Grand Rapids to Basswood Lake, Minn., and Colton to Pelican Lake, Minn.	150	2,700
Sulphur, Nev., to Andrews, Oreg.	160	1,460	Leavenworth to Liberty, Wash.	40	600
Tierraville to Douglass, S. C.	70	840	Ia Grand to Imnaha, Oreg.	60	720
Elizabeth Base Net, N. J.	5	25	Vicinity of Livinston, Mont.	200	4,200
Total	1,410	17,855	Vernal to Fruiland, Utah.	100	1,200
TRIANGULATION, SECOND ORDER			Tallassee, Ala., to Libro, Fla.	175	1,750
Jasper to Wheaton, Minn.	125	1,250	Total	3,275	40,790
Stepstone to Louisville, Ky.	105	1,050	RECONNAISSANCE, SECOND ORDER TRIANGULATION		
Vesch to Troy, Minn.	80	800	St. John to Danzig, N. Dak.	190	2,280
Sherburn to Hector, Minn.	65	650	Stepstone to Louisville, Ky.	105	1,050
Vicinity of Portland, Oreg.	70	980	Pittsburgh, Pa., to Wellsville, N. Y.	140	1,400
Potomac River (District of Columbia—Virginia boundary)	10	15	Sherburn to Hector, Minn.	65	650
Papago Indian Reservation, Ariz.	565	5,665	Potomac River (District of Columbia—Virginia boundary)	10	15
Hualapai Indian Reservation, Ariz.	115	1,725	Hamburg to Cortland, N. Y.	140	1,400
Mescalero Indian Reservation, N. Mex.	100	1,500	Encinal to Goodlett; Encinal to Indio; Menard to Abilene; and Benjamin to Goodlett, Tex.	200	2,000
Pawawtuck River, Conn. and R. I.	10	50	Cortland to Ravena, N. Y.	105	1,050
Clareona to Titusville, Fla.	35	245	Skull Springs to Lost Valley, Oreg.	170	3,000
Total	1,280	13,930	Loedell to Sumpter, Oreg.	60	700
TRAVERSE, SECOND ORDER			Marlboro, N. Y., to Nicholson, Pa.	95	950
Huntington Beach, Calif.	3.8		Venturia, N. Dak., to Reliance, S. Dak.	130	1,300
BASE LINES, FIRST ORDER			Mount Vernon to Harrisburg, Ill.	30	350
Missoula, Mont.	5.3		Clark to Mount Vernon, S. Dak.	75	750
Battle Mountain, Nev.	7.1		Fredericksburg to Danville, Va.	160	1,500
Elko, Nev.	4.3		Kurtz to Paoli, Ind.	20	360
Reed, Nev.	5.5		Contreras to Encino; and Cedarvale to Ancho, N. Mex.	120	1,440
Romeo, Colo.	6.2		Lee to York, Fla.	110	990
Elizabeth, N. J.	4.9		Shady to Lily, Fla.	120	1,080
Total	33.3		Clareona to Titusville; and Orlando to Okeechobee, Fla.	130	1,300
RECONNAISSANCE, FIRST ORDER TRIANGULATION			Carrabelle, Fla., to Colquitt, Ga.	100	1,000
Lowell, Mass., to Albany, N. Y.	135	1,350	Early, Fla., to Opelika, Ala.	190	1,900
Circleville to Fairhaven, Ohio.	95	1,350	Winslow to Winkelman, Ariz.	140	1,680
Lancaster, Pa., to Elkton, Md.	45	720	Blue Earth, Minn., to Lakota, Iowa.	15	150
Underwood to Earl, N. Dak.	130	1,560	Papago Indian Reservation, Ariz.	565	5,665
Henderson, Ky., to Matthews, Ill.	100	1,000	Hualapai Indian Reservation.	115	1,725
Missoula to Trail Creek, Mont.	130	1,820	Mescalero Indian Reservation, N. Mex.	100	1,500
Georgetown, Ohio, to Adrian, Mich.	210	2,100	Pleasant Gap to Cusseta, Ala.	105	1,050
Aznoe, Mont., to Rathdrum, Idaho.	190	2,850	Niceville, Fla., to Calhoun, Ala.	115	1,180
Laramie River Valley, Wyo.	55	825	Total	3,610	39,385

Geodetic triangulations, base lines, reconnaissance, and leveling, and astronomical and gravity observations—Continued

Locality	First order	Second order	Locality	First order	Second order
LEVELING			LEVELING—continued		
	<i>Miles</i>	<i>Miles</i>		<i>Miles</i>	<i>Miles</i>
California.....	148	697	North Carolina.....	569	231
Colorado.....	9	555	Oklahoma.....		41
Georgia.....	80	5	Oregon.....	48	180
Idaho.....	50	809	Pennsylvania.....	29	255
Kansas.....		390	Tennessee.....	238	601
Maine.....	99	824	Texas.....	227	38
Maryland.....		46	Utah.....	2	87
Minnesota.....	147	810	Vermont.....	3	85
Montana.....	147	688	Virginia.....	12	1,064
Nevada.....		308	Washington.....	59	70
New Hampshire.....	1	9	West Virginia.....	16	79
New Mexico.....	26	154			
New York.....	27	41	Total.....	1,937	8,187

Locality	Number of determinations				Locality	Number of determinations			
	Astronomical			Grav-ity		Astronomical			Grav-ity
	Lati-tude	Longi-tude	Azi-muth			Lati-tude	Longi-tude	Azi-muth	
ASTRONOMICAL AND GRAVITY DETERMINATIONS					ASTRONOMICAL AND GRAVITY DETERMINATIONS—con.				
Arizona.....	3	3	3		Montana.....	6	6	6	
Arkansas.....	1	1	1		Nebraska.....	4	5	5	
California.....	3	3	3		Nevada.....	3	3	3	
Colorado.....	2	2	2		New Mexico.....	3	4	4	
Connecticut.....				21	New York.....				6
Florida.....				20	North Dakota.....		8	8	
Georgia.....	1	1	1		Oklahoma.....	2	2	2	
Idaho.....	1	1	1		Pennsylvania.....	2	2	2	31
Illinois.....	1	1	1		Rhode Island.....				6
Iowa.....	1	1	1		South Carolina.....	1	1	2	
Kansas.....	5	5	5		South Dakota.....		3	3	
Kentucky.....	1	1	1		Texas.....	14	17	17	
Louisiana.....	1	1	1		Washington.....	3	4	3	
Massachusetts.....				6	Wyoming.....	1	1	1	
Minnesota.....		2	2		Total.....	60	80	80	90
Missouri.....	2	2	2						

Activity	Stations	Miles	Activity	Stations	Miles
SUMMARY			SUMMARY—continued		
Triangulation:			Leveling.		
First-order.....		1,440	First-order.....		1,937
Second-order.....		1,280	Second-order.....		8,187
Traverse, second-order.....		3.8	Astronomical determinations.		
Base lines, first-order.....		33.3	Latitude.....	60	
Reconnaissance:			Longitude.....	50	
First-order triangulation.....	3,275		Azimuth.....	80	
Second-order triangulation.....	3,610		Gravity determinations.....	90	
			Total.....	310	19,766.1

The office computations and adjustments of 17 arcs of first-order and 18 arcs of second-order triangulation were completed during the year, with the computations of 12 arcs of first-order and 9 arcs of second-order triangulation in progress. Office computations were also made of 12 first-order and 4 second-order bases. A field party

in New York City was engaged on triangulation, level and plane coordinate computations during the first 6 months of the year.

About 50 separate lines of levels were adjusted to the level net and lists of descriptions and elevations of bench marks for 41 lines of levels were distributed to engineers and surveyors on special mailing lists.

Personnel detailed to the Washington office by the Chief of Engineers United States Army, adjusted the triangulation along the Mississippi River from New Orleans to the Delta. The manuscript for the publication containing the results of this adjustment was also prepared.

Four geodetic manuals were received from the printer during the year, two on plane coordinates, one of special gravity tables, and one giving factors for the new international spheroid. A large publication covering triangulation in California, and a small gravity publication were also printed, while one on the triangulation of Minnesota was nearly completed.

TIDES AND CURRENTS

Besides directing the related field operations, tide and current activities include the tabulation and reduction of tide and current records, the determination of tidal datum planes, and the preparation of the annual tide and current tables, tidal current charts, tidal bench mark descriptions, and other publications.

Long series of tide observations are essential for the derivation of data for hydrographic control, for the reduction of the results of short series of observations to mean values, for the accurate determination of datum planes, and for the determination of secular changes in relation of land to sea. During the year 38 primary tide stations for such observations were in operation, of which 22 were on the Atlantic coast, 4 on the Gulf coast, 9 on the Pacific coast, 2 in Alaska, and 1 in the Hawaiian Islands. Sixteen of these stations were conducted in cooperation with other organizations: United States Engineers, six stations; Navy Department, six stations; and one station each with the Woods Hole Oceanographic Institute, the Los Angeles Harbor Department, the city of Santa Monica, and the territorial survey of Hawaii.

Data obtained at the primary stations were supplemented by observations at 546 secondary tide stations. These include stations operated on a cooperative basis with the United States Engineers; University of Washington; Biological Research Bureau, Bermuda; Washington Suburban Sanitary District, Maryland; Portland Canal Power Co., Alaska; Port of Willapa Bay, Wash.; State of Delaware; and the Port of Oakland, Calif.

Comprehensive tide surveys of coastal sections supply detailed data for the accurate determination of local datum planes and their relation to mean sea level. The constantly increasing value of water front property makes such information of prime importance in the determination of boundaries. Special current surveys of important waterways are also required for an understanding of the complex circulation of the tidal water, essential to both navigation and harbor engineering. The tide survey of the coast of Washington, started in May 1934, was completed in October 1935.

Special current observations were obtained on *Stone Horse Shoal*, *Cross Rip*, *Handkerchief*, and *Pollock Rip* Lightships. The series of current observations started last year in San Pedro Channel, Calif., through a cooperative arrangement with the Lighthouse Service, was completed October 30, 1935. Observations were taken hourly throughout the period of the survey from a relief lightship anchored for that purpose in approximately 60 fathoms of water. In addition to the current observations, wave movements, temperature, and salinity of the water and the velocity and direction of the wind were observed.

Aside from their utilization in the construction of charts, the tide and current data obtained by the Bureau are made available to the public in tide and current tables and miscellaneous publications.

The tide tables, an indispensable aid to navigation of modern deep-draft vessels, are issued annually in two volumes. The Tide Tables, Atlantic Ocean, 1937, contain daily predictions of the times and heights of the tide for 49 ports together with data for obtaining predictions at some 2,350 other places. Much new and revised data for our South Atlantic and Gulf States were incorporated from information derived from extensive hydrographic surveys made in those areas during the past several years. The Tide Tables, Pacific Ocean and Indian Ocean, 1937, contain daily predictions for 47 ports and differences and constants for obtaining predictions at about 1,800 other places. New and revised data for the State of Washington were incorporated in the tables from information derived from the recent tide survey of that State.

Two current tables are also issued annually, that the mariner may have advance information relative to the velocity and direction of the current likely to be encountered at any time in our coastal waters. The Current Tables, Atlantic Coast, 1937, contain daily predictions of the times of slack water and the times and velocities of strength of flood and ebb for 18 reference stations, together with data for obtaining predictions for about 900 other places. All data for Nantucket and Vineyard Sounds were revised in accordance with the results from a recent current survey. The usefulness of these tables was further extended by the inclusion of daily predictions for Mobile Bay entrance, Alabama, and Galveston Bay entrance, Texas, together with data for a number of places in the Gulf of Mexico and in Puerto Rico. The Current Tables, Pacific Coast, 1937, contain daily predictions for 11 reference stations with differences for obtaining predictions for some 500 other places.

Tidal bench mark publications for the use of engineers were issued for the States of California, Rhode Island, and Massachusetts, and those for South Carolina, Georgia, New York, and Florida are in progress.

A manual of tide observations was published for the purpose of giving the general requirements of the Bureau in carrying on its tidal work and to serve as a guide for those engaged in taking tide observations.

The manuscript of a special publication giving in detail the results of current surveys in Narragansett and Buzzards Bays, and Nantucket and Vineyard Sounds was completed.

The basic data compiled in the preparation of the publications have been utilized to supply information to the public for various other purposes. Tide and current data have been furnished to private corporations, universities, municipal governments, and Federal departments for use in diverse engineering and scientific activities. Considerable data were also prepared and certified for use in admiralty cases and special tide predictions supplied to newspapers and almanacs throughout the country. An increasing demand has been noted for tide and current forecasts for use in sports.

TERRESTRIAL MAGNETISM

Most of the Bureau's work in terrestrial magnetism is for the purpose of determining the changes in magnetism with time, so that the values of the magnetic declination at about 6,000 stations can be kept up to date. This is accomplished by means of field surveys and the operation of five magnetic observatories.

Principal uses of the information obtained are made by the navigator and aviator, the geological prospector using magnetic methods, and the investigator of radiotransmission problems and difficulties.

The field survey consists principally of observations at repeat stations at 5-year intervals. Observations at other places are generally confined to magnetic declination and include observations at airports to provide data for testing magnetic airplane compasses; outlining of areas of local magnetic disturbance; and more detailed values at various places along the coast, especially near channels where vessels correct their compasses.

The field work during the year was sufficient to make it possible to prepare the manuscript for the usual five-yearly publications (Declination in the United States) and the isogonic chart for 1935. Observations were made at an airport in New York, at an area of local disturbance on the Delaware River near Wilmington, Del., and in Alaska, to provide better data for the charts by the hydrographic parties engaged in general surveys.

The distribution of the magnetic observations made during the year is shown in the following table:

State	Observations				Total	State	Observations				Total
	Repeat stations		Other stations				Repeat stations		Other stations		
	Triangulation	Other	Complete	Declination			Triangulation	Other	Complete	Declination	
Alabama	1				1	Minnesota	2	1		3	6
Alaska				12	12	Missouri	2	1	1	4	7
Arkansas			1	1	2	New Jersey				1	1
California	1			2	3	New York				1	7
Connecticut				1	1	Ohio		1		1	1
Delaware				9	9	Oregon			2	2	6
Illinois	1	2	1	2	6	Pennsylvania			1	1	3
Indiana		2	3	3	8	Washington				26	26
Iowa	1			3	4	Wisconsin		4		1	5
Louisiana	2	1	1	1	4						
Maryland				1	2	Total	10	14	13	81	118
Michigan		2	2		4						

The magnetic observatories have continued to make magnetic observations which began in the year following the name of the observatory, as follows: Cheltenham, Md. (1901); San Juan, P. R. (1926); Tucson, Ariz. (1909); Honolulu, Hawaii (1902); and Sitka, Alaska (1902).

At the Cheltenham observatory particular attention has been given to comparison of instruments of various kinds with a view to elimination of errors and improvement of records so that there will be less work necessary in field and office in obtaining records and preparing them for publication.

The steady demand for magnetic information has been met through letters or through publications. Land surveyors have received assistance in connection with the retracing of lines of old compass surveys. During the year a number of publications of magnetic information by States, chiefly prepared during the previous year, were issued so that the information is available in this form for 18 States.

The observatory records are in demand for several purposes besides their basic one of furnishing information regarding changes in the magnetism for correction of field results and similar purposes. In the search for oil and minerals investigators of geological formations by magnetic methods use observatory data, especially information regarding magnetic storms which vitiate their results. Announcement of this is furnished by telegram so that the necessary precautions can be taken or the work stopped until the storm has ceased. Investigators of radio transmission find it necessary to receive weekly copies of the records of one or more observatories. At the request of the International Meteorological Organization, magnetic character of days was prepared for several observatories for the year 1906 and earlier.

SEISMOLOGY

The seismological work of the Bureau includes the collection and publication of earthquake information derived from cooperative sources; the operation of seismographs, and the interpretation of their records; the immediate determination of earthquake epicenters; the operation of strong-motion instruments and the analysis of their records; the determination of natural periods of buildings and other structures, and of the ground and the measurement of tilt. Related activity described elsewhere is geodetic work in regions subject to earthquakes.

The basis for dealing with earthquakes of the future is the knowledge of what has occurred in the past. The history of an earthquake is obtained from reports of visible and felt effects and from instrumental observation, the former of which come from widespread cooperation on the part of organizations and individuals. Instrumental data are derived from a number of seismological observatories, of which the Bureau operates four directly—San Juan, P. R.; Tucson, Ariz.; Honolulu, T. H.; and Ukiah, Calif., at the International Latitude Observatory; and five cooperatively—Columbia, S. C.; Chicago, Ill.; Bozeman and Butte, Mont.; and College near Fairbanks, Alaska. A number of independent stations also make their records available. Many of these records are furnished to various organizations for special studies.

Immediate determination of earthquake epicenters is made with the cooperation of Science Service and the Jesuit Seismological Association from advance information from some of these records and from other sources. Information in regard to earthquakes from the various sources mentioned is published in the form of mimeographed reports of instrumental results and preliminary reports of earthquake activity for various parts of the country, and in printed form in the annual United States Earthquakes publications.

The study of strong earth motions and related activity heretofore carried on chiefly in California was extended to Montana where valuable records were obtained at Helena. The work as a whole including recording and analysis of strong earth motions by means of accelerographs, displacement meters, and Weed instruments. In addition, the natural periods of buildings, other structures, and of the ground must be obtained because much earthquake damage is now ascribed to resonance or the presence of the same periods in the earth waves as in structures.

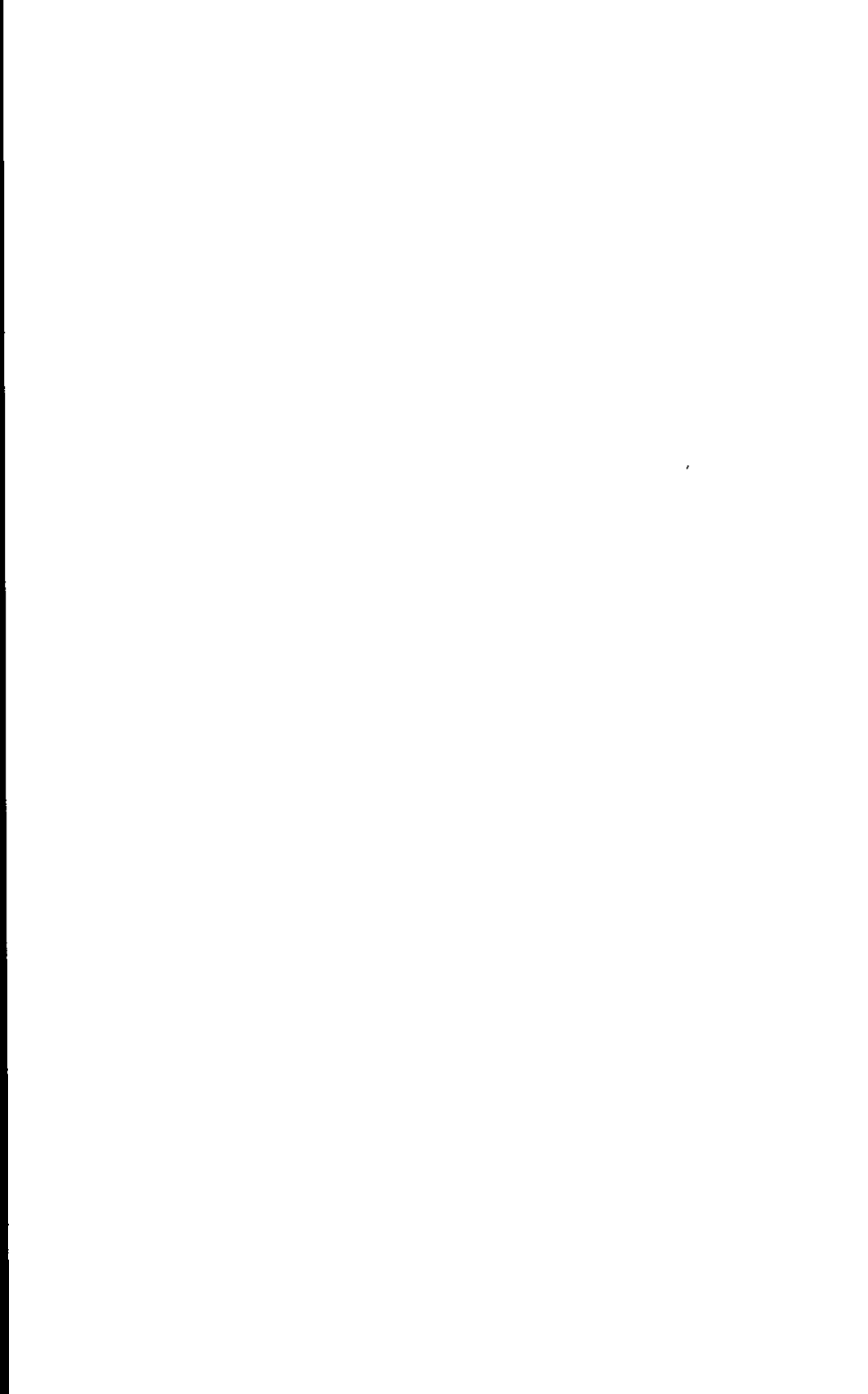
Fifty instruments were operated in California; one in Montana; one in Panama, Canal Zone; and one each were held in reserve for emergency use in Washington, D. C.; and Chicago, Ill.

Ten strong-motion records were obtained in California, 35 in Montana, and 1 in Panama. Of these, one was completely analyzed by extended mathematical treatment. Good progress was made in developing a graphical method of analysis.

One hundred and seventeen vibration observations were made in 88 buildings and 5 tests were made to determine ground periods. Fifty observations were made on bridges, exclusive of 20 special observations; 2 were made on elevated water tanks; 9 special observations were made in buildings; 1 observation was made on a dam; and 1 test on a dam, and 23 ground tests were made with a specially designed shaking machine. Much attention was given to the preparation of the data obtained chiefly during the previous year with augmented funds. The publication was nearly ready for issue at the close of the year.

Four tiltmeters continued operation with the cooperation of the University of California.

Improvements were made in the design of strong-motion accelerographs, four of which have been under construction for use in Montana. A publication was prepared on The Selection, Operation, and Installation of Seismographs.



BUREAU OF MARINE INSPECTION AND NAVIGATION

ADMINISTRATION

In reviewing the work of the Bureau for the past year, it is desired to direct attention to the consideration given its needs by the last Congress. Several legislative steps were taken which will greatly strengthen the position of this Bureau in promoting safety of life at sea.

The 1929 Safety of Life at Sea Convention was ratified.

An act of much importance was Public Law No. 622 of the Seventy-fourth Congress which provided for a change in the designation of the Bureau together with certain reorganization features which will tend to increase its efficiency. This same act also created marine casualty investigation boards clothed with power to conduct far-reaching investigations of marine casualties.

Laws relating to American seamen were amended, looking toward the improvement of conditions with regard to both the operator and ship personnel.

Legislation was also enacted authorizing the Bureau to promulgate special regulations governing the construction and operation of tank vessels and to require load lines on vessels of 150 gross tons or over engaged in coastwise trade.

Since this legislation was enacted at the close of the last session of Congress, the matter of giving proper effect to these new laws will be accomplished during the beginning of the next fiscal year.

During the year just closed, the added activity of the Technical Division has progressed in its study of existing seagoing passenger vessels covering subdivision and stability in damaged conditions. These studies in connection with the seagoing passenger vessels have been completed and recommendations made to the operators either to provide additional safety features in design or operation of vessels not meeting the new high technical standard, or to remove such vessels from passenger service. In this concentrated effort to increase the safety of ships, the Bureau is very much indebted to the splendid cooperation of the operators themselves who without exception have governed themselves by these recommendations. This is evidenced by the fact that 126 vessels of the 216 made the subject of these studies were found to be below the standard, and improvements will be made in 85 of this number, and the remaining 41 will be removed from the passenger service.

The fact that there were no lives of passengers lost on passenger vessels during the past fiscal year, incident to ship operation, emphasizes the safety of travel on American ships.

The general work of the supervision of the merchant marine and seagoing merchant personnel vested in this Bureau by its organic act, has proceeded along regularly established lines. The interpretation and administration of the navigation and steamboat inspection laws, covering documentation, inspection of hulls, boilers, and equipment, examination and licensing of officers, certification of able seamen and lifeboat men, Ship Mortgage Act, entry and clearance of vessels, movement of vessels, welfare of seamen, admeasurement, load line, adjudication of penalties, collection of fees, tonnage tax, etc., and the compilation of Federal statistics of the merchant marine, have been prosecuted with increased efficiency.

In the enforcement of the rules and regulations governing the movement of vessels in the St. Marys River, patrol of courses during regattas and marine parades, the Bureau is indebted to the Coast Guard which operated in its usual efficient manner under the rules and regulations of the Department.

TECHNICAL DIVISION

For the purpose of recording the fact historically, the Technical Division was inaugurated with a limited force in February 1935. Its duties at first consisted in studying structural plans of vessels submitted by owners to observe compliance with rules of the Bureau and to make recommendations to increase safety of passenger ships. Advice has been freely given to naval architects and others on preferable methods and tabulation of data in connection with subdivision and stability calculations in damaged condition. Procedure in conducting inclining experiments has been standardized and fixed ballast has been added to a number of ships to bring them to modern stability requirements. In June 1936, due to enlarging the functions of the Technical Division, the title of the old Technical Division was changed to Structural and Stability Section. In addition to retaining its former functions, matters in connection with fire protection, fire detecting, tests on life preservers, lifeboats and floats, and parachute flare pistols have been transferred to this section. Since the setting up of this section, studies on subdivision and damaged stability on practically all ocean-going passenger vessels have been brought to a conclusion and recommendations for improving the vessels have been made to the respective owners. Calculations for load lines based on subdivision requirements as the result of the new coastwise load-line amendment and ratification of the Safety of Life at Sea Convention have also been added to the duties of the Structural and Stability Section. Load lines so determined will be designated on vessels by the mark C-1, and in special cases by the mark C-2.

ADMEASUREMENT OF VESSELS

Incoming reports and other data from the collectors of customs show that during the fiscal year ended June 30, 1936, 1,815 vessels of 196,736 tons gross were admeasured for documentation. The procedure for finding the tonnage of 60 of these, aggregating 18,043 tons gross, was reviewed by this office. Among them are two tankers

of 7,224 tons each, built in the district of Philadelphia, the others ranging from 7 to 700 tons gross.

There is a marked increase over last year's vessel construction, both in number of vessels and tonnage assigned them.

Readmeasured under the provisions of article 45 were 390 vessels, the gross tonnage of which was changed from 424,073 tons gross and 263,069 tons net to 420,505 tons gross and 268,659 tons net.

During the year a "Special appendix to certificate of registry of American passenger vessels" was issued to each of eight vessels.

LOAD LINE

The total number of inspections of vessels at time of clearance was 15,664, of which 9,412 were foreign and 6,252 domestic. The number of violations apprehended was 39.

During the year 255 load-line certificates were issued to American vessels on the international form and 56 certificates were issued to vessels belonging to countries not signatories to the International Load Line Convention. The total number of vessels to which load-line certificates were issued is 1,596. Annual inspections numbered 1,208.

PASSENGER ACT OF 1882

The enforcement of this law through the marine divisions of the customhouses during the fiscal year 1936 affected 829 voyages, involving 108,180 steerage passengers. The purpose of the act of 1882 is to provide for the welfare, health conditions, food, separation of the sexes, and care in case of illness. This information was derived from the compilation of reports received monthly from collectors of customs at all headquarter ports of vessels arriving at these ports having on board steerage passengers.

NAVIGATION PATROL SERVICE

One important duty of this Bureau is the supervision of the 310,000 motorboats in the country through the enforcement of the navigation laws. This is done by the patrol vessels of the Bureau, six of which were in operation at the beginning of the year on the Atlantic and Gulf coasts and on the Great Lakes. During the course of the year, however, three of these were placed out of commission because of obsolescence. In addition to the work done by the vessels, an inspector was detailed to the Pacific coast and another to the Mississippi River to enforce navigation laws in these localities.

The same cooperation on the part of many motorboat owners, yacht clubs, motorboat organizations, etc., has been in evidence this year as usual and is well illustrated by the lack of friction present in renumbering of all motorboats, which was required by the Anti-Smuggling Act.

Of the total of 11,548 violations reported during the year, 6,309 were reported by the vessels of the Bureau as a result of 15,844 inspections.

The following table shows the number of violations of law reported to the Department by the various branches of the Federal service engaged in the enforcement of the navigation laws:

Headquarters port	Total	Dry- den	Eala	Kil- ken- ny	Nav- iga- tion	Psyche	Siwash	Coast Guard	Local inspec- tors	Cus- toms in- spec- tors	Nav- iga- tion inspec- tors
Baltimore	1,406		136	220	50		946	13	8	33	
Boston	304				204			11	1	88	
Bridgeport	183				16		138		1	28	
Buffalo	297					23		41		233	
Charleston	159		26	58				35		40	
Chicago	8								5	3	
Cleveland	192					27		78	4	83	
Detroit	168					20		64	5	79	
Duluth	10					5		4		1	
Galveston	86	78			4				1	3	
Honolulu	73							47	1	25	
Juneau	59							4		55	
Los Angeles	319							51	18	182	98
Louisville	10							1		8	
Memphis	10									14	
Milwaukee	14									3	
Mobile	191	73			50			37	1	30	
New Orleans	1,150	964			9			108	11	58	
New York	331				40		537	50	4	200	
Norfolk	793		223	59	12		386	63	4	46	
Ogdensburg	28									10	
Pembina	4					18				4	
Philadelphia	336		124		21			37	4	180	
Pittsburgh	3									3	
Port Arthur	100	80			3					17	
Portland, Maine	251				205			18	1	27	
Portland, Oreg	51							14	1	25	11
Providence	62				37			4	3	2	16
Rochester	31					19		4		8	
St. Albans	4							4		4	
St. Paul	21				21						
San Antonio	63	16						14		31	2
San Diego	177							36	2	26	113
San Francisco	1,178							237		940	1
San Juan	40								7	33	
Savannah	166		26	109						31	
Seattle	265							27		222	16
Tampa	1,928	15	153	605	50			39		1,066	
Wilmington	478		254	98	51			3		72	
Total	11,548	1,226	942	1,149	773	112	2,107	1,043	86	3,853	257

During the year 11,548 violations of the navigation laws were considered in connection with the mitigation or remission of the

penalties incurred. The following table shows the enforcement of such laws by customs districts and the laws violated:

Headquarters port	Total	Steamboat laws	Motorboat laws	Surrendered license	Seamen's act	Anchorage and St. Marys River rules	Passenger act	Enrollment and license	Entry and clearance	Name on vessel	Change of master	Unlading	Load line act	Numbering act	Miscellaneous
Baltimore.....	1,406	4	1,048	21				5	2	23		3	3	283	14
Boston.....	304	1	203	36				10	5	11	3	2	1	28	4
Bridgeport.....	183	5	135	21						7	1			15	2
Buffalo.....	297		137	5				22				1		183	
Charleston.....	159	3	91	13				4		5	7			36	
Chicago.....	8	5		3											
Cleveland.....	192	1	81	10				1				1			1
Detroit.....	168	4	63	25		4		3	12	5	1			80	
Duluth.....	10		3	1				1	10	4	2	13		39	
Galveston.....	86	1	58	1				2	4	4	1	1		19	
Honolulu.....	73	6	23	3	1			1					1	34	4
Juneau.....	59	2	3	26				4	4	5				14	1
Los Angeles.....	319	19	113	41				4	3	4	1	2	5	84	43
Louisville.....	10	1	1	8											
Memphis.....	14	4	7	1				2							
Milwaukee.....	9	3	2	1				1							1
Mobile.....	191		147	21						9	1	1		12	
New Orleans.....	1,150	12	648	44				19		85	21			306	15
New York.....	931	19	601	131				7	3	40	10			102	18
Norfolk.....	793	5	537	27	1			4	1	13	11	4	1	182	7
Ogdensburg.....	28		21	3						1				3	
Pensacola.....	4		1	3										1	
Philadelphia.....	336	18	134	88				11		7	4	1		43	30
Pittsburgh.....	3		2					1							
Port Arthur.....	100		64	14										21	
Portland, Maine.....	251		202	17				1		3		2		25	1
Portland, Oreg.....	51	1	23	14							1		1	9	
Providence.....	62	4	51	1				1			1			5	1
Rochester.....	31		23	6										2	
St. Albans.....	4		1												
St. Paul.....	21		19											2	
San Antonio.....	63		47	1										15	
San Diego.....	177	17	69	7				7	5	28				34	10
San Francisco.....	1,178	7	151	28	4			11	4	4	2		4	936	27
San Juan.....	40	7	8	5				1	2					16	
Savannah.....	166	4	114	12				1	2	4	1			28	
Seattle.....	265	16	14	57			1	12	15	21	2	15		102	10
Tampa.....	1,928	3	1,000	77				8	12	31	6			782	9
Wilmington.....	478	2	307	40				5		14	3			102	5
Total.....	11,548	170	6,150	819	6	4	1	149	81	332	78	47	16	3,491	204

The following is a comparative statement of violations of the navigation laws, 1931-36.

Port	1931	1932	1933	1934	1935	1936
Baltimore.....	584	471	485	374	263	1,406
Boston.....	509	698	230	205	130	304
Bridgeport.....	163	63	165	100	132	183
Buffalo.....	83	24	21	94	63	297
Charleston.....	49	52	43	77	84	159
Chicago.....	37	24	123	12	10	8
Cleveland.....	167	180	23	110	108	192
Detroit.....	185	191	174	85	382	163
Duluth.....	27	20	3	4	6	10
Galveston.....	39	65	15	33	117	86
Honolulu.....	15	35	68	80	96	73
Indianapolis.....	4	2	2	2	1	
Juncenu.....	47	71	52	41	40	59
Los Angeles.....	400	237	278	167	215	319
Louisville.....	9	15	49	4	17	10
Memphis.....	48	54	87	15	5	14
Milwaukee.....	9	2	28	6	3	9
Mobile.....	95	269	171	133	218	191
New Orleans.....	187	937	735	519	750	1,150
New York.....	828	589	2,599	1,733	1,721	931
Nogales.....						
Norfolk.....	238	211	335	65	401	793
Ogdensburg.....	28	21	9	35	9	28
Pembina.....		1			2	4
Philadelphia.....	511	340	498	202	134	336
Pittsburgh.....	9	21	13	27	6	3
Port Arthur.....	26	13	120	34	49	100
Portland, Maine.....	315	370	59	32	55	251
Portland, Oreg.....	129	118	87	45	83	51
Providence.....	47	151	16	12	13	62
Rochester.....	86	37	34	108	73	31
St. Albans.....	170	1	1	3	4	4
St. Louis.....	6	4	4	10	12	
St. Paul.....	2	11				21
San Antonio.....	72	44	46	4	76	63
San Diego.....	22	30	9	14	33	177
San Francisco.....	232	252	202	143	305	1,178
San Juan.....	23	15	17	11	25	40
Savannah.....	91	90	84	69	192	166
Seattle.....	581	1,176	450	340	343	265
Tampa.....	928	1,037	1,688	790	1,274	1,928
Wilmington.....	196	116	37	69	43	478
Total.....	7,187	8,062	9,152	5,807	7,493	11,548

NAVIGATION RECEIPTS

During the year the Bureau has collected through tonnage duties, navigation fees, and navigation fines \$1,791,821.91. The table below shows these collections in detail.

June 30—	Tonnage duties	Navigation fees	Navigation fines	Total
1936.....	\$1,561,846.95	\$194,653.77	\$35,321.19	\$1,791,821.91
1935.....	1,452,257.50	179,444.83	36,806.99	1,668,509.32
1917.....	1,393,743.18	159,808.05	49,962.37	1,603,513.56

HULLS AND EQUIPMENT STATISTICS
VESSELS INSPECTED AND CERTIFICATES OF INSPECTION ISSUED TO STEAM AND MOTOR VESSELS AND TO BARGES
CERTIFICATES OF INSPECTION ISSUED BY DISTRICTS

Supervising district	Local district										Domestic vessels										Foreign passenger steam and motor vessels		Total				
	Steam vessels					Motor vessels					Passenger barges					Seagoing barges					Total					Num-ber	Gross tonnage
	Num-ber	Gross tonnage	Num-ber	Gross tonnage	Num-ber	Gross tonnage	Num-ber	Gross tonnage	Num-ber	Gross tonnage	Num-ber	Gross tonnage	Num-ber	Gross tonnage	Num-ber	Gross tonnage	Num-ber	Gross tonnage	Num-ber	Gross tonnage							
First	San Francisco, Calif.	251	993,638	105	12,330	1	103	4	6,141	361	1,042,232	28	204,614	389	1,246,846	Total	Num-ber	Gross tonnage	Total	Num-ber	Gross tonnage						
	Honolulu, Hawaii	7	14,936	10	3,423			2	5,230	100	23,769			35	438,080												
	Los Angeles, Calif.	75	341,661	24	2,177			1	434		344,272	11	93,808	111	438,080												
	Portland, Oreg.	46	114,923	14	1,689					538	117,150			61	117,150												
	New York, N. Y.	939	2,078,304	189	103,085	1	465	90	38,514	1,234	2,366,468	116	2,315,527	1,355	4,681,895												
	Albany, N. Y.	62	41,924	22	9,881					84	51,805	1		85	51,809												
	New Haven, Conn.	20	8,509	33	1,582					63	10,181			53	10,181												
	Philadelphia, Pa.	192	437,470	90	165,265	2	620	55	60,814	337	663,549	2	7,992	339	671,541												
	Norfolk, Va.	127	205,411	115	14,902					61	77,162	305	298,065	305	298,065												
	Baltimore, Md.	236	757,919	113	51,476			15	14,298	364	823,693			364	823,693												
Third	Charleston, S. C.	11	9,942	42	1,892			3	5,105	66	16,939			66	16,939												
	Jacksonville, Fla.	21	51,622	73	6,092					94	57,714	1	3,445	95	61,159												
	Savannah, Ga.	20	69,706	13	765					33	70,471			33	70,471												
	St. Louis, Mo.	59	25,378	22	2,024	1	104			82	27,506			82	27,506												
	Dubuque, Iowa	25	3,846	26	1,142					51	4,988			51	4,988												
	Boston, Mass.	136	317,911	24	18,434			15	12,490	175	348,535	13	79,384	188	428,219												
	Bangor, Maine	3	4,352	20	742			4	2,700	25	7,794	3	1,947	30	9,741												
	New London, Conn.	10	12,935	13	752			2	2,564	23	16,251			25	16,251												
	Portland, Maine	25	15,614	15	946			6	6,640	46	23,230			46	23,230												
	Providence, R. I.	28	59,019	15	10,968			3	3,062	46	73,049	1	8,370	47	82,819												
Sixth	Louisville, Ky.	15	3,406	6	884					21	4,290			21	4,290												
	Evansville, Ind.	18	7,009	6	264					24	7,773			24	7,773												
	Memphis, Tenn.	39	12,810	7	292					46	13,102			46	13,102												
	Nashville, Tenn.	30	6,749	3	147					33	6,896			33	6,896												
	Pittsburgh, Pa.	54	13,895	9	226	1	320			64	14,441			64	14,441												
	Cincinnati, Ohio	28	9,635	8	334					36	9,969			36	9,969												
	Pont. Pleasant, W. Va.	19	3,995	5	123	1	109			25	4,227	3	5,106	28	4,227												
	Cetroit, Mich.	76	172,641	7	19,826					83	192,467			86	197,573												
	Chicago, Ill.	82	249,884	8	8,889					90	258,773			90	258,773												
	Duluth, Minn.	36	130,174	2	131					38	130,305	1	469	39	130,774												
Grand Haven, Mich.	20	34,060	7	571					27	34,631			27	34,631													
Marquette, Mich.	24	44,172	8	351					32	44,523	2	1,111	34	45,634													

HULLS AND EQUIPMENT STATISTICS—Continued
VESSELS INSPECTED AND CERTIFICATES OF INSPECTION ISSUED TO STEAM AND MOTOR VESSELS AND TO BARGES—CON.
CERTIFICATES OF INSPECTION ISSUED BY DISTRICTS—Continued

Supervising district	Local district	Domestic vessels										Foreign passenger steam and motor vessels		Total			
		Steam vessels		Motor vessels		Passenger barges		Seagoing barges		Total		Num-ber	Gross tonnage	Num-ber	Gross tonnage		
		Num-ber	Gross tonnage	Num-ber	Gross tonnage	Num-ber	Gross tonnage	Num-ber	Gross tonnage	Num-ber	Gross tonnage						
Eighth.	Milwaukee, Wis.	64	243,487	7	1,040							71	244,527	2	12,170	71	244,527
	Port Huron, Mich.	16	10,133	3	5,210							23	10,342			23	10,342
	Cleveland, Ohio.	110	471,710	3	5,467							113	477,177	7	20,203	113	477,177
	Buffalo, N. Y.	138	485,390	1	1,189	1	128					140	486,618	7	2,659	147	490,318
	Oswego, N. Y.	17	14,278	21	3,636							38	17,964	7	2,461	45	20,623
Tenth.	Toledo, Ohio.	81	377,771	5	1,438							86	379,209			86	379,209
	New Orleans, La.	174	433,079	25	4,301	6	6,215	2	5,332			207	438,967	11	75,038	218	514,005
	Galveston, Tex.	149	687,363	11	28,351	2	1,238	14	20,057			177	743,870	1	8,379	178	752,249
	Groble, Ala.	97	403,398	39	6,053	1	1,000	5	7,011			142	422,960			142	422,960
	San Juan, P. R.	1	3,223	1	3,223							2	3,223			2	3,223
Eleventh.	Tampa, Fla.	12	5,276	17	5,241							29	10,517			29	10,517
	Seattle, Wash.	146	429,076	63	23,443							213	452,519	24	146,902	237	600,419
	Portsmouth, Wash.	2	14,969									2	14,969			2	14,969
	Turkey, Alaska.	2		13	1,435							15	1,435			15	1,435
	St. Michael, Alaska.	4	2,132	13	1,432							17	2,564	3	3,431	20	6,045
Total, 1936	3,778	9,874,436	1,286	630,231	18	10,888	200	325,037	5,372	10,861,482	264	3,288,069	5,636	14,150,451	5,900	17,431,941	
Total, 1935	3,847	9,462,607	1,293	629,913	19	10,494	217	316,893	5,436	10,419,007	261	3,165,979	5,697	13,585,886	6,197	16,581,893	
Increase (+) or decrease (-)	-69	+411,819	-7	+20,318	-1	+394	+13	+9,044	-64	+441,575	+3	+122,990	-81	+564,565			

VESSELS INSPECTED, BY GEOGRAPHIC DIVISIONS

Pacific coast.....	543	1,012,948	244	74,599	2	641	15	20,158	804	2,008,646	82	653,283	2,886	2,696,909
Atlantic coast.....	1,632	4,077,356	732	483,472	3	1,685	294	273,519	2,891	4,840,162	147	2,475,090	3,038	7,315,262
Western rivers.....	237	57,226	5	5,376	3	593			842	63,822	68	12,179	362	86,182
Great Lakes.....	64	2,285,350	78	42,378	6	8,503	21	32,460	441	2,276,108	12	83,457	506	2,318,762
Gulf coast.....	432	1,365,170	92	38,746	9	3,503			554	1,642,879	12	83,457	566	1,726,316
Total, 1936.....	3,778	9,874,426	1,286	650,231	18	10,888	200	325,037	5,372	10,861,482	264	3,288,069	5,636	14,150,451

REINSPECTIONS

Local inspection district (port)	Steam vessels	Motor vessels	Barges, etc.	Total	Local inspection district (port)	Steam vessels	Motor vessels	Barges, etc.	Total
San Francisco, Calif.	101	47	1	149	Point Pleasant, W. Va.	6			6
Los Angeles, Calif.	3	8		11	Detroit, Mich.	73	2		75
Portland, Oreg.	75	22		97	Chicago, Ill.	22	3		25
Honolulu, Hawaii	34	13		47	Duluth, Minn.	10			10
New York, N. Y.	703	197	4	904	Grand Haven, Mich.	33	8		41
Albany, N. Y.	39	34		73	Marquette, Mich.	16	1		17
New Haven, Conn.	12	69		81	Milwaukee, Wis.	10	3		13
Philadelphia, Pa.	121	111		232	Port Huron, Mich.	8	20		28
Norfolk, Va.	67	15	2	84	Cleveland, Ohio	11			11
Baltimore, Md.	52	4		56	Buffalo, N. Y.	43		4	47
Charleston, S. C.		40		40	Oswego, N. Y.	19	56		75
Jacksonville, Fla.	14	114		128	Toledo, Ohio.	12	2		14
Savannah, Ga.	18	27		45	New Orleans, La.	84	19	9	112
St. Louis, Mo.	7			7	Galveston, Tex.	2	15	2	19
Dubuque, Iowa	3			3	San Juan, P. R.	11	7		18
Boston, Mass.	75	5		80	Tampa, Fla.	6	7		13
Bangor, Maine	2	4		6	Seattle, Wash.	16	10		26
New London, Conn.	11	19		30	Juneau, Alaska.	3	2		5
Portland, Maine	81	2		83					
Providence, R. I.	24	3		27	Total, 1936	1,857	892	22	2,771
Louisville, Ky.	3			3	Total, 1935	2,180	962	33	3,175
Memphis, Tenn.	2			2					
Fittsburgh, Pa.	4	3		7	Decrease	323	70	11	404
Cincinnati, Ohio.	21			21					

MISCELLANEOUS INSPECTIONS

[Statement of steam vessels granted letters of approval of designs of boilers, engines, and other operating machinery inspected under an act of Congress approved June 9, 1910, which vessels are not inspected annually, only one inspection being made for letter of approval; hulls of United States Government vessels inspected; and boilers in or for United States Government steamers and buildings, and for other United States Governmental purposes.]

Local inspection district (port)	Steam ves- sels granted letters of approval		Gov- ernment ves- sels in- spect- ed	Gov- ernment boilers in- spect- ed	Local inspection district (port)	Steam ves- sels granted letters of approval		Gov- ernment ves- sels in- spect- ed	Gov- ernment boilers in- spect- ed
	Num- ber	Gross ton- nage				Num- ber	Gross ton- nage		
San Francisco, Calif.					Cincinnati, Ohio.				126
Los Angeles, Calif.					Point Pleasant, W. Va.				58
Portland, Oreg.			1	39	Detroit, Mich.			1	46
Honolulu, Hawaii				25	Chicago, Ill.			1	2
New York, N. Y.			2	129	Duluth, Minn.			1	12
Albany, N. Y.				12	Grand Haven, Mich.	1	15	1	2
New Haven, Conn.				4	Marquette, Mich.			1	16
Philadelphia, Pa.				47	Milwaukee, Wis.	1	34	10	33
Norfolk, Va.				74	Port Huron, Mich.	2	37		7
Charleston, S. C.			3	43	Cleveland, Ohio			5	12
Baltimore, Md.				133	Buffalo, N. Y.			4	15
Jacksonville, Fla.				23	Oswego, N. Y.				4
Savannah, Ga.				51	Toledo, Ohio.				143
St. Louis, Mo.			9	182	New Orleans, La.			36	95
Dubuque, Iowa				127	Galveston, Tex.			3	202
Boston, Mass.	1	17	4	53	Mobile, Ala.			1	8
Bangor, Maine				5	San Juan, P. R.				10
New London, Conn.				6	Tampa, Fla.				35
Portland, Maine			2	9	Seattle, Wash.	1	69		
Providence, R. I.	1	34		1					
Louisville, Ky.				47	Total, 1936	8	234	84	2,169
Evansville, Ind.				21	Total, 1935	7	301	100	2,110
Memphis, Tenn.	1	28		101					
Nashville, Tenn.				36	Increase (+) or de- crease (-)	+1	-67	-16	-41
Pittsburgh, Pa.				40					

SPECIAL AND DRYDOCK EXAMINATIONS

Local inspection district (port)	Special examinations	Drydock examinations	Local inspection district (port)	Special examinations	Drydock examinations
San Francisco, Calif.....	873	334	Nashville, Tenn.....	43	8
Los Angeles, Calif.....	213	106	Pittsburgh, Pa.....	257	41
Portland, Ore.....	320	95	Cincinnati, Ohio.....	111	1
Honolulu, Hawaii.....	27	176	Point Pleasant, W. Va.....	14	2
New York, N. Y.....	1,178	709	Detroit, Mich.....	1	57
Albany, N. Y.....	46	28	Chicago, Ill.....	62	21
New Haven, Conn.....	137	13	Duluth, Minn.....	1	8
Philadelphia, Pa.....	392	181	Grand Haven, Mich.....	47	2
Norfolk, Va.....	209	209	Milwaukee, Wis.....	680	41
Charleston, S. C.....	80	19	Port Huron, Mich.....	26	2
Jacksonville, Fla.....	94	43	Cleveland, Ohio.....	107	94
Savannah, Ga.....	214	43	Buffalo, N. Y.....	146	47
St. Louis, Mo.....	52	5	Oswego, N. Y.....	20	26
Dubuque, Iowa.....	1	12	Toledo, Ohio.....	131	25
Boston, Mass.....	587	172	New Orleans, La.....	1,284	213
Bangor, Maine.....	2	1	Mobile, Ala.....	319	64
New London, Conn.....	17	7	San Juan, P. R.....	76	5
Portland, Maine.....	125	28	Tampa, Fla.....	102	16
Providence, R. I.....	473	42	Seattle, Wash.....	1,150	236
Louisville, Ky.....	48	3	Hoquiam, Wash.....		4
Evansville, Ind.....	10	3			
Memphis, Tenn.....	26	16	Total.....	9,482	3,158

CERTIFICATES WITHDRAWN OR REFUSED

Vessels from which certificates of inspection were withdrawn.....	13
Vessels refused certificates of inspection:	
Domestic steam vessels.....	59
Domestic vessels propelled by gas, fluid, naphtha, or electric motor.....	32
Domestic vessels and barges of over 100 gross tons carrying passengers for hire, other than steam, motor, and sail vessels.....	1
Domestic seagoing barges of 100 gross tons or over.....	3
Foreign steam vessels.....	3
Total.....	111

CARGO VESSELS EXAMINED TO CARRY PERSONS IN ADDITION TO CREW

During the year ended June 30, 1936, 1,289 cargo vessels were examined to carry persons in addition to crew, under provisions of the act of Congress approved June 5, 1920.

NEW LIFE PRESERVERS INSPECTED

Kind	Inspected	Passed	Rejected
Block cork.....	80,510	80,508	2
Balsa block.....	19,831	19,788	43
Kapok.....	17,015	16,975	40
Total, 1936.....	117,356	117,271	85
Total, 1935.....	113,776	113,681	95
Increase (+) or decrease (-).....	+3,580	+3,590	-10

LIFE-SAVING APPARATUS INSPECTED AT FACTORIES

Kind	Inspected	Passed	Rejected
New life buoys.....	9,752	9,741	11
New wood floats.....	31	31	

WORK PERFORMED BY INSPECTORS IN CENTRAL OFFICE

Vessels inclined.....	96
Special examinations of vessels.....	228

BOILERS

Boilers inspected:	
Steel (riveted construction).....	7,481
Iron (riveted construction).....	19
Water tube (riveted construction).....	2,404
Welded construction.....	71
Total	9,975

Boilers found defective:	
Gave way under hydrostatic pressure:	
Steel (riveted construction).....	179
Iron (riveted construction).....	27
Water tube (riveted construction).....	1
Welded construction.....	1
Total	207

Defective from other causes:	
Steel (riveted construction).....	1,725
Iron (riveted construction).....	4
Water tube (riveted construction).....	94
Welded construction.....	3
Total	1,826

Boilers condemned from further use.....	37
---	----

Defects in boilers and attachments:	
Sheets.....	693
Heads.....	204
Steam and mud drums.....	125
Flues and tubes.....	58,669
Water walls.....	43
Steam pipes.....	200
Furnaces.....	350
Main stays.....	454
Staybolts.....	15,535
Studs.....	83
Rivets.....	905
Braces.....	417
Miscellaneous.....	6,038
Total	83,721

MARINE BOILER PLATES TESTED

Inspected by assistant inspectors at—	Plates rejected because of—						Total		
	Tensile strength	Surface defects	Light gage	Heavy gage	Lost	Lamination	Re-jected	Ac-cepted	In-spected
Chicago, Ill.....	2						2	30	32
Cleveland, Ohio.....								174	174
Coatesville, Pa.....	3	27	12	7	1		50	1,802	1,852
Philadelphia, Pa.....	43	20	15				78	496	574
Pittsburgh, Pa.....						3	3	569	572
Total, 1936	48	47	27	7	1	3	133	3,071	3,204
Total, 1935	3	13	3	11		19	49	979	1,028
Increase (+) or decrease (—).....	+45	+34	+24	—4	+1	—16	+84	+2,092	+2,176

TESTS OF MISCELLANEOUS MATERIAL

Inspected by assistant inspectors at--	Samples of bars and braces		Samples of bolts and rivets		Samples of forgings		Bars and braces		Bolts and rivets	
	Tested	Re-jected	Tested	Re-jected	Tested	Re-jected	Ac-cepted	Re-jected	Ac-cepted	Re-jected
Buffalo, N. Y.	27	3	-----	-----	-----	-----	238	10	-----	-----
Chicago, Ill.	6	2	-----	-----	-----	-----	5	2	-----	-----
Cleveland, Ohio.	14	-----	-----	-----	-----	-----	54	-----	-----	-----
Coatesville, Pa.	334	-----	7,973	-----	26	-----	-----	-----	-----	-----
Pittsburgh, Pa.	83	-----	27	-----	-----	-----	657	-----	748	-----
Total.	464	5	8,000	-----	26	-----	954	12	748	-----

STATISTICS CONCERNING SHIPS' PERSONNEL.

OFFICERS LICENSED

Local district	Steam and motor vessels					Steam ves- sels		Motor ves- sels		Sail vessels of over 700 gross tons		Masters of barges of over 100 gross tons	Total
	Masters	Mates		First-class pilots	Second-class and special pilots	Chief engineers	Assistant and spe- cial engineers	Engineers	Operators	Masters	Chief mates		
		Ocean	Inland										
San Francisco, Calif.	354	238	29	5	5	335	386	164	632	33	3	-----	2,184
Honolulu, Hawaii.	26	11	-----	-----	-----	15	18	10	70	6	-----	-----	157
Los Angeles, Calif.	124	92	3	1	9	95	77	55	506	11	-----	-----	979
Portland, Ore.	48	35	11	1	2	54	51	28	282	3	-----	-----	515
New York, N. Y.	961	447	41	84	2	1,284	850	421	1,143	31	2	2	5,268
Albany, N. Y.	41	2	6	16	1	87	19	23	51	1	-----	-----	247
New Haven, Conn.	25	7	-----	12	3	20	2	12	137	-----	-----	-----	218
Philadelphia, Pa.	179	157	5	41	6	219	160	97	1,034	7	-----	-----	1,905
Norfolk, Va.	98	29	2	23	6	148	58	51	579	-----	-----	-----	994
Baltimore, Md.	223	108	17	20	16	211	104	84	546	3	1	-----	1,333
Charleston, S. C.	20	6	-----	11	4	24	19	13	143	3	-----	-----	243
Jacksonville, Fla.	70	42	1	7	4	41	36	55	533	6	-----	-----	795
Savannah, Ga.	29	13	2	4	-----	20	14	19	69	1	-----	-----	171
St. Louis, Mo.	30	1	25	29	1	49	31	21	256	-----	-----	1	444
Dubuque, Iowa.	6	-----	8	10	-----	15	5	8	136	-----	-----	-----	188
Boston, Mass.	150	179	3	30	3	169	145	37	484	13	1	-----	1,214
Bangor, Maine.	25	19	3	-----	4	16	5	11	128	7	-----	-----	218
New London, Conn.	18	11	8	3	-----	28	10	25	208	2	-----	-----	313
Portland, Maine.	35	39	3	1	2	42	23	5	150	9	-----	-----	315
Providence, R. I.	42	18	10	5	-----	40	25	15	161	4	-----	-----	320
Louisville, Ky.	20	4	1	4	1	21	11	15	57	-----	-----	-----	134
Evansville, Ind.	5	-----	6	0	-----	9	2	4	96	-----	-----	-----	128
Memphis, Tenn.	14	-----	6	6	-----	32	12	5	85	-----	-----	-----	161
Nashville, Tenn.	16	-----	3	8	-----	19	2	1	95	-----	-----	-----	144
Pittsburgh, Pa.	35	-----	14	7	1	39	14	8	50	-----	-----	-----	168
Cincinnati, Ohio.	25	-----	16	14	-----	15	12	4	67	-----	-----	-----	153
Point Pleasant, W. Va.	9	-----	9	5	-----	16	1	5	63	-----	-----	-----	108
Detroit, Mich.	61	5	-----	28	1	71	33	13	84	-----	-----	-----	301
Chicago, Ill.	46	4	-----	18	4	49	34	21	106	-----	-----	-----	282
Duluth, Minn.	18	-----	-----	19	3	16	16	4	68	-----	-----	-----	144
Grand Haven, Mich.	22	1	-----	8	3	47	29	3	92	-----	-----	-----	205

OFFICERS LICENSED—Continued

Local district	Steam and motor vessels					Steam ves- sels		Motor ves- sels		Sail vessels of over 700 gross tons		Masters of barges of over 100 gross tons	Total
	Masters	Mates		First-class pilots	Second-class and special pilots	Chief engineers	Assistant and spe- cial engineers	Engineers	Operators	Masters	Chief mates		
		Ocean	Inland										
Marquette, Mich.	12			13	4	21	7	5	72				134
Milwaukee, Wis.	44	1		32	5	59	34	15	57				247
Fort Huron, Mich.	44			24	1	53	43	1	43				209
Cleveland, Ohio	66	1		63		100	79	14	105				428
Buffalo, N. Y.	59			41	7	95	53	11	105				371
Oswego, N. Y.	10	1	1	14	4	22	5	5	172				234
Toledo, Ohio	31	2		16		30	15	9	98				201
New Orleans, La.	179	104	13	20	26	227	135	91	303	5	1		1,104
Galveston, Tex.	102	66		6	9	110	65	29	367	4		2	760
Mobile, Ala.	56	34		9	5	66	44	23	210	5			452
San Juan, P. R.	12	9		4	6	7	16	7	44	3			108
Tampa, Fla.	23	14	4	1	4	20	28	28	279	2			403
Seattle, Wash.	181	107	38	1	1	117	101	93	287	12			938
Hoquiam, Wash.	6	3	6			6	9	7	18				55
Juneau, Alaska	9	6	8	1	14	7	6	26	255				332
St. Michael, Alaska	3	1	2		1	3		5	30				45
Total, 1936	3,612	1,817	305	678	168	4,189	2,849	1,606	10,562	171	8		525,970
Total, 1935	3,824	1,902	314	685	198	4,254	2,981	1,623	10,105	223	7		426,120
Increase (+) or decrease (-)	-212	-85	-9	-7	-30	-65	-132	-17	+457	-52	+1	+1	-150

RESULTS OF ACTION AGAINST LICENSES

Licenses suspended	129
Licenses revoked	15
Licenses refused	92
Licenses canceled	18
Violations of the law:	
Cases investigated	960
Cases dismissed	786
Cases reported to district attorneys and chief officers of customs	88
Trials conducted	97
Number of appeals from decisions of local boards	11
Decisions of local boards reversed by supervising inspectors	1
Decisions of local boards modified by supervising inspectors	4
Decisions of local boards sustained by supervising inspectors	6

EXAMINATIONS FOR COLOR-BLINDNESS

During the year ended June 30, 1936, 6,867 applicants for original licenses and for renewals of licenses were examined for visual defects, 27 of whom were found color-blind, or had other visual defects, and were rejected, and 6,840 were passed. As compared with the previous year, these figures show an increase of 798 in the number examined and of 828 in the number passed.

CERTIFICATES OF SERVICE ISSUED TO ABLE SEAMEN AND TO LIFEBOAT MEN

ABLE SEAMEN

Issued by—	Applica- tions re- ceived	Applica- tions re- jected	Certifi- cates is- sued	Issued by—	Applica- tions re- ceived	Applica- tions re- jected	Certifi- cates is- sued
INSPECTION DISTRICT				INSPECTION DISTRICT—COR.			
San Francisco, Calif.	363	5	358	Marquette, Mich.	15	7	8
Honolulu, Hawaii.	70	12	58	Milwaukee, Wis.	33	7	31
Los Angeles, Calif.	356	58	298	Port Huron, Mich.	46	9	41
Portland, Oreg.	60	15	45	Cleveland, Ohio.	185	9	176
New York, N. Y.	695	63	632	Buffalo, N. Y.	70	6	65
Albany, N. Y.	1		1	Toledo, Ohio.	88	8	80
Philadelphia, Pa.	143	4	139	New Orleans, La.	135	20	115
Norfolk, Va.	175	7	168	Galveston, Tex.	102	7	95
Baltimore, Md.	340	83	257	Mobile, Ala.	119	22	97
Charleston, S. C.	9		9	San Juan, P. R.	21	3	18
Jacksonville, Fla.	97	3	94	Tampa, Fla.	13		17
Savannah, Ga.	61	1	60	Seattle, Wash.	269	42	227
Boston, Mass.	285	61	224	Hoquiam, Wash.	12	2	10
Bangor, Maine.	12		12	Juneau, Alaska.	42	31	11
New London, Conn.	17		17				
Portland, Maine.	31	1	30	Total, 1936.	4,252	542	3,710
Providence, R. I.	94	17	77	Total, 1935.	5,521	479	5,042
Detroit, Mich.	137	31	106				
Chicago, Ill.	89	8	81	Increase (+) or decrease			
Duluth, Minn.	49	3	46	(—)	-1,269	+63	-1,332
Grand Haven, Mich.	8	1	7				

LIFEBOAT MEN

LOCAL INSPECTORS

San Francisco, Calif.	86		86	Detroit, Mich.	55		55
Honolulu, Hawaii.	273	43	230	Chicago, Ill.	7		7
Los Angeles, Calif.	66		66	Duluth, Minn.	3		3
Portland, Oreg.	13		13	Marquette, Mich.	5		5
New York, N. Y.	335		335	Milwaukee, Wis.	2		2
Albany, N. Y.	3		3	Port Huron, Mich.	30		30
New Haven, Conn.	1		1	Cleveland, Ohio.	39		39
Philadelphia, Pa.	54		54	Buffalo, N. Y.	13		13
Norfolk, Va.	54		54	Toledo, Ohio.	5		5
Baltimore, Md.	111		111	New Orleans, La.	127	2	125
Jacksonville, Fla.	186		186	Galveston, Tex.	21		21
Savannah, Ga.	31		31	Mobile, Ala.	60		60
Boston, Mass.	188	40	148	Tampa, Fla.	8		8
Bangor, Maine.	13		13	Seattle, Wash.	185		185
New London, Conn.	19		19	Hoquiam, Wash.	12		12
Portland, Maine.	42		42	Juneau, Alaska.	84	49	35
Providence, R. I.	108	5	103				
Pittsburgh, Pa.	1		1	Total by local inspectors.	2,240	130	2,101

OTHER AUTHORITY

U. S. Coast Guard, Treasury Department.	2,341	1,017	1,324	New York State Merchant Marine Academy.	70	2	68
Coast and Geodetic Survey, Department of Commerce.	55	23	32	Total, 1936.	5,877	1,575	4,302
Bureau of Lighthouses, Department of Commerce.	1,122	304	728	Total, 1935.	16,785	8,183	8,602
Massachusetts nautical school ship <i>Nantucket</i>	49		49	Decrease.	10,908	6,608	4,300

TRANSPORTATION AND LOSS OF LIFE AND PROPERTY

LIVES LOST ON VESSELS SUBJECT TO INSPECTION, BY DISTRICTS

Cause	First		Second		Third		Fourth		Fifth		Sixth		Seventh		Eighth		Ninth		Tenth		Eleventh		Total		
	Passengers	Crew	Passengers	Crew	Passengers	Crew	Passengers	Crew	Passengers	Crew	Passengers	Crew	Passengers	Crew	Passengers	Crew	Passengers	Crew	Passengers	Crew	Passengers	Crew	Passengers	Crew	
Stranding: Nonpassenger vessels.....		34																							34
Fire: Nonpassenger vessels.....						2																			3
Collision: Nonpassenger vessels.....		2		4		1																			3
Foundering: Nonpassenger vessels.....											5														7
Explosion:																									9
Passenger vessels.....		1									4														1
Nonpassenger vessels.....				2		5					2														11
Accidental drowning:																									13
Passenger vessels.....		3		5		2		3		1	2		1												10
Nonpassenger vessels.....		2		1		6		1		4															1
Suicide:																									31
Passenger vessels.....		14		20		3		5		5		1													57
Nonpassenger vessels.....		3		2		2		3		2		1													6
Miscellaneous:																									39
Passenger vessels.....		27		15		12		6		3		2		1											65
Nonpassenger vessels.....		5		2		9		4		5		1		1											48
Total:		41		37		20		17		9		3		1		3		1		3		1			125
Passenger vessels.....		40		36		18		13		12		10		2		3		7		9		3			83
Nonpassenger vessels.....		1		1		2		2		1		1		1		1		1		1		1			42
Grand total.....		41		37		20		17		9		3		1		3		1		3		1			168
Last year.....		21		14		121		105		10		20		1		14		2		4		17			184
Increase (+) or decrease (-).....		+20		+52		-81		-69		+3		+7		+1		+2		+1		-6		+1			+20

The total number of lives lost from all causes, passengers and crew, was 338. Of the lives lost, 273 were from suicide, accidental drowning, natural deaths, and other causes beyond the power of the service to prevent, leaving a loss of 65 fairly chargeable to accidents such as stranding, fire, collision, foundering, etc.

PASSENGERS CARRIED

During the fiscal year 239,816,321 passengers were carried on vessels that are required by law to report the number of passengers carried. Dividing this number by 128, the total number of passengers lost, shows that 1,873,565 passengers were carried for each one lost. The entire loss of life of passengers resulted from unpreventable causes, but in no case were lives of passengers lost as a result of casualty to passenger vessels.

However, one major casualty occurred during the year involving the freight steamer *Iowa*, resulting in an unusual loss of lives, all of which were members of the crew. The steamship *Iowa*, of 5,724 gross tons, left Astoria, Oreg., for New York, via San Francisco, Calif., about midnight Saturday, January 11, 1936. About 4 hours later the *Iowa* was stranded on Peacock Spit, Columbia River entrance, and became a complete wreck, and the 34 officers and crew were drowned. At the time of the wreck there was a 76-mile gale blowing. An investigation was conducted, and from the evidence adduced it was concluded that the accident was caused by unforeseen and unexpected storm conditions arising after the steamer left Astoria, Oreg. Estimated value of steamer was \$260,000; estimated value of cargo, \$160,000.

VESSELS LOST

Steam vessels.....	12
Motor vessels.....	3
Sail vessels.....	1
Barges, etc.....	15
Total.....	31

VALUE OF PROPERTY LOST

By explosion or accidental escape of steam.....	\$36, 863
By wreck or founder.....	1, 356, 644
By collision.....	1, 536, 871
By fire.....	731, 960
By snags.....	70, 658
From miscellaneous causes.....	1, 860, 739
Total.....	5, 593, 735

PREVENTION OF OVERCROWDING OF PASSENGER VESSELS

Under the law, the certificates of inspection of vessels specify the number of passengers they may carry with safety. To prevent the taking on of passengers in excess of the number so fixed, the Bureau employs inspectors who count such passengers and, when the limit is reached, prevent additional persons from going on board.

During the year 5,507,314 passengers going on excursion boats were so counted. The following table shows these counts by services.

Port	Inspectors						Total	
	Navigation		Local		Customs		Counts	Passengers
	Counts	Passengers	Counts	Passengers	Counts	Passengers		
Albany			104	46,713			104	46,713
Baltimore	1,653	762,136	148	98,312			1,801	860,448
Boston	6	4,740			331	288,369	337	293,109
Buffalo			85	78,995	969	482,533	1,074	561,528
Chicago	908	207,753					908	207,753
Cincinnati			30	49,517			30	49,517
Cleveland	406	375,331	26	24,515	42	28,154	474	428,000
Detroit	591	538,304			10	8,115	601	546,419
Dubuque			7	7,772			7	7,772
Duluth	78	11,308	15	2,599	102	13,249	195	27,146
Evansville			6	3,724			6	3,724
Galveston			21	6,547	25	6,280	46	12,827
Grand Haven			56	33,231			56	33,231
Indianapolis					9	11,113	9	11,113
Los Angeles			18	20,706			18	20,706
Louisville	138	70,625	68	41,257			206	111,882
Memphis			1	1,327			1	1,327
Milwaukee			17	21,942			17	21,942
Mobile	84	1,054	4	1,032			88	2,086
New Haven			241	13,853			241	13,853
New London			69	13,272			69	13,272
New Orleans			312	71,060			312	71,060
New York			1,184	148,793	3,570	1,480,539	4,724	1,579,332
Norfolk					28	8,209	28	8,209
Oswego			209	11,978			209	11,978
Philadelphia			283	77,797	83	67,844	336	145,641
Pittsburgh			3	1,670			3	1,670
Port Huron			2	455			2	455
Portland, Maine	69	10,864			2	400	71	11,264
Portland, Oreg.	20	1,536	26	5,531			46	7,067
Providence	127	37,228	151	45,210			278	82,438
Rochester	21	10,520					21	10,520
St. Louis			17	17,426			17	17,426
San Francisco	444	25,708	12	15,551	272	38,423	728	79,772
Seattle	157	24,820	710	72,478	15	7,999	882	105,297
Tampa	2	155					2	155
Toledo			42	40,672			42	40,672
Total, 1936	4,707	2,142,172	3,807	973,915	5,478	2,391,227	13,992	5,507,314
Total, 1935	5,051	2,146,436	3,772	1,079,551	4,225	3,145,617	13,048	6,371,604

On 197 occasions it became necessary for inspectors to prevent additional passengers from going on board. This involved the safety of 171,856 passengers. In 1935 there were 168 shut-offs, involving the safety of 148,382 passengers.

The following table shows these shut-offs in detail by ports:

Port	July 1935		August 1935		September 1935		June 1936		Total	
	Counts	Passengers	Counts	Passengers	Counts	Passengers	Counts	Passengers	Counts	Passengers
Baltimore			4	3,400			2	2,380	6	5,780
Boston	27	40,495	31	40,981			13	5,277	71	86,753
Chicago	9	7,770	13	12,135					22	19,905
Cleveland	1	814	2	4,700					3	5,514
Detroit	2	5,600	6	16,600			4	11,000	12	33,200
Galveston	1	467	4	1,830					5	2,297
Louisville	1	1,450							1	1,450
Mobile	2	40	1	20					3	60
New York							36	5,902	36	5,902
Portland, Maine			2	477					2	477
Portland, Oreg.			2	104	1	263			3	367
Providence	4	1,618	4	3,471					8	5,089
San Francisco			5	664			12	2,500	17	3,164
Seattle	7	1,888					1	10	8	1,898
Total	54	60,142	74	84,382	1	263	68	27,069	197	171,856
Total, 1935									168	148,382



PATENT OFFICE

VOLUME OF BUSINESS

Improvement in industrial conditions throughout the country continued to be reflected in the activities of the Patent Office in 1936, as also in each of the preceding 2 years. Most significant of these indexes of progress toward economic recovery were a satisfactory flow of pecuniary receipts; a gain in the number of applications for mechanical patents, including reissues, and for designs, trade marks, prints, and labels; more numerous recording of deeds of assignment; larger purchases of printed copies of patents and photoprints of manuscript records, etc., and an increase in general correspondence with the Office.

The number of applications for patents, reissues, designs, trade marks, and prints and labels in the fiscal year was 85,102, the largest total in any like period since 1932. The aggregate of design patents issued in 1935-36 was the greatest in the history of the Office. This fact is noteworthy as indicating the growing use of this form of protection by manufacturers and merchandisers. The establishment of the Design Division as a separate unit more than 2 years ago has greatly expedited the consideration of applications and provided industry with a service to which it is having increasingly larger recourse. Copies of patents sold during the year were 3,540,545. This exceeded the number sold in any year since 1932. In all, 939,061 photostatic and 53,761 photographic copies were furnished by the Office, the largest number in several years. A total of 431,181 letters representing the miscellaneous correspondence of the Office was received. In addition, 34,845 letters were returned with information.

The number of applications for mechanical inventions filed during the year was 59,809. This was 401 more than the total received in any year since 1932. Applications for design patents numbered 6,127, which was 1,058 more than in 1935, 2,316 more than in 1934, and the largest number ever filed in any year. Compared with 1935, there was an increase in the number of applications for registration of trade marks. There were 15,840 such applications in 1936, against 15,617 in the previous year.

RECEIPTS AND EXPENDITURES

For the first time in 3 years the expenditures of the Office exceeded its receipts. The deficit was \$78,364.52, and this notwithstanding that the receipts were \$103,224.50 larger in 1936 than in 1935. In January 1935 the reallocation of 269 junior examiners who had served from 3 to 6 years without any increase in compensation necessitated

a large addition to the annual charge for salaries. For the full fiscal year of 1935-36 that charge was \$131,300, or \$52,936 more than the deficit incurred in the same 12 months. In 1935 the surplus of receipts over expenditures was \$111,283.46 and in 1934 it was \$506,683.10. In the period from 1923 to 1933 the annual deficits varied from a minimum of \$134,433 to \$827,342. In itself the deficit in the last fiscal year is of no great import first, because it is less than 2 percent of the receipts, and secondly, because the purpose and the policy of the Patent Office should not contemplate that it be operated at a profit derived from the pockets of inventors. What, therefore, is regrettable about the latest deficit is that it postpones the reduction of the various statutory fees now payable by applicants for patents and trade-mark registrations. It was hoped that, with the prospect of a continuous and considerable excess of receipts over expenditures, a decrease in fees could be effected for the benefit of inventors and of industry.

CONDITION OF THE WORK

As a concomitant, if not as a consequence, of the larger number of applications filed in 1935-36, there was a slight recession in the status of the work of the mechanical divisions, compared with the previous year. On June 30 the work of 5 divisions was within 60 days of current. Forty-nine divisions were within 3 months of current, and all 65 of them were within 4 months of current. Seventeen divisions were within 2 months, and 56 were within 3 months of current at the end of the fiscal year 1935-36. The design division is operating within less than 30 days of current. This marks a gain over the record for any previous year. The work of all the clerical divisions of the Office is current.

The number of patent applications awaiting action on June 30, 1936, was 33,540, or 1,620 more than on the corresponding date of 1935. Final disposition was made of 61,990 applications either by their issuance as patents or their abandonment by the applicants. This compared with 64,599 final dispositions in 1934-35. There were pending at the close of the latest fiscal year 104,095 applications, or 2,260 fewer than on the same relative date of 1935.

CLASSIFICATION OF PATENTS

One of the chief needs of the Patent Office and of industry—classification of patents—is now being met after too long a delay. In the course of the 12 months preceding June 30, the revision of 10 classes (21, 46, 64, 75, 99, 138, 174, 195, 223, and 227) containing 39,737 patents and 27,960 cross-references was completed and groups of subclasses were revised in other classes comprising 10,068 original patents. This was accomplished in addition to the performance of work on the current issue of patents and the discharge of other duties of the Division.

Sixteen of the nineteen employees in the Division were engaged during the year in the revision of the classification. The time of three was given to the dispatch of the current work, exclusive of classification. This current work is of two kinds: First, passing on questions of division under rules 41 and 42, including questions

of election of species and cancelation of claims, and second, the assignment of pending applications to the proper classes for examination. Written decisions on division under rules 41 and 42 were furnished in respect to 2,568 applications, and 870 written memoranda were prepared in cases of assignment of applications to the proper class when two or more primary examiners contested the propriety of such assignment. At least half as numerous were the cases which were informally decided on reference by examiners.

The Division is now proceeding with the revision of 17 classes in which are comprised 154,189 original patents. The revision of several of these classes is nearing completion. Among these are the three principal electrical classes—171, 172, and 173—which have gone without revision for a long period. It is planned to begin work shortly on the other unrevised electrical classes—175 and 177. A start has already been made in formulating a new class of air conditioning, an art which is developing rapidly and which is even now the subject matter of a large number of patents.

With a force of 20 men assigned to the task of revising classes which have remained longest without revision those in the worst condition can be reclassified within 3 years, and thereafter a permanent staff of 12 or 15 can bring the classification to date and keep it so.

IMPROVEMENTS IN THE RULES OF PRACTICE

Changes made in the Rules of Practice have brought beneficial results not only to the Patent Office but also to inventors and to industry. For one thing, these amendments are obviating delays and facilitating the proceedings which they concern. Notable improvement has been effected in the disposal of motions and proceedings governed by rules 109 and 122. By transferring the disposition of these from the 3 examiners of interferences to the 66 primary examiners, the period of their pendency has been greatly reduced. At the end of 1934 some 375 interlocutory matters were awaiting decision by the examiners of interferences. By December 1, 1935, disposition had been made of all these proceedings. In the course of the same 12 months similar matters pending for decision by the various primary examiners reached an average of 160; that is, fewer than 3 cases for a division. Under the rules as amended motions are now being set for hearing within 60 days after the last day for filing. Accordingly, in the last months of the fiscal year 1935-36 there were but 200 cases awaiting hearing. This contrasts with about 550 under the former practice, when the interval between the last date for filing motions and the hearing was seldom less than 6 months and often as much as a full year. The number of interference cases suspended for consideration of interlocutory proceedings is now less than 350, as against a maximum of 900 under the former practice. In 1935, following the transfer of motions from the examiners of interferences to the primary examiners, the number of cases which had come to final hearing and in which decisions were pending was decreased from a maximum of 219 to 113. The present rate of progress under the new practice warrants the belief that the decisions now in arrears will be reduced to a normal level of approximately 60.

RECENT LEGISLATION

At the last session of the Congress statutes were enacted to put into effect certain provisions of the International Convention for the Protection of Industrial Property, as amended at The Hague.

By the act of June 19, 1936, section 4887 of the Revised Statutes (U. S. C., title 35, sec. 32) was amended to change the priority period for the filing of an application for a design patent from 4 months to 6 months.

By the act of June 20, 1936, section 4 of the Trade Mark Act of February 20, 1905 (U. S. C., title 15, sec. 84), was amended to change the priority period for the filing of an application for the registration of a trade mark from 4 months to 6 months; and to provide that subject to the provisions of section 5 of the Trade Mark Act a collective mark may be registered by an association located in a foreign country, where the existence of that association is not contrary to the laws of such country, even if it does not possess an industrial or commercial establishment.

SPECIAL CASES

Petitions to have applications examined out of their regular turn numbered 336 for the year ended June 30, 1936, compared with 470 for the corresponding period of 1934-35, and 485 for 1933-34. In 85 cases in which the applicants were able to show that the advancement of their applications would result in immediate investment of capital and employment of labor the petitions were granted.

PATENT OFFICE ADVISORY COMMITTEE

The Patent Office Advisory Committee, appointed by the Secretary of Commerce in July 1933 has continued to meet regularly at intervals of from 4 to 6 weeks (except during the summer season), such meetings generally extending over a period of 3 days. The committee represents such different viewpoints as industry, general law, and patent law.

Numerous points of patent practice and procedure have had and continue to engage the committee's attention, including the prevention of willful delays by applicants, schedule of fees, classification, printing of patent copies, inventions by Government employees, reissues, ethics, recording of licenses, publishing of applications, form of claims, divisional applications, form of and time for filing briefs, etc. Appropriate recommendations reflecting the action of the committee on these and other matters have been or will be made, where, in its opinion, improvement would result from a change.

Members of the advisory committee are: George Ramsey, New York, N. Y., chairman; Robert M. Barr, Philadelphia, Pa.; William J. Belknap, Detroit, Mich.; Worthington Campbell, New York, N. Y.; John J. Darby, Washington, D. C.; John A. Diener, Chicago, Ill.; Thomas J. Griswold, Jr., Midland, Mich.; Franklin E. Hardy, Pittsburgh, Pa.; Delos G. Haynes, St. Louis, Mo.; Carl D. Kelly, Chicago, Ill.; Herman Lind, Cleveland, Ohio; Robert Lund, St. Louis, Mo.

Justin W. Macklin, who was one of the first members and later secretary of the committee, continued his services until last May, when

the President appointed him to the post of First Assistant Commissioner of Patents.

On April 22, 1936, occurred the death of Bryan M. Battey of New York, N. Y., Assistant Commissioner of Patents, who had served in that capacity since April 10, 1934. Henry Van Arsdale, of New Rochelle, N. Y., was appointed on June 6, 1936, to fill the vacancy and began the discharge of his duties on June 18, 1936.

STATISTICS

Following is presented the usual statistical information regarding the various activities of the Patent Office.

*Applications received during the fiscal year ended June 30, 1936*¹

With fees:	
Applications for patents for inventions.....	59,809
Applications for patents for designs.....	6,127
Applications for reissues of patents.....	403
	66,339
Applications for registration of trade marks.....	² 15,840
Applications for registration of labels and prints.....	2,923
	18,763
Total, with fees.....	85,102
Without fees:	
Applications for inventions (act Mar. 3, 1883).....	331
Applications for reissue (act Mar. 3, 1883).....	1
Total, without fees.....	332
Grand total.....	85,434

¹ Including applications in which fees were refunded and transferred.

² Includes 1,882 applications for renewal of trade-mark registrations.

Applications for patents for inventions with fees

Year ended June 30—	Year ended June 30—Continued.
1927..... 84,511	1932..... 73,465
1928..... 88,482	1933..... 59,408
1929..... 87,039	1934..... 56,095
1930..... 91,430	1935..... 56,832
1931..... 84,097	1936..... 59,809

Applications for patents, including reissues, designs, trade marks, labels, and prints, with fees

Year ended June 30—	Year ended June 30—Continued.
1927..... 113,783	1932..... 93,859
1928..... 116,844	1933..... 79,469
1929..... 114,496	1934..... 79,367
1930..... 117,569	1935..... 81,000
1931..... 106,717	1936..... 85,102

Patent applications awaiting action

June 30—	June 30—Continued.
1927..... 64,646	1932..... 76,728
1928..... 106,575	1933..... 49,050
1929..... 103,236	1934..... 39,226
1930..... 119,597	1935..... 31,920
1931..... 92,203	1936..... 33,540

Patents withheld and patents expired

	1935	1936
Letters patent withheld for nonpayment of final fees.....	7,229	5,673
Applications allowed awaiting payment of final fees.....	15,949	15,147
Patents expired.....	37,260	37,316
Applications in which issue of patent has been deferred under sec. 4885, Revised Statutes.....	333	594
Applications in process of issue.....	3,245	2,844

Patents granted and trade marks, labels, and prints registered

	1932	1933	1934	1935	1936
Letters patent.....	52,572	50,766	48,523	41,621	39,978
Plant patents.....	17	52	30	28	61
Design patents.....	2,728	2,934	2,419	3,437	4,174
Reissue patents.....	392	375	343	400	400
Trade marks.....	10,901	8,909	10,139	11,109	10,777
Labels.....	1,492	1,458	1,635	1,908	1,787
Prints.....	483	479	535	500	519
Total.....	68,585	64,973	63,624	59,003	57,696

Statement of receipts and earnings for the fiscal year ended June 30, 1936

Unearned balance at close of business June 30, 1935.....	\$189,487.43
Collections during fiscal year ended June 30, 1936.....	4,201,175.67
Total.....	4,390,663.10
Refundments.....	22,563.93
Net collections.....	<u>\$4,368,099.17</u>

Earnings:

Inventions, first fees.....	\$1,790,880.00
Extra claims.....	31,634.00
Reissues.....	12,120.00
Designs.....	64,585.00
Design extensions.....	28,395.00
Trade marks.....	233,655.00
Labels and prints.....	13,908.00
Total.....	2,175,177.00
Final fees.....	1,183,140.00
Extra claims.....	25,918.00
Total.....	1,209,058.00
Appeals.....	58,550.00
Oppositions.....	9,060.00
Disclaimers.....	2,030.00
Revivals.....	4,460.00
Total.....	74,100.00
Printed copies, etc.....	361,289.70
Photoprints.....	10,789.60
Photostats.....	60,809.55
Manuscripts.....	110,957.45
Certified printed copies, etc.....	7,953.88

Recording articles of incorporation	\$381.00
Recording international trade marks	30.00
Registration of attorneys	430.00
<hr/>	
Total	\$553, 141. 18
Drawings	18, 511. 38
Assignments	141, 879. 70

Total earnings	\$4, 171, 867. 26
Unearned balance June 30, 1936	196, 231. 91

Net receipts 4, 368, 099. 17

Expenditures fiscal year ended June 30, 1936

Salaries	\$3, 331, 029. 17
Photolithographing:	
Current issue, black and white	\$43, 817. 91
Current issue, color	10, 682. 00
Reproduction	52, 070. 30
Photographic printing	13, 960. 22
Photostat supplies	54, 723. 03
Total	175, 253. 46
Miscellaneous expenses	47, 499. 24
Printing and binding:	
Specifications	740, 596. 25
Official Gazette	96, 630. 38
Indexes	10, 700. 03
Total	847, 926. 66
Miscellaneous	44, 755. 16
Total	4, 446, 463. 69

Receipts and expenditures

Receipts from all sources	\$4, 368, 099. 17
Expenditures	4, 446, 463. 69
Deficit	78, 364. 52
Receipts from sale of Official Gazette and other publications (Superintendent of Documents)	69, 430. 00

Comparative Statement

June 30—	Receipts	Expenditures	Deficit	Surplus
1927	\$3, 524, 155. 55	\$3, 769, 604. 03	\$245, 448. 48	
1928	3, 705, 338. 31	3, 839, 771. 66	134, 433. 35	
1929	3, 783, 481. 65	4, 391, 860. 16	608, 378. 51	
1930	4, 096, 325. 43	4, 552, 685. 41	455, 859. 98	
1931	4, 565, 377. 08	4, 832, 277. 96	266, 900. 88	
1932	4, 487, 508. 78	5, 314, 851. 59	827, 342. 81	
1933	4, 423, 563. 18	4, 588, 885. 02	165, 021. 84	
1934	4, 353, 468. 11	3, 876, 785. 01		\$506, 683. 10
1935	4, 284, 874. 67	4, 153, 591. 21		111, 283. 46
1936	4, 368, 099. 17	4, 446, 463. 69	78, 364. 52	

¹ This does not include the amount received by the Superintendent of Documents for the Official Gazette and other publications.

Comparative statement of expenditures under separate appropriations

Appropriation	1935	1936
Salaries.....	\$3, 100, 199. 86	\$3, 331, 029. 17
Public use of inventions, etc.....	253. 89	-----
Photolithographing.....	146, 533. 29	175, 253. 46
Printing and binding.....	822, 419. 15	847, 926. 66
Miscellaneous printing and binding.....	46, 557. 82	44, 755. 16
Furniture and filing cases.....	12, 320. 41	-----
Contingent expenses, including library stock.....	25, 308. 79	-----
Miscellaneous expenses.....	-----	47, 499. 24
Total.....	4, 153, 591. 21	4, 446, 463. 69

Litigated cases

Patent:		
Interferences declared.....		1, 941
Interferences disposed of before final hearing.....		1, 957
Interferences disposed of after final hearing.....		413
Interferences heard.....		285
Interferences awaiting decision.....		60
Trade mark:		
Interferences declared.....		163
Oppositions instituted.....		932
Cancellations instituted.....		163
Interferences disposed of before final hearing.....		874
Interferences disposed of after final hearing.....		346
Interferences heard.....		334
Interferences awaiting decision.....		15
Before the Board of Appeals:		
Appeals in ex parte cases.....		2, 816
Appeals in interference cases:		
Priorities.....	282	
Motions.....	362	
		644
		<u>3, 460</u>
Ex parte appeals disposed of.....		2, 196
Appeals in interference cases disposed of:		
Priorities.....	174	
Motions.....	371	
		545
		<u>2, 741</u>
Ex parte cases awaiting action.....		1, 769
Interference cases awaiting action:		
Priorities.....	165	
Motions.....	179	
		344
		<u>2, 113</u>
Oldest ex parte case awaiting action, April 28, 1936.		
Oldest interference case awaiting action, May 25, 1936.		
To the commissioner:		
Appeals in trade-mark interferences.....	10	
Appeals in trade-mark oppositions.....	77	
Appeals in trade-mark cancellations.....	22	
Appeals in ex parte trade-mark cases.....	22	
Interlocutory appeals.....	21	
		152
Petitions to commissioner:		
Ex parte.....	7, 199	
Inter partes.....	233	
		7, 432
		<u>7, 584</u>

Cases disposed of by commissioner:		
Appeals in trade-mark interferences.....	8	
Appeals in trade-mark oppositions.....	58	
Appeals in trade-mark cancelations.....	15	
Appeals in ex parte trade marks.....	14	
Interlocutory appeals.....	21	
		111
Petitions disposed of—		
Ex parte.....	7,199	
Inter partes.....	233	
		7,432
		7,543
Notices of appeals to United States Court of Customs and Patent Appeals:		
In ex parte cases (including 8 trade marks).....	127	
In inter partes cases (patents).....	52	
In design applications.....	1	
In trade-mark interferences.....	3	
In trade-mark oppositions.....	26	
In trade-mark cancelations.....	10	
		219
To Supreme Court, District of Columbia, in equity suits.....		79

OTHER DETAILS OF BUSINESS FOR THE FISCAL YEAR

As to the volume of business, the Office received during the year 66,339 applications for patents, reissues, and designs; 13,958 trade-mark applications and 1,882 applications for renewal of trade-mark registrations; 2,923 label and print applications; 187,999 amendments to patent applications; 9,196 amendments to design applications; and 15,738 amendments to trade-mark, label, and print applications.

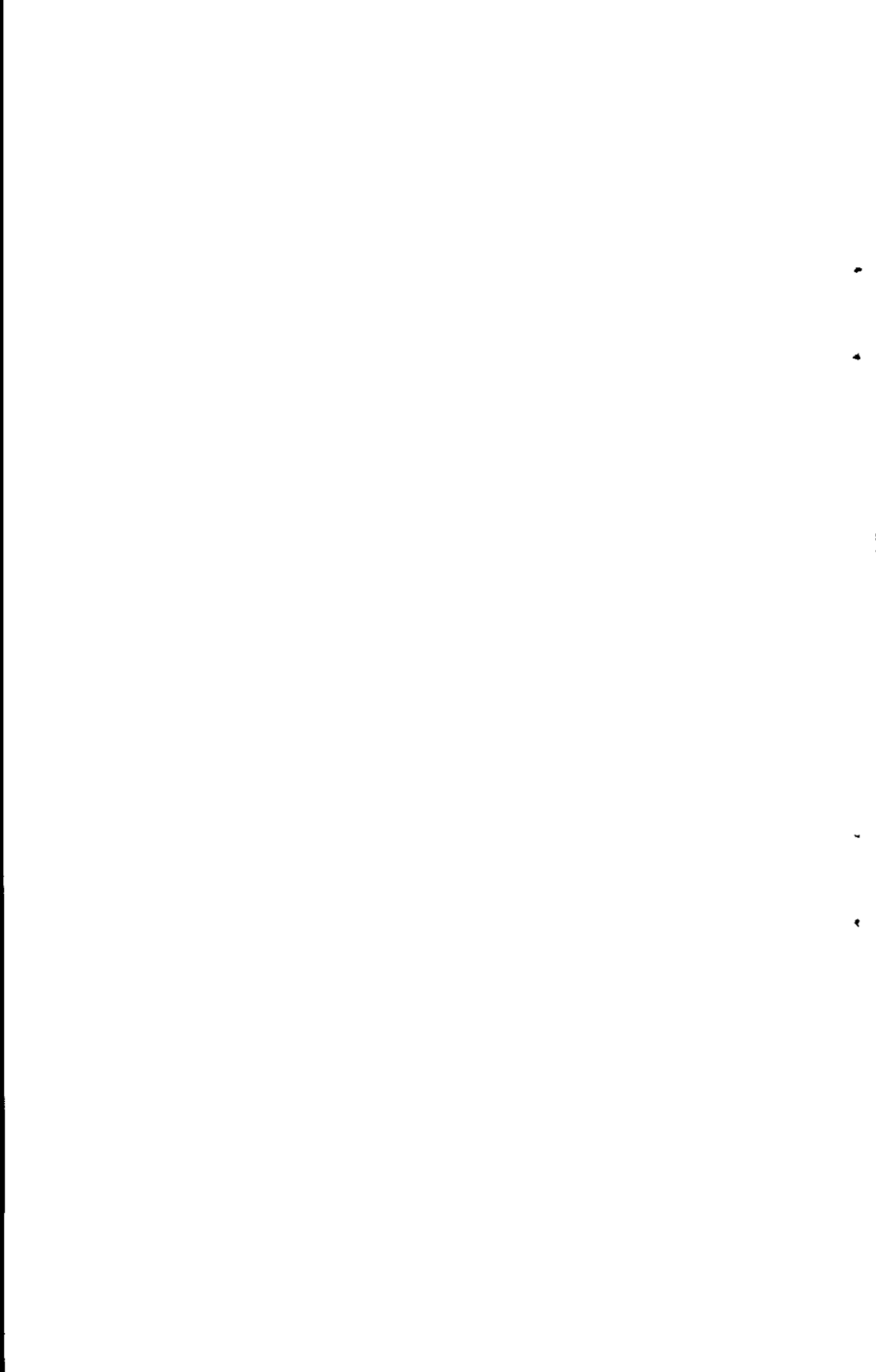
The number of letters constituting the miscellaneous correspondence received and indexed was 431,181. In addition 34,845 letters were returned with information.

The number of printed copies of patents sold was 3,540,545; 1,147,486 copies of patents were shipped to foreign governments; and 734,967 copies furnished public libraries. The total number of copies of patents furnished was 6,041,927, including those for Office use and other departments.

The Office received for record 41,206 deeds of assignment.

The Drafting Division made 842 drawings for inventors and corrected 11,881 drawings on request of inventors; 119,507 sheets of drawings were inspected and 15,055 letters answered.

Typewritten copies of 3,150,000 words were furnished at 10 cents per hundred words. The Office certified to 14,399 manuscript copies and furnished 6,874 miscellaneous certified copies. It also furnished 479,926 photostat copies of manuscript pages, 40,173 photographic copies, and 312,527 photostat copies of publications and foreign patents, for sale; 15,963 photostat-manuscript pages, 199 certified manuscript copies and 6,611 photostat copies for Government departments, without charge; 34,132 photostat and 13,588 photographic copies for use of the Patent Office; 14,275 photostat copies for sale through photoprint section, and 144 photostats for Office use; also 75,483 photostats for assignments, grants, and disclaimers for official use; in all, 939,061 photostat and 53,761 photographic copies.



UNITED STATES SHIPPING BOARD BUREAU

GENERAL STATEMENT

Since the abolition of the United States Shipping Board and the transfer of its functions to the Department of Commerce by Executive order effective August 9, 1933, this Bureau has been charged with the maintenance and development of the American merchant marine, the regulation of carriers by water in interstate and foreign commerce, and (through the Merchant Fleet Corporation) with the administration of the marine insurance fund, the operation of Government lines and terminals, and the custody of the Government's laid-up fleet. Under the provisions of the Merchant Marine Act, 1936, all of these functions will be transferred to the newly created United States Maritime Commission early in the fiscal year 1937.

The first year and a half of the period during which this Bureau has been charged with the functions of the former United States Shipping Board coincided almost exactly with the successive investigations of ocean-mail contracts by a special committee of the Senate and by the Post Office Department, the result of which has been that the system of indirect subsidies established under the Merchant Marine Act, 1928, whatever might have been its original possibilities if properly administered, was discredited and its usefulness ended. The latter part of that 3-year period coincided almost as closely with the active pendency of numerous legislative proposals, some of which would have established new and more direct subsidies, while others would practically have put an end to a privately owned merchant marine.

This legislative situation was not clarified until the approval of the Merchant Marine Act, 1936, on the next to the last day of the fiscal year for which this report is made. Under these circumstances, and particularly in view of the uncertainty which prevailed for so long as to the Government's future policy toward the merchant marine, neither private operators nor a Government bureau could accomplish much of a constructive nature toward a development which would necessarily involve the building of new ships and possibly the consolidation or rearrangement of privately owned lines.

However, marked progress has been made during this period in at least two important respects, namely, the regulation of carriers by water and the repayment of construction-loan and ship-sales notes. These accomplishments should greatly facilitate the work of the United States Maritime Commission in administering policies established by the new legislation.

The administration of the regulatory provisions of the shipping laws has been raised to a much higher level of efficiency in the interest of both carriers and shippers, and the respect of both groups for those provisions has been correspondingly enhanced.

The two investigations mentioned in the annual report of the Bureau for the fiscal year 1935 were completed and departmental orders based on the findings in these two investigations were issued during the fiscal year 1936. The report on the intercoastal investigation condemning certain practices, outlining in detail the requirements of the Intercoastal Shipping Act, 1933, and noting changes necessary for compliance with the law, was issued on July 3, 1935. As a result of the investigation into rates of common carriers in foreign commerce, an order was issued on July 12, 1935, effective September 1, 1935, requiring the carriers to file export rates. This order served to end all secrecy concerning such rates.

The collections on secured accounts due the Shipping Board Bureau and the Merchant Fleet Corporation during the fiscal year 1936, while not as large as in the previous year, continued in gratifying volume and totaled \$18,281,808.88. This sum consisted of \$14,797,340.56 in principal payments and \$3,484,468.32 in interest payments. No new construction loans were made during the fiscal year. Two borrowers prepaid the entire amount of their obligations and eight borrowers from the construction loan fund prepaid substantial portions of their indebtedness as did eight companies obligated for the purchase of ships. On August 9, 1933, when the transfer of the activities of the Shipping Board to the Department of Commerce took effect, outstanding ship sales and construction loan mortgages amounted to \$155,080,592.64. On June 30, 1936, that total had been reduced to \$104,284,877.89. In other words, in slightly less than 3 years, \$50,795,714.75, or almost one-third, had been paid back to the Government, notwithstanding that by the terms of the loans most of them were to run for either 15 or 20 years.

Even more gratifying has been the marked improvement during the past 3 years in the status of those lines which were in default on August 9, 1933. On that date 13 active companies were in arrears on ship sales or construction-loan mortgages. Since then only 2 small companies have been added to the list, while on the other hand 6 of the original 13 have completely paid up all arrearages. A seventh has for more than 2 years been making regular payments on a schedule which has already reduced its arrearages from \$853,800 to \$109,600 with every indication that its obligations will be current by the time this report is printed. Two of the six other companies still in default are in appreciably sounder financial condition than they have been at any time during the period, and only two have had occasion to resort to receivership.

The total operating loss of the Merchant Fleet Corporation, including its administrative expense and net profit from operation and maintenance of terminals and real estate, as well as expense of employees assigned to the Shipping Board Bureau for the fiscal year 1936, was \$1,616,984.35, as compared with \$1,698,130.96 for the fiscal year 1935, a reduction of about \$81,000. In addition, the amount which was chargeable to liquidation funds totaled \$955,667.54, including \$443,289.97 for work performed by the general administrative organization of the Corporation.

In this connection it is worthy of note that the total expenditures of the entire Bureau-Fleet Corporation organization have been consistently and steadily reduced each year since the transfer to the

Department of Commerce in 1933 so that the total of \$2,572,497 for the fiscal year 1936 is little more than a third of the corresponding total of \$6,313,156.61 for the last year under the former Shipping Board.

During the fiscal year a new form of operating agreement was effected with the managing agents of the Government-owned lines. The new agreement, designated as "Operating Agreement 1935" and superseding Operating Agreement 1930, is a straight agency agreement and leaves the actual operation of the lines in the hands of the managing agent under the direct supervision of the Merchant Fleet Corporation. The new methods of compensation included in Operating Agreement 1935 are believed to be conducive to more economical operation of the lines by managing agents.

During the fiscal year 1936, three vessels were sold, one for operation in the West African service, one for conversion to a bulk and liquid cargo carrier, and one for conversion to a stationary oil plant. In addition, 40 vessels with a total deadweight of 318,565 tons were delivered for dismantling and scrapping in settlement of a contract made by the former Shipping Board. Acquisitions included four small craft and the S. S. *Eastern Temple*, on which the Government was mortgagee and which was purchased at a court sale. Preservation and maintenance work was carried on above the waterline on those vessels of the laid-up fleet which warranted the work. At the end of the fiscal year 1936 the inactive fleet consisted of 197 vessels, exclusive of Navy Department vessels, as compared with 229 vessels on July 1, 1935.

In March 1936, a reorganization of the Shipping Board Bureau and the Merchant Fleet Corporation was effected, and the functions of several divisions and offices were reassigned as noted in the body of this report. The revision of the administrative organization will, it is believed, expedite the transfer and consolidation of activities as required under the Merchant Marine Act of 1936.

During the fiscal year 1936 American shipping in the foreign trade continued to register moderate gains in spite of disturbed world conditions. Under the provisions of the Merchant Marine Act, 1936, it is expected that further impetus will be afforded American shipping. Equalization of construction and operating differentials will no doubt provide a motive for expansion and replacement in the merchant marine. The obsolescence of the preponderance of the vessels in our merchant fleet has been a matter of great concern, but it is expected that the new legislation will solve the replacement problem, and will be a step toward the permanent solution of this retarding phase of our maritime activity. The complete modernization of our merchant fleet will enable us to maintain our competitive position on the seas and enhance the gains already made in our foreign commerce.

The commerce of the world has shown an encouraging increase and many of the artificial trade barriers have been removed by international action. It has been the aim of the Shipping Board Bureau to foster in every way possible the fortunes of the American merchant marine to the end that it might gain the advantages accruing from reciprocal action between the United States and foreign countries.

At the close of the fiscal year 1936 the Bureau's activities were carried on in the Division of Regulation, Division of Shipping Research, and Section of Public Information. The work of the Merchant Fleet Corporation was carried on in the Division of Construction and Maintenance, Division of Operations and Sales, Division of Traffic, Division of Insurance, and in the offices of the secretary, treasurer (Division of Finance), and general comptroller. These last offices perform dual functions for both the Merchant Fleet Corporation and the Shipping Board Bureau.

OFFICE OF THE DIRECTOR

Under policies approved by the Secretary of Commerce the Director administers the activities of the Bureau through the Division of Regulation, the Division of Shipping Research, and the Section of Public Information, and also has general administration of policies of the Secretary of Commerce relating to the activities of the Merchant Fleet Corporation.

DIVISION OF REGULATION

This Division continued to handle matters relating to the regulatory provisions of the Shipping Act, 1916, the Merchant Marine Act, 1920, and the Intercoastal Shipping Act, 1933. Its activities deal with the lawfulness of transportation rates of common carriers by water in interstate and foreign commerce; with the practices of these carriers and of other persons carrying on the business of forwarding or furnishing wharfage, dock, warehouse, or other terminal facilities in connection with such carriers; and with the maintenance of tariff files covering rates and practices of common carriers by water.

Formal docket.—At the close of the fiscal year 1935 there were 70 cases pending before the Division for determination. At the close of the 1936 fiscal year, 239 cases were pending, 205 of which are claims for reparation and involve substantially the same issues.

The final report in docket 126, the general intercoastal investigation referred to in last year's report, was issued on July 3, 1935, Intercoastal Investigation, 1935, 1 U. S. S. B. B. 400. It condemned certain practices of carriers and outlined in considerable detail the requirements under the Intercoastal Shipping Act, 1933, and the particular instances in which changes were necessary in order to bring the practices, services, and charges of such carriers within the law.

In connection with the following formal dockets, court actions were instituted by the carriers involved, contesting the orders issued by the Department:

Docket no. 193—*Intercoastal rates to and from Berkeley and Emeryville, Calif. (no. 2), 1 U. S. S. B. B. 510.*—This proceeding involved tariff schedules filed by the McCormick Steamship Co. and the Berkeley Transportation Co. proposing to cancel joint rates maintained by them for through intercoastal transportation of property between Berkeley or Emeryville, Calif., and ports on the Atlantic coast of the United States. The tariff schedules were suspended under authority of section 3 of the Intercoastal Shipping Act, 1933, and the Department, after an investigation, found the proposed can-

relations not justified, and by an order issued August 28, 1935, required the cancelation of the suspended schedules by respondent carriers and the continued maintenance of the joint rates. Thereupon these carriers filed a bill in equity in the southern division of the District Court of the United States for the Northern District of California to enjoin the enforcement of the order. A decision holding the order invalid has been handed down by this court.

Docket no. 294—Gulf intercoastal contract rates, 1 U. S. S. B. B. 524.—In an investigation and suspension proceeding involving tariffs of carriers, members of the Gulf Intercoastal Conference, a proposed contract-rate system for intercoastal transportation of certain commodities, was found unjustified and unlawful. An order of the Department, issued January 21, 1936, requiring the carriers to cancel the tariffs involved, was made the subject of a bill in equity in the Supreme Court of the District of Columbia to enjoin the Department from enforcing the said order. In a decision of that court, sitting as a United States District Court for the District of Columbia, the order of the Department was upheld and the bill dismissed.

Informal docket.—The Division endeavors, on its informal docket, through correspondence and informal conference, to aid shippers, carriers, and others in the adjustment of controversies which arise in the matter of rates, fares, and charges for transportation, and rules and regulations relating thereto. A change in our rules of procedure whereby informal complaints are now required to be verified under oath is believed to be responsible, at least to a considerable extent, for the decrease in the number of cases handled on this docket. Prior to June 28, 1935, verification of informal complaints was not required. At the close of the fiscal year 1935, 10 cases awaited disposition. Only four new complaints were filed during the current year. Twelve cases were disposed of, and one case, because of the filing of a formal complaint, has been transferred to the formal docket.

Special docket.—There has been a marked decrease in the number of cases handled on the special docket during the current fiscal year. Applications on this docket differ from complaints on the formal docket in that the unlawfulness of rates charged is admitted, and the carriers, after adjusting rates for future shipments, desire to make reparation for the unlawful charges on past shipments. Such applications require careful consideration in order that the possibility of what, in effect, might be rebates to favored shippers may be avoided. At the close of the last fiscal year four applications were pending. Three new applications were filed in which carriers requested authority to make refunds to the shippers involved. Three applications were granted, and four still await final action.

Special inquiries.—Section 21 of the Shipping Act, 1916, provides that the Department may require any common carrier by water, or other person subject to the act, to file with it any periodical or special report, or any account, record, rate, or charge, or any memorandum of any facts and transactions appertaining to the business of such carrier or other person subject to the act. It further provides that whoever fails to file any report, account, record, rate, charge, or memorandum as required thereby shall forfeit to the United States the sum of \$100 for each day of default. Four special inquiries, under authority of this section, have been instituted. Carriers

involved in two of these proceedings have complied with the requirements of the Department and such cases have been closed. The remaining two cases are still pending; in one, Isbrandtsen-Moller Co., Inc., a common carrier by water in foreign commerce, refused to comply with the order of the Department, and filed a bill in equity in the District Court of the United States for the Southern District of New York to enjoin the Department from the enforcement thereof. Having suffered an adverse decision on April 5, 1936 (14 Fed. Sup. 407), the carrier appealed to the United States Supreme Court and secured from that body on May 25, 1936, an order staying the running or accumulation of penalties pending a review of the case.

Interstate tariffs under section 18, Shipping Act, 1916, and Intercoastal Shipping Act, 1933.—During the fiscal year 5,338 schedules of rates and charges covering transportation by water in interstate commerce were filed pursuant to statutory requirements. Of this number, 26 were rejected for failure to comply with the law or the Department's tariff rules and regulations. There were 247 requests received for special permission to depart from notice requirements of the statute or requirements of the tariff rules and regulations. Of such requests 208 were granted and 27 denied. In one instance the request was in part granted and in part denied, and in eight instances requests were either withdrawn by the carrier or otherwise disposed of. At the close of the year three applications were pending.

Changes in rate adjustments were protested and suspensions requested in 13 instances. In four instances the tariffs were suspended and investigations as to their lawfulness instituted. Suspension was denied in six instances and three were otherwise disposed of. One of the rate adjustments, as to which suspension was denied, involved numerous requests for suspension of general increases in intercoastal rates which were established by carriers, effective October 3, 1935, when making the tariff publication required by the Department's decision and order in Docket 126, Intercoastal Investigation, 1935. The increases averaged approximately 10 percent and covered a large number of commodities. The intercoastal investigation had disclosed that some carriers were in financial straits and that all were in need of additional revenue. The requests for suspension accordingly were denied, without prejudice to the right of any protestant to place in issue the lawfulness of any increased rate through the filing of a formal complaint.

Foreign tariffs under section 19 of the Merchant Marine Act, 1920.—An order issued July 12, 1935, in Docket No. 128, section 19, investigation, 1935, 1 U. S. S. B. B. 470, under section 19 of the Merchant Marine Act, 1920, and designed to terminate the secrecy existing as to rates of common carriers in foreign commerce, required such carriers to file, within 30 days of their effective dates, export rates on all commodities except those loaded and transported in bulk without mark or count. The order became effective September 1, 1935. Since that date 2,036 filings comprising from 1 to 150 pages each, have been made, and as a result information as to the rates actually charged by carriers engaged in foreign export trade is available to the public for the first time.

Export bills of lading.—The uniform through export bill of lading form prescribed by the Interstate Commerce Commission provides (pt. II, clause 14) that the conditions of the regular form of port bill of lading in use by the steamship company shall apply if such conditions are not in conflict with conditions in the uniform through export bill of lading, but only if the steamship company's port bill of lading form is "on file, in accordance with the rules and regulations of the United States Shipping Board and/or the Interstate Commerce Commission." To make this provision of the uniform through export bill of lading effective, the Secretary of Commerce on December 5, 1935, issued an order establishing in this Division a bill of lading file in which common carriers by water in foreign commerce are permitted to file their regular port bill of lading form or forms. This order requires the filing of sufficient additional copies of the steamship bill of lading forms to permit of distribution to the field offices of the Bureau of Foreign and Domestic Commerce, where they are available for inspection by shippers and other interested parties. Ninety days advance notice is required to change bill of lading forms in this file. Following the issuance of this order, 163 bill of lading forms have been filed by common carriers by water who participate in the transportation of goods under the uniform through export bill of lading.

Agreements under section 15, Shipping Act, 1916.—During the year, 1,505 new agreements, including modifications and cancelations of approved agreements, between carriers and other subject persons, were filed for approval under section 15 of the Shipping Act, 1916. If these agreements contain provisions which appear to be unjustly discriminatory or unfair as between carriers, shippers, exporters, importers, or ports, or between exporters from the United States and their foreign competitors, or if they appear to operate to the detriment of the commerce of the United States, or to violate the Shipping Act, such provisions are called to applicant's attention for correction before final consideration. Approval was given to 1,353 agreements, modifications, and cancelations, 1 agreement receiving disapproval.

At the close of the fiscal year there were on file 2,564 effective agreements, of which 124 were conference agreements. The remainder comprise transshipment arrangements, agreements for the pooling of revenues, joint services, and other forms of cooperative working arrangements. Under the conference agreements, the parties thereto cooperate in the matter of fixing uniform rates, fares, charges, rules, and regulations for the transportation of cargo or passengers, as the case may be, thus insuring to shippers and others uniform and stable transportation rates and conditions, and to the carrier freedom from unfair competition as between the lines in agreement.

DIVISION OF SHIPPING RESEARCH

The division continued to maintain records and compile statistics relating to the transportation of the foreign water-borne cargo and passenger traffic of the United States; the intercoastal commerce of the United States; the commerce between continental United States and its possessions; and the ownership, operation, and general characteristics of vessels of all nationalities of 1,000 gross tons and upward. Additional information pertaining to wages paid in

American and foreign shipyards and data concerning the wages paid on ships under foreign registry have been secured. Special studies on shipping and transportation problems, as required by various governmental agencies, were conducted from time to time.

The records of the division indicate that during the fiscal year ended June 30, 1936, 3,867 vessels of various nationalities participated in the water-borne foreign trade of the United States, making about 44,000 entrances and clearances and transporting approximately 75 million tons of cargo and 1,450,000 passengers between 164 United States ports and 1,233 foreign ports.

The permanent records of the Division now include data pertaining to the water-borne commerce of the United States for a period of 15 years (1921-35), covering transactions at 359 continental United States ports, 453 ports in outlying possessions, and 2,972 foreign ports, making a total of 3,784 world ports. During this period 2,064 commodities, whose volume totaled 1,200,000,000 cargo tons, valued at approximately 90 billion dollars, were transported in the water-borne foreign commerce of the United States.

During the fiscal year the Division prepared 28 periodical reports, copies of which were issued to governmental officials and organizations, transportation companies, financial, industrial, educational, and other institutions. The Division also compiled 83 special reports, 38 of which were for the use of the Shipping Board Bureau and 21 for other Government agencies. The remaining 24 special compilations were prepared for commercial and port organizations, transportation companies, periodical publications, and educational institutions.

The records of the Division for the fiscal year 1936 were compiled from over 100,000 individual reports received from collectors of customs and vessel owners, operators, and agents.

SECTION OF PUBLIC INFORMATION

During the fiscal year 1936, a more active part was taken by the section in the cooperative study of ports and port facilities, conducted jointly by the Department of Commerce and the Secretary of War, as required by section 8 of the Merchant Marine Act of 1920. The section undertook field surveys of the ports of Tampa, Miami, and Jacksonville, Fla.; Boston, Mass.; and Portland, Maine. At the close of the fiscal year the report on Portland, Maine, had not been completed.

The following studies were published and distributed:

- Port Series No. 6: Part 1. Galveston, Tex. (revised 1935).
- Port Series No. 6: Part 2. Houston, Tex. (revised 1935).
- Port Series No. 6: Part 3. Texas City and Corpus Christi, Tex. (revised 1935).
- Port Series No. 10: Savannah and Brunswick, Ga. (revised 1935).
- Port Series No. 15: Norfolk, Portsmouth, and Newport News, Va. (revised 1934).
- Port Series No. 17: Ports of the Territory of Hawaii (revised 1935).
- Port Series No. 19: Gulfport and Pascagoula, Miss. (revised 1934).
- Port Series No. 21: Ports of Puerto Rico (revised 1935).
- Miscellaneous Series No. 1: Port and Terminal Charges at United States Ports (1936 edition).
- Transportation Series No. 3: Transportation Lines Operating on the Great Lakes (1935).

The following studies were completed and forwarded to the Government Printing Office:

- Port Series No. 2: Boston, Mass. (revised 1936).
- Port Series No. 8: Part 1. Jacksonville, Fla. (revised 1936).
- Port Series No. 8: Part 2. Miami and Tampa, Fla. (revised 1936).
- Port Series No. 13: Part 1. Los Angeles and Long Beach, Calif. (revised 1936).
- Port Series No. 13: Part 2. San Diego and San Luis Obispo, Calif. (revised 1936).
- Port Series No. 25: Ports on the Upper Hudson River (1936).
- Port Series No. 26: Sacramento and Stockton, Calif. (1936).
- Transportation Series No. 4: Transportation Lines Operating on the Mississippi System.

The section's foreign port data, revised and kept current, continued to be a valuable source of information on rates, charges, facilities, and conditions at ports throughout the world.

At the request of the Solicitor of the Department, numerous reports on legislation affecting the merchant marine and the work of the Bureau were prepared in the section. Daily requests for shipping information, which because of their nature and scope were not referable to other units of the Bureau, continued to be handled by the section.

ADMINISTRATIVE OFFICE

The office of the assistant to Director of the Bureau serves as the joint central administrative office of the Bureau and the Merchant Fleet Corporation.

In addition to these administrative functions, the office performs special assignments, including the investigations and recommendations pertaining to sales to aliens of vessels documented under the laws of the United States and the surrender of marine documents of vessels covered by preferred mortgages.

Sales to aliens and transfer of registry.—During the past fiscal year 71 vessels with a gross tonnage of 177,284 were approved for sale to aliens with the privilege of transferring to foreign registry. These vessels were either small yachts considered not essential in the development of the American merchant marine or larger vessels of such age and obsolescence as to be uneconomical to operate. Many of the larger obsolescent vessels had become surplus to operating fleets and had been previously replaced by newly-constructed modern vessels. Of the 71 vessels, 70 were specifically enumerated for transfer to foreign registry as follows: British 13, of 66,743 gross tons; Canadian 15, of 14,207 gross tons; Chinese 1, of 5,391 gross tons; Cuban 5, of 172 gross tons; Danish 1, of 17 gross tons; Ecuadorian 1, of 869 gross tons; Estonian 1, of 1,607 gross tons; Honduran 1, of 1,218 gross tons; Italian 5, of 26,047 gross tons; Japanese 6, of 18,863 gross tons; Mexican 3, of 1,125 gross tons; Netherland 1, of 48 gross tons; Newfoundland 1, of 1,151 gross tons; Nicaraguan 1, of 1,218 gross tons; Norwegian 2, of 6,405 gross tons; Panamanian 2, of 14,190 gross tons; Philippine 5, of 12,081 gross tons; Saudi Arabian 1, of 20 gross tons; Swedish 1, of 19 gross tons; Swiss 1, of 17 gross tons; Venezuelan 1, of 205 gross tons; and 2 of 5,612 gross tons to unspecified foreign flag. One vessel of 59 gross tons was sold to an alien without intention of documenting it under foreign registry, but to

be used in the fishing trade off the Pacific coast. One mortgage to an alien company was also approved.

Surrender of marine documents.—During the fiscal year ended June 30, 1936, the approval required by section 30, subsection 0 (a), Merchant Marine Act, 1920, cited as the Ship Mortgage Act, authorizing the surrender of the marine documents of vessels documented under the laws of the United States, was granted for 75 vessels. The surrender of the documents was occasioned by the change of home port, change of ownership, or change of name of the vessels involved. In granting approvals, positive conditions were imposed that the vessels concurrently be redocumented under the laws of the United States and proper endorsements made to preserve the status of all preferred mortgages recorded against each of said vessels.

MERCHANT FLEET CORPORATION

ORGANIZATION

The Merchant Fleet Corporation is incorporated under the laws of the District of Columbia and all of the capital shares except the qualifying share held by each member of the Board of Trustees, are held by the Secretary of Commerce on behalf of the United States.

The annual meeting of the stockholders of the Corporation, usually scheduled to be held on April 17, was postponed until June 18, 1936, at which time the Board of Trustees for the ensuing year was elected. Immediately following the annual meeting, the newly elected Board of Trustees elected the officers of the Corporation for the ensuing year. At the close of the fiscal year 1936 the members of the Board of Trustees were James Craig Peacock, S. D. Schell, South Trimble, Jr., C. D. Gibbons, John J. Miller, and Miller C. Foster. The officers of the Corporation were:

President and chairman of the Board.....	James Craig Peacock.
Vice president, vice chairman, and secretary.....	S. Duvall Schell.
Assistant secretary.....	R. L. McDonald.
Treasurer.....	C. D. Gibbons.
General comptroller.....	L. D. Staver.

On July 10, 1936, Mr. Peacock resigned as president and chairman, remaining, however, as Director of the Shipping Board Bureau, and Mr. Schell was elected president of the Corporation and chairman of the Board. Mr. Foster was elected vice chairman of the Board.

OFFICE OF THE PRESIDENT

The president has general management and supervision over the affairs of the Corporation, administered through the following divisions and offices: Division of Construction and Maintenance, Division of Operations and Sales, Division of Traffic, Division of Insurance, Offices of the treasurer (Division of Finance), and general comptroller.

DIVISION OF CONSTRUCTION AND MAINTENANCE

Under the terms of the reorganization effective March 2, 1936, the Division of Loans and Sales was abolished, and its functions were transferred to the newly created Division of Construction and Maintenance and to other units. The new division also assumed the functions relating to the maintenance and repair of vessels, which were formerly allocated to the Division of Operations and, in addition, continued the maintenance and preservation of Government-owned merchant vessels under the control of the Merchant Fleet Corporation, conducted condition surveys on privately owned vessels on which the Government held sales and construction-loan mortgages, continued work in connection with the dieselization program, examined vessel specifications and plans referred to the Division by

other offices of the organization, developed additional data relating to the proposed standardization of various classes of merchant vessels, and continued certain secretarial duties of the American Marine Standards Committee.

Formal applications for loans and action taken thereon.—On March 4, 1935, the President of the United States included in his message to Congress suggestions for a new method of Government aid for the building of ships for the foreign trade. Pending the passage of merchant marine legislation in which the suggestions were incorporated, the number of applications for ship construction loans has greatly decreased. Only two such applications were received during the fiscal year.

American South African Line, Inc.: Under date of October 21, 1935, application was made for a loan to aid in financing the construction of a new twin-screw combination passenger and cargo vessel capable of a service speed of 16 $\frac{1}{4}$ knots.

United States Lines Co.: Under date of December 14, 1935, application was made for a loan to aid in financing the construction of a new twin-screw combination passenger and cargo vessel capable of a service speed of 20 knots.

No final action had been taken on these or other pending applications when the provision of section 204 (a) of the Merchant Marine Act, 1936, prohibiting the making of any further construction loans, became effective on June 29, 1936.

Inspection and Maintenance Section.—Pursuant to the reorganization effective March 2, 1936, this section was relieved of responsibility for supervising reserve fleet activities, including maintenance of Government-owned merchant vessels in laid-up status.

During the year, 420 complete condition surveys were made of privately owned vessels under Government mortgage; 40 such surveys were made of Government-owned vessels operated under charter or by managing agents, and 453 partial surveys were made covering previously reported deficiencies, drydocking, repair damages, reconditioning work, etc. In addition, certain special surveys were conducted for the information of various interested offices of the organization.

This section also supervised repairs on Government-owned vessels operated by managing agents under agency agreements. Repair materials valued at \$20,287.38 were sold to managing agents operating under the 1930 agreement; materials valued at \$69,455.38 were issued to managing agents under the 1935 agreement; and warehouse surplus materials valued at \$17,834.60 were sold to private owners and operators. These sales were handled through the Supplies Section of the Division of Operations and Sales.

During the fiscal year investigations were conducted and corrective action was taken in respect to defects in designs of machinery installed on certain of the 23 Government-owned merchant vessels converted from steam to Diesel drive. This work was carried on in cooperation with the engine builders.

Technical Section.—In addition to examining vessel specifications and plans referred to the Division for technical statements of opinion, this section in cooperation with the Navy Department continued to

develop basic data and plans for standardizing vessels of such designs as to be suitable for various commercial trades and adaptable for naval auxiliary service in the event of national emergency. Under this program, there was published a catalog entitled "Tanker Series No. 1", dated June 16, 1936, which covers specifications and the design for a proposed standard tanker, as well as an economic study of the results to be expected by operating the vessel at various speeds while carrying various grades of oil.

This section has taken an active part in the work of the Senate Committee on Safety of Life at Sea, having representatives on the Subcommittee on Fire Detection and Extinction and the Subcommittee on Engineering. These subcommittees prepared for the approval of the main committee rules for the safety of life at sea to be used by the Bureau of Marine Inspection and Navigation. Personnel of this section conducted tests on the steamship *Nantasket* for the purpose of determining the suitability of various materials for use in ship construction.

Under date of August 16, 1935, there was published a pamphlet entitled "General Considerations in Treating Boiler Water", this being a sequel to a pamphlet on the same subject published during the previous fiscal year. Wide distribution was made of these pamphlets among members of the marine industry.

During the year this section cooperated with the Inspection and Maintenance Section in connection with various engineering problems involving the operation of vessels by managing agents.

American Marine Standards Committee.—The records of the committee were still in the custody of this division at the end of the fiscal year. Activities were confined to issuing publications covering standard specifications previously approved by the committee and replying to inquiries.

DIVISION OF OPERATIONS AND SALES

In March 1936, under a reorganization of the Washington office of the Merchant Fleet Corporation, the name of the division was changed to the Division of Operations and Sales and its functions relating to the maintenance and repair of vessels were transferred to the Division of Construction and Maintenance, the Maintenance and Reserve Fleet Section being abolished. Functions relating to the reserve fleet were retained and, in addition thereto, functions relating to the sale and disposition of vessels were transferred to the division.

The division has continued general supervision over the operation of vessels and the maintenance and supervision of operation of terminal properties under the control of the Shipping Board Bureau and the Merchant Fleet Corporation. During the past fiscal year, except as noted herein, this division was composed of the same sections mentioned in last year's report.

Operations.—The operation of the five Government-owned cargo lines was continued under operating agreement 1930, as amended, until their transfer to operating agreement 1935 was effected in October 1935. The names of the managing agents of these lines, together with the number of ships and voyages under each of the

operating agreements and the total during the year, are given in the following table:

Line and managing operators	Operating agree- ment 1930		Operating agree- ment 1935		Total voyages made
	Ships	Voyages	Ships	Voyages	
American France Line: Cosmopolitan Shipping Co., Inc.	8	23	5	21	44
American Hampton Roads-Yankee Line.....	4	8	4	13	21
Oriole Lines: Southgate-Nelson Corporation.....	5	14	5	20	34
American Pioneer Line: Roosevelt Steamship Co., Inc.	12		12		
Australia.....		6		3	9
India.....		7		2	9
Orient.....		6		3	9
American Republics Line: C. H. Sprague & Son, Inc.	10	25	10	11	36
Total.....	39	89	36	73	162

¹ S. S. *Unicot* still under operating agreement 1930 and will be transferred upon completion of repairs.

The total of 162 voyages completed during the year were performed at a net cost to the Merchant Fleet Corporation of \$1,126,470.59, which represents a decrease of \$254,358.01 compared with the cost for the fiscal year 1935. The total vessel operating revenues were \$9,149,652.43, and the vessel operating expenses were \$10,276,123.02. These results were partly under the operating agreement 1930, under which managing operators collected all revenue and paid all expenses, and partly under the operating agreement 1935, under which all vessel revenues and expenses are for the direct account of the Merchant Fleet Corporation.

This decrease in operating cost was due primarily to greatly increased revenues obtained in the American Pioneer Line services to Australia and the Orient and to a reduction which was made in the number of sailings in the America France Line service. The American Pioneer Line for the fiscal year 1936 shows an estimated operating profit of about \$18,000 against a loss in 1935 of approximately \$122,000. When the America France Line was placed under operating agreement 1935, in October 1935, the sailings were reduced from 52 to 36 per year and the operating loss through this curtailment of service has been reduced approximately \$100,000 compared with the cost in 1935. The reduction in the operating loss for a full year due to the curtailment of service of this line will amount to approximately \$250,000.

The operating results of each line under operating agreement 1935 have been systematically analyzed and reports prepared monthly showing the results of operations and the findings of our analyses. These reports have formed the basis of corrective measures with the managing agents where such action appeared necessary.

Bareboat charters.—In order to permit Lykes Bros.-Ripley Steamship Co., Inc., the purchaser of certain Government lines and tonnage, to meet an urgent demand for ships to move cotton from Gulf ports to European and United Kingdom ports which are served by its lines, seven vessels were chartered to that company under bareboat form of charter. The vessels were delivered to the charterer in November 1935, and made a total of eight voyages for which the Government has thus far received about \$50,000 in charter hire and will probably receive an additional \$30,000 representing 50 percent

of the profit earned on these voyages. The vessels after redelivery were placed in the reserve fleet. During the year, three salvage tugs and one cargo vessel were also under bareboat charter.

Operating Contract Analysis Section.—In September 1935, there was created the Operating Contract Analysis Section; the Vessel Movement Section, which was reported last year as an independent section, became a branch thereof. This new section was necessitated by the placing into effect of the operating agreement 1935 which the board of trustees authorized in August 1935 for each of the lines operated for account of the Merchant Fleet Corporation. The functions of this section are to supervise and make analyses of the operation of vessels by the managing agents; to negotiate and recommend terms of charter parties and adjustments thereunder; and to prepare schedules of charges to be allowed under operating agreements covering vessel operations, fees, commissions, and stevedoring.

During the year this section furnished operating data and estimates and rendered other important assistance to the special committee appointed by the president of the Merchant Fleet Corporation to negotiate the terms of the operating agreement 1935 and to draft regulations to place it into effect. It also attended to the operating details incident to the termination of operating agreement 1930 and the redelivery of vessels thereunder and delivery under the new form of agreement. Among its other accomplishments was a review of the subagency arrangements of each managing agent and an investigation of their foreign-flag affiliations in order to determine the competitive features involved.

Special consideration was given to stevedoring contracts and, upon the basis of data furnished by the general comptroller, the costs under such contracts were carefully analyzed and adjustments and revisions effected where necessary. Contracts which managing operators under operating agreement 1930 had in effect for stevedoring were, with the approval of the president of the Merchant Fleet Corporation, continued under operating agreement 1935, subject to examination and revision where necessary to fully protect the interests of the Government.

The vessel movement branch of this section continued its functions of the maintenance of records of sailings on lines sold for guaranteed operation and status records of all vessels owned by the Merchant Fleet Corporation and the preparation of statistical statements from such records.

Reserve Fleet and Sales Section.—This section was created in March 1936 to perform the duties in connection with the safety, preservation, and maintenance of laid-up vessels, the responsibility for which remained with the Division. This section also was delegated certain duties relating to the negotiation of terms and conditions involved in the sale and disposition of vessels and to the supervision over the performance by purchasers under contracts covering the sale of vessels and lines. Previous to the creation of this section, these last-named functions had been performed by employees of the former Division of Loans and Sales reporting to the Division of Operations.

On June 30, 1936, there were 197 ships in the inactive fleet as against 229 on July 1, 1935. These numbers are exclusive of Navy Department vessels under our custody.

In the last annual report, mention was made of a physical survey of all laid-up vessels and the classification of such vessels into three groups according to their type and condition. During the past fiscal year, preservation and maintenance work above the waterline was accomplished on vessels in class I and class II which are those listed as having sufficient value to warrant their further preservation. No preservation or maintenance work was performed on vessels in class III which are listed as having insufficient value for commercial or military operation to warrant their further preservation.

The net expenditure for maintaining the reserve fleet for the past fiscal year, which is exclusive of general administrative expense and chargeable to liquidation funds, was approximately \$436,000, as compared with a cost of about \$207,665 for the previous fiscal year. This increase in expenditure was the result of the accomplishment of necessary preservation work which had long been deferred, and which required the employment during nine months of the year of additional personnel, and the use of considerably more material than had been used last year. Since funds were not available, however, for drydocking any of these vessels, this is a project which will receive consideration during the coming year.

During the year one vessel (the S. S. *West Lashaway*, 8,578 d.w.t.) was sold for restricted operation for a 2-year period in the service of the American West African Line; the S. S. *Elkhorn* (9,694 d.w.t.) was sold to the Texas Co., which is obligated to convert the vessel to a stationary oil plant for use solely in that capacity; the S. S. *Daniel Webster* (12,980 d.w.t.) was sold to the National Bulk Carriers, Inc., which is obligated to convert the vessel into a bulk and liquid cargo carrier and not to operate the vessel in any other capacity for a 5-year period. In addition, 40 vessels were delivered to the Boston Iron & Metal Co. for breaking up. The delivery of these vessels to the purchaser was in the nature of a settlement to compose differences growing out of the withdrawal of 86 ships from a sale to this purchaser under a sales agreement dated November 5, 1932, calling for delivery of 124 vessels.

Four small craft were acquired without exchange of funds from other Government departments, and the steamship *Eastern Temple* (5,544 d. w. t.), on which the Government was mortgagee, was purchased at a court sale in May 1936.

Supplies Section.—This section, during the fiscal year ended June 30, 1936, handled the purchasing, storing, and distributing of all materials, supplies, and equipment required by vessels, terminals, and offices of the United States Shipping Board Bureau and the United States Shipping Board Merchant Fleet Corporation. In addition, all procurement contracts entered into by managing agents since the operating agreement 1935 went into effect were analyzed by this section before final approval of the contracts. This section also supervised the transportation of materials for the use of the Corporation, and the procurement, stocking, and issuance of all office supplies, furniture, and stationery, including forms required by managing agents for use in connection with vessels operated for account of the Merchant Fleet Corporation.

Purchase orders in an aggregate amount of \$368,430.54 were issued during the year, of which \$195,879.45 represented purchases made by the Washington office. Sales orders handled by this section totaled \$41,466.13 and, in addition, there were numerous transfers of surplus materials to other Government departments without exchange of funds.

Coincident with the placing into effect of operating agreement 1935, it became necessary for the Supplies Section to expand its activities in connection with inventories of stores and equipment aboard our vessels, and many improvements have been made in the manner of taking vessel inventories and in keeping records of materials owned by the Government. In addition, an analysis was made of all ships' stores, machinery, and equipment in the various storehouses of the Merchant Fleet Corporation for the purpose of making recommendation as to which material is to be retained as a reserve stock and which may be considered surplus.

Vessel Disability and Personnel Section.—The placing into effect of Operating Agreement 1935 has made necessary closer supervision over wages, working conditions, and the personnel aboard vessels of the Merchant Fleet Corporation, causing a material increase in the activities of this section.

Following conferences held with representatives of managing agents and with representatives of licensed officers' and seamen's labor organizations, standard manning and wage scales and uniform regulations on working conditions were promulgated and put into effect on vessels under the control of the Merchant Fleet Corporation; these provided for a general increase in wages, an increase in the number of vessel personnel employed, and an improvement in working conditions.

This section rendered assistance in an advisory capacity to the Insurance Division and to the office of the Solicitor for the Department. It has exercised supervision over the selection by managing agents of licensed officers on vessels operated for account of the Government, and has conducted investigations concerning sea personnel and vessel disabilities. Careful attention has been paid to the latter and specific measures have been taken and instructions issued so that recurrence may be prevented and losses resulting from damage to our vessels may be kept at a minimum.

Terminals and Real Estate Section.—Under the control of the Department and administered by the Division of Operations and Sales at the end of the year, there were five marine terminals and one tank storage station. A sixth terminal, at Charleston, S. C., was disposed of on June 16, 1936, pursuant to an act of Congress (Public, No. 624, 74th Cong.).

Boston: This terminal is leased to Piers Operating Co. for a 5-year period ending June 30, 1939, on the basis of a fixed rental of \$65,711 per annum. Commencing in May 1935 the War Department undertook extensive repairs to the substructure at an approximate cost of \$1,000,000 and completed the work in April 1936. While this reconstruction work was in progress, the facilities available for the use of the lessee were curtailed and as a result it was necessary to grant an abatement of the rental paid by the lessee. On the basis of current figures, which are subject to adjustment pending final deter-

mination of the exact amount of rental to be abated, the Merchant Fleet Corporation has earned a profit of about \$8,607.80 for the fiscal year 1936.

Hoboken: The North Atlantic Terminal Service, Inc., is the lessee of this terminal for a period of 5 years, ending August 31, 1938, under a form of lease whereby the Merchant Fleet Corporation receives 50 percent of the gross revenues accruing to the lessee, with a minimum guaranteed rental of \$90,000 for the first year and \$100,000 for each of the succeeding 4 years. At the commencement of the second year, the minimum guarantee was reduced to \$60,000 and at the commencement of the third year was set at \$80,000. These concessions in the amount of rental were necessitated by adverse business conditions. During the fiscal year 1936 it was necessary to undertake extensive repairs and reconditioning work in order to preserve the property, the operations for the year resulting in a loss of \$11,354.09.

Brooklyn: This terminal was leased to Piers, Inc., for a period commencing March 1, 1934, and ending December 31, 1936, at a rental of 56 percent of the gross revenue accruing to the lessee, with a minimum guaranteed rental of \$150,000 per annum. This minimum guarantee as reported last year was reduced on March 1, 1935, to \$130,000 but, when a reduction to \$94,000 for the current year was refused, the lessee in accordance with the provisions of the lease gave notice of cancellation effective November 27, 1935. The terminal was thereupon advertised for lease at an upset price of \$125,000 per annum and, when no bids were received, it was again advertised at the same price and with the same result. The upset price was then reduced to \$100,000 per annum and new bids were invited and, in response to this last proposal, three bids were received. Award was made to the highest bidder, namely, the American-Hawaiian Steamship Co. which had bid \$111,000 on behalf of a corporation to be formed and a lease was executed with its newly formed subsidiary, Brooklyn Dock & Storage, Inc., for a period of 4½ years, commencing January 1, 1936, and ending June 30, 1940. Notwithstanding considerable reconditioning expense, the Government derived a profit of \$83,835.06 from the operation of this terminal.

Philadelphia: This terminal is leased to Philadelphia Piers, Inc., for the period commencing August 2, 1934, and ending June 30, 1939, at an annual rental of \$162,500. During the past fiscal year it has been necessary to undertake extensive repairs, consisting principally of renewal of steam and water piping, elevator reconditioning, and cleaning and painting. The total amount spent was \$133,873.39, but the excess of revenue over expenditures amounted to \$28,626.65 for the year.

Norfolk: Under a lease for a period commencing August 3, 1934, and ending June 30, 1939, the Norfolk Tidewater Terminals, Inc., was the lessee of this property at an annual rental of \$160,000. During the past year the lessee requested a reduction in the amount of the annual rental of \$50,000 and upon being refused, served notice of cancellation of the lease in September 1935, to become effective in March 1936. The terminal was then advertised for lease at an upset price of \$110,000 per annum and, in response to the proposal, only one bid was received, namely, that of the incumbent, the Norfolk

Tidewater Terminals, Inc., which bid \$115,500. This bid was accepted and a lease was executed for the period commencing March 25, 1936, and ending June 30, 1940, at an annual rental of \$115,600, the slight increase in rental being negotiated to include a specific item which had been reserved in the lease as advertised. For the fiscal year 1936, during which period the terminal was under lease to the Norfolk Tidewater Terminals, Inc., under two forms of lease at different annual rentals, the profit accruing to the Government amounted to \$79,144.89.

Charleston: This property was under lease to the Port Utilities Commission of Charleston for a 5-year period ending February 29, 1936, and, prior to the expiration of the lease, a supplemental indenture of lease was executed to provide for an extension to June 30, 1936, without change in the other terms and conditions. By act of Congress approved May 27, 1936, the Secretary of Commerce was authorized and directed to convey this property by quit-claim deed to the city of Charleston, S. C., and, pursuant to this act, the property was delivered on June 16, 1936. The operation of this terminal for the year resulted in a net loss to the Government of \$38,354.43.

Craney Island: The Craney Island Fuel Oil Station located on the Elizabeth River near Norfolk, Va., was leased to the Pennsylvania Shipping Co. commencing May 1, 1933, on a yearly basis at an annual rental of \$500, with an option of renewal from year to year for a total period not exceeding 5 years. This lease has been renewed on May 1 in each of the 3 succeeding years. In accordance with the terms of the lease, the lessee is obligated to pay for maintenance, reconditioning, and miscellaneous expense in connection with the upkeep of the property, and the amount of rental received by the Government has not been offset by any expense.

DIVISION OF TRAFFIC

The Division of Traffic, a part of the Shipping Board Bureau since 1934, was again incorporated as a division of the Merchant Fleet Corporation during the fiscal year, and continued to handle traffic matters for the Bureau as well as for the Merchant Fleet Corporation.

The new form of operating agreement which became effective during the year required more direct supervision by this Division over the traffic activities of the four managing agents operating the five remaining services for Government account. This supervision is exercised principally with respect to their schedule of sailings, contact with competitive lines, dealings in conferences, forward contracts, rates, and traffic agreements. All our services have shown improvement in the past fiscal year owing to increased cargo carryings and increased revenues.

The Division continues to render assistance to privately owned American-flag lines in dealing with special cargo movements, competition, and other traffic matters of importance in their operations. An incident in illustration was a movement of 3,300,000 barrels of flour from North Pacific coast ports to the Philippine Islands handled by the Agricultural Adjustment Administration, in which the American Mail Line from Seattle, and the States Steamship Co. from Portland, were particularly interested.

Egyptian cotton.—Through the London office of this Division the season's contract for movement of Egyptian cotton to the United States was closed. Two American-flag lines are benefited by this arrangement, one by the direct movement and the other by transshipment at Liverpool.

Pooling agreements.—The Philippine-China pool, comprising all the conference cargo lines from North Atlantic ports, including the American Pioneer Line, continued to work satisfactorily. After overcoming many difficulties which led to certain revisions in the percentages of distribution among the various lines, arrangements have been practically completed for an extension of the westbound pooling agreement from European continental ports within the Antwerp-Hamburg range to United States North Atlantic ports. This Division has taken an active part in all these negotiations.

The Carriage of Goods by Sea Act, commonly known as the Hague Rules, was approved on April 16, 1936, and the Chief of this Division, heading the Bill of Lading Committee of the Merchant Fleet Corporation, in cooperation with the solicitor's office and the Division of Insurance, is actively engaged in drawing up a new bill of lading for the Government-owned services in conformity with the provisions of this act.

DIVISION OF INSURANCE

Under authority of the Merchant Marine Act, 1928, the Merchant Fleet Corporation maintained and administered the general insurance fund which is used to insure, in whole or in part, the Government's legal or equitable interest in vessel tonnage.

The Fleet Corporation continued to encourage the placing of hull insurance, on vessels in which the Government has an interest, in the American commercial market, and rendered assistance to owners of vessels purchased from the Bureau as well as owners of vessels constructed or reconditioned with the aid of the Bureau's construction loan fund, by accepting in the insurance fund the excess of the capacity of the commercial market; and insurance in an amount not exceeding the amount of the mortgage debt, in cases where the shipowner was unable to obtain satisfactory rates in the commercial market. In some cases the use of the foreign market has been approved under special circumstances.

As of June 30, 1936, the total coverage in the general insurance fund amounted to \$22,432,750, of which \$12,405,300 applied to 66 privately owned American-flag vessels and \$10,027,450 represented insurance on 39 Government-owned vessels operated in Fleet Corporation services. The total amount of insurance was, therefore, \$8,109,966 less than the amount covered at the beginning of the fiscal year.

The premiums received by the general insurance fund from its inception to June 30, 1936, totaled \$16,846,704, while claims in the amount of \$14,038,084 were paid during the same period.

Unsettled claims for which the general insurance fund is liable are estimated at \$1,137,224 as of June 30, 1936. Assuming that these claims are settled for this estimated amount, the unobligated balance of the general insurance fund on June 30, 1936, would be \$12,622,106.

The examination of commercial policies furnished by owners of vessels mortgaged to the Government has continued to be an important

activity. These policies, totaling \$215,704,700, are required under the sales and loan mortgages to protect the Government's interest in the vessels.

Commercial protection and indemnity insurance furnished by operators of Government vessels in the amount of \$28,190,550 was also examined. Policies covering fire, workmen's compensation, and general liability submitted by lessees of Government pier properties and also automobile liability insurance for the Merchant Fleet Corporation, totaling approximately \$10,000,000, were examined. About 200 cases of personal injury of employees of the Fleet Corporation and Shipping Board Bureau were handled with the United States Employees' Compensation Commission.

The settlement of protection and indemnity claims which arose prior to July 1, 1929, when the United States Protection and Indemnity Agency, Inc., was sold, has progressed favorably. During the year 37 claims were settled for approximately \$321,359.62, and on June 30, 1936, there were 36 pending claims totaling \$1,248,740.20. This includes a number of claims revived by the amendment to the Suits in Admiralty Act of June 30, 1932.

The annual survey of marine insurance in the United States indicates that sharp competition continues between the American and foreign markets. The downward trend of hull rates in the British market is regarded with apprehension by the more conservative underwriters abroad, and the American market, which is represented by the American Marine Insurance Syndicates, has been forced to yield desirable domestic business to London at rates which the syndicates feel will probably not produce a profit. Despite these conditions, both hull and cargo premiums in the United States for 1935 have shown a gain over the figures for 1934.

Reports from American shipowners show that of the insurance on 1,159 ocean-going vessels in the amount of \$463,889,292, with premiums of \$10,967,546, 53 percent was placed in the United States and 47 percent in the foreign market. Of these premiums, the insurance fund of the Shipping Board Bureau received \$299,960, or 2.74 percent; 345 vessels were self-insured, either wholly or in part, in the amount of \$93,063,562.

A decided improvement in cargo premiums is indicated in the figures for 1935, the net premiums of domestic insurance companies having increased by \$3,410,000 and admitted companies by \$1,427,000 over the 1934 figures.

TREASURER (DIVISION OF FINANCE)

The Division of Finance, in charge of the treasurer of the Merchant Fleet Corporation, handles receipts and disbursements for both the United States Shipping Board Bureau and United States Shipping Board Merchant Fleet Corporation. Since January 1, 1936, disbursements for the Shipping Board Bureau have been made by the Division of Disbursement of the United States Treasury Department, but collections and disbursement vouchers are scheduled and transmitted to that office by the Division of Finance.

For the fiscal year 1936 the Shipping Board Bureau had a total appropriation of \$211,000, of which \$163,394.21 was expended and

an additional amount of \$870.10 committed during the year for salaries and miscellaneous expenses of the Bureau.

No appropriation from the United States Treasury was made for administrative and operating expenses of the Merchant Fleet Corporation in the fiscal year 1936, but the use of unexpended balances of funds on hand July 1, 1935, and operating and liquidation receipts during the fiscal year 1936, was authorized, the latter being limited to \$1,000,000 to defray expenses of liquidation; the use of an additional sum of \$1,000,000 was authorized for reconditioning and operating ships to carry coal, cotton, grain, lumber, and other basic commodities to foreign ports. A brief statement of the several active funds maintained by the Merchant Fleet Corporation during the fiscal year 1936 follows:

Fund	Opening balance	Net receipts	Net disbursements	Closing balance
Operating fund.....	\$6,385,752.63	\$5,006,029.82	\$6,618,685.63	\$4,773,066.82
Dieselization fund.....	148,460.80	-----	30,764.01	117,696.79
Liquidation fund.....	54,224.43	4,168,329.40	4,152,532.46	70,021.37
Insurance fund.....	11,141,700.49	13,880,253.17	1,072,211.37	13,949,752.49

¹ Includes \$3,173,496.98 liquidation receipts transferred to insurance fund.

A complete statement of the financial activities of the Shipping Board Bureau and Merchant Fleet Corporation is appended hereto.

Collections.—Collection of current and inactive accounts receivable of the Merchant Fleet Corporation is an important activity of this Division. During the fiscal year 1,578 current invoices, totaling approximately \$1,250,000, and insurance premiums, totaling \$520,000, were collected, and 73 inactive accounts amounting to \$1,464,000 were collected, settled, or otherwise closed.

Collections of principal payments on secured accounts due the Shipping Board Bureau and Merchant Fleet Corporation totaled \$14,797,340.56, of which \$11,330,641.75 applied to construction loan notes and \$3,210,574.17 to ship-sales securities. The sum of \$3,484,468.32 was collected as interest on notes and other securities, of which \$2,715,698.74 applied to construction loan notes.

Amounts collected as repayments of construction loans were re-deposited in the construction loan fund, but interest on such loans was covered into the United States Treasury as miscellaneous receipts. Collections of both principal and interest on ship-sales notes, however, were used to defray expenses of maintaining the reserve fleet and for salaries and expenses of the personnel engaged in liquidation within the \$1,000,000 limitation approved by the 1936 appropriation act. No disbursements were made under the \$1,000,000 authorization to use liquidation receipts for reconditioning and operating ships for carrying coal and other basic commodities to foreign ports. Collections in excess of the liquidation expense total were transferred to the insurance fund, pursuant to title V, section 501, of the Merchant Marine Act, 1928.

While, as in the past, several companies had difficulty in meeting their obligations to the Government, it is of particular interest to note that during the fiscal year eight borrowers from the construction loan fund prepaid notes totaling \$4,997,188.50, and eight compa-

nies prepaid ship sales purchase notes totaling \$407,787.67. The prepayments from two borrowers from the construction loan fund, totaling \$2,105,750, represented the entire amount of their obligations, which were covered by several series of notes, with final maturities in 1941.

Securities.—The face value of notes and other securities held for collection dropped from approximately \$123,300,000 as of July 1, 1935, to \$108,400,000 on June 30, 1936, due not only to the heavy collections and prepayments previously mentioned but also to the fact that no new construction loans and but few ship sales were made during the fiscal year.

Housing properties.—Conveyances of 43 properties and 14 mortgages at Brooklawn, N. J., were made to the Brooklawn Housing Corporation during the year; this action leaves 4 properties and 58 mortgages with a total purchase price of \$39,936, plus interest, to be conveyed to that corporation, pursuant to the terms of the sales agreements. The expiration date of the contract with this corporation was extended from December 31, 1935, to June 30, 1936, and was recently extended further to September 30, 1936.

Refunds of deposits were made during the year to auction-sale purchasers of four properties at Morgan Village, Camden, N. J., and the purchase contracts with these buyers were canceled. This leaves only 3 of a total of 12 properties in Morgan Village still subject to auction-sale contracts. All 12 of these properties are rented.

Vessel operating receipts and disbursements.—Coincident with the transfer of vessels to operation under operating agreement 1935, it became necessary to arrange for handling domestic and foreign receipts and disbursements of the several lines. Operating accounts were opened in banks in New York, Norfolk, and Boston, in which all vessel-operating receipts are deposited and from which disbursements are made by employees of the Merchant Fleet Corporation. Foreign disbursements for vessels of several of these lines are made from specific bank credits established for each voyage at each foreign port of call, while foreign disbursements for other lines are made from foreign revenue collections, which in amount equal or exceed disbursement requirements for these lines.

Construction loan fund.—Effective March 2, 1936, this Division was made responsible for the handling of applications for loans from the construction loan fund and for supervision of the performance and administration of the requirements of contracts for all existing loans, so far as operating restrictions, insurance coverage, and other specific features of and modifications to such contracts are concerned.

No loan applications were filed after March 2, 1936. A summary of the applications received prior to that date is included in the report of the Division of Construction and Maintenance.

GENERAL COMPTROLLER

This office, during the fiscal year 1936, continued to maintain the accounting and auditing records and procedures essential to the orderly and proper reflection of the assets and liabilities and earnings and expenses, and to the certification and approval of the receipts and disbursements of the Shipping Board Bureau and the Merchant Fleet Corporation.

The operating agreement 1935 became effective during the year, and the formulation, institution, and application of the internal and agency accounting and auditing procedures, required for the control and reflection of the fiscal operation of our vessels thereunder, threw a heavy burden upon this office, entailing a more meticulous audit of operating revenues and expenses than was formerly necessary and the opening and maintenance of detailed operating and control accounts. This work was carried on concurrently with the usual supervision given operations under the operating agreement 1930 and the making of special audits covering the period of that agreement in order that settlement with the managing operators might be accomplished.

The other work handled by the office was similar in character and scope to that outlined in the preceding annual reports and involved, among other things, the supervision of the fiscal operations of delinquent debtors; the disposition of outstanding accounts; the rendering of assistance to other divisions of the organization and to departments of the Government in the defense and prosecution of claims; the audit and control of the accounts of our terminal properties, and the making of special investigations and reports dealing with the operation and financial condition of both Government and private lines.

These matters and the routine work of the office were handled without important change in either organization or procedure, except that a limited reallocation of personnel was made, in order to provide the close supervision necessary to the control of operations under the operating agreement 1935.

STATISTICS

Owing to limitations of space, a few of the statistical statements incorporated in former years in the annual reports of the United States Shipping Board have been omitted from this report, but will be furnished in mimeographed form to those making application in writing to the Chairman of the United States Maritime Commission, Washington, D. C.

Summarized consolidated cash statement, by appropriations, fiscal year ended June 30, 1936

Code	Caption	United States Shipping Board Bureau				
		Total	Salaries and expenses			Construction loan fund
			1934	1935	1936	
	Unexpended balance as at June 30, 1935.....	\$73,643,787.87	\$81,074.47	\$65,003.98	0	\$50,688,120.00
RA	Receipts:					
	Appropriations.....	216,000.00			\$211,000.00	
	Sales:					
RB	Sales of vessels, tugs, and barges.....	3,472,925.07				
RC	Sales of assets other than vessels, tugs, and barges.....	49,027.31				
	Total sales.....	3,521,952.38				
RF	Operation-of-vessels revenue.....	4,824,230.03				
RH	Real-estate operation and rental revenue.....	661,093.71				
	Other receipts.....					
RJ	Interest earned.....	695,323.69				
RL	Miscellaneous receipts.....	3,309,204.75				2,720,848.32
RM	Insurance premiums.....	898,897.34				
	Total other receipts.....	4,903,430.78				2,720,848.32
	Recovered disbursements:					
RDD	Operating-of-vessels expense.....	215,983.89				
RDE	Vessel repairs and betterments.....	21,298.15				
RDG	Protection and indemnity insurance expenses and losses.....	24,490.74				
RDH	Marine insurance expenses and losses.....	77,834.11				
RDI	Laid-up-vessels expenses.....	58,140.75				
RDL	Real estate operation and rental expense.....	20,380.15				
RDO	Warehouses stores.....	883.12				
RDS	Appropriations returned to U. S. Treasury.....	3.22				
RDT	Miscellaneous disbursements.....	11,977,430.04				11,267,941.75
RDU	Administrative salaries.....	60,484.66				
RDV	Other general expenses.....	83,625.73	17.61	125.75	638.29	
RDX	Dissalvation expense.....	8.21				
	Total recovered disbursements.....	12,418,963.80	17.61	125.75	638.29	11,267,941.75
	Transfer of funds.....	25,913,680.70	17.61	125.75	211,638.29	13,988,790.07
	Total.....	4,285,532.60				
	Total.....	103,843,031.17	81,092.08	58,129.73	211,638.29	64,646,910.07

Summarized consolidated cash statement, by appropriations, fiscal year ended June 30, 1936—Continued

Code	Caption	Total	United States Shipping Board Bureau			
			Exposi- tions	Salaries and expenses		Construction loan fund
				1934	1935		1936
	Disbursements:					
	Construction, improvements, and/or betterments:					
DA	Vessels.....	\$27,500.00				
DC	Real estate and equipment.....	11,822.66				
DX	Dieselization expense.....	30,764.01				
	Total construction, improvements, and/or betterments.....	70,086.67				
	Operations outgo—vessels:					
DD	Operation of vessels expense.....	5,251,765.97				
DE	Vessel repairs and betterments.....	65,341.19				
DG	Protection and indemnity insurance expense and losses.....	316,735.05				
DH	Marine insurance expense and losses.....	923,165.01				
DI	Marine insurance premiums.....	29,286.11				
	Total operations outgo—vessels.....	6,584,291.33				
DJ	Laid-up vessels expense.....	486,371.75				
DL	Real estate operation and rental expense.....	423,747.52				
	Other disbursements:					
DO	Warehouse stores.....	73,760.25				
DS	Appropriations returned to U. S. Treasury.....	104,632.05		\$31,092.03		
DT	Miscellaneous disbursements.....	786,908.11				
	Total other disbursements.....	965,300.41		81,092.06		
	General administrative expense:					
DU	Administrative salaries.....	1,484,526.80			\$160,330.08	
DV	Other general expense.....	175,051.13	\$5,068.47	\$734.33	3,042.42	
	Total general administrative expense.....	1,660,178.02	8,068.47	734.33	164,022.50	
	Refunded receipts:					
DRC	Sales of assets other than vessels, tugs, and barges.....	910.00				
DRF	Operation of vessels revenue.....	14,218.88				
DRJ	Interest earned.....	1,409.00				
DRK	Miscellaneous receipts.....	3,160,144.58				
DRL	Insurance premiums.....	194,820.73		.30		\$2,720,848.32

DL	Real estate operation and rental expense	423,747.82							
DO	Other disbursements:								
DS	Warehouse stores	73,760.25							
DT	Appropriations returned to U. S. Treasury	22,340.00							
	Miscellaneous disbursements	766,405.33	31,812.73						
	Total other disbursements	862,695.63	31,812.73						
DU	General administrative expense:								
DV	Administrative salaries	1,271,492.73							52,654.08
	Other general expense	111,992.90							56,213.01
	Total general administrative expense	1,383,485.63							108,867.09
DRC	Refunded receipts:								
DRF	Sales of assets other than vessels, tugs, and barges			910.00					
DRJ	Operation of vessels revenue	14,218.48							
DRL	Interest earned	465,205.96		1,408.00					
DRM	Miscellaneous receipts								
	Insurance premiums								
	Total refunded receipts	479,514.44		2,318.00					194,820.73
	Total disbursements	9,323,432.39	90,241.96					30,495.00	1,171,424.47
	Transfer of funds	15,738.98						269.01	116,992.15
	Unexpended balance as at June 30, 1935	4,773,096.82	24,859.11	43,340.56	940,362.50	3,168,329.40	117,696.79	5,000,000.00	13,949,752.49
	Total	14,112,318.19	115,101.07	54,224.43	1,000,000.00	3,170,647.40	148,460.80	5,000,000.00	15,233,169.11

Special Balance Sheet as at June 30, 1936

ASSETS

Cash and unrecapitalized appropriations:

A-1	General cash	Cash	Unrecapitalized appropriations	Total
A-1-1	.....	\$4,824,241.14	\$8,877.05	\$4,833,118.19
A-1-2	Insurance fund	16,640,752.49	18,107,752.49	34,748,504.98
A-1-3	Claims fund, Appropriation Act 1923	24,658.11	174,898.11	199,556.22
A-1-4	Dissemination of vessels	117,686.73	117,686.73	235,373.46
A-1-5	Operation of vessels taken back from purchasers	.....	5,000,000.00	5,000,000.00
A-1-6	Construction loan fund	.....	61,928,081.75	61,928,081.75
A-1-7	U. S. Shipping Board Bureau	11,440.07	96,842.35	108,282.42
	Total	18,637,989.60	67,081,781.15	85,969,770.75

Accounts receivable and claims:

A-2	Due from sundry debtors	Total	Payable	Claim offsets	Net receivables
A-2-1	.....	\$3,917,070.85	\$157,917.84	\$2,604,291.40	\$1,144,861.61
A-2-2	Due from foreign governments	16,781,988.94	18,433.38	16,763,555.04	23,82
A-2-3	Accounts receivable of managing agents	.....	.....	.....	426,562.43
A-2-4	Due from ship sales	678,437.43	.....	.....	470,332.28
A-2-5	Due the insurance fund	34,946.64	.....	.....	34,946.64
	Estimated recoverable value of claims in favor of U. S. Shipping Board Merchant Fleet Corporation	.....	.....	.....	21,573.25
	Total	21,860,379.87	186,853.22	19,575,570.62	2,088,336.03

Notes and mortgages receivable and securities:

A-3	Notes due construction loan fund	Total	Net
A-3-1	.....	88,573,938.25	\$88,573,938.25
A-3-2	Notes due from ship sales	15,033,424.18	300,832.23
A-3-3	Notes due from sundry debtors	1,264,811.78	12,473.13
A-3-4	Mortgages due from sundry debtors	136,325.00	90,914.33
A-3-5	Miscellaneous securities	17,788.09	5,670.00
	Total	105,025,817.30	1,008,888.84

Stores supplies and equipment:

A-4	Reserve fleets stores and supplies	Total	Reserves	Net
A-4-1	.....	\$28,159.61	.....	28,159.61
A-4-2	Stores and supplies aboard laid-up vessels	221,065.41	\$157,066.38	133,693.03
A-4-3	Supplies and equipment in warehouses	743,871.59	.....	743,871.59
A-4-4	Ship chest stores and containers	12,284.80	.....	12,284.80
A-4-5	Surplus supplies and equipment in warehouses	546,526.20	403,894.66	136,631.54
A-4-6	Furniture and fixtures, equipment and automobiles	79,161.04	51,197.32	27,963.72
	Total	1,701,063.45	618,138.36	1,082,910.09

Fleet: Appraisal value of 242 vessels and 22 barges and launches:

A-5	.....	Cost
A-6	Other properties:	8,205,822.00
A-6-1	Terminals and fuel station	775,820.06
	Total	18,836,338.00

Total 2,098,356.03

A-6-2	Shipyards and housing proceeds.....	4,774,969.07	4,746,568.71	28,400.36
A-6-3	Ground rent estate.....	2,560,000.00		2,560,000.00
	Total.....	16,630,791.07	5,622,388.77	10,008,402.30
A-7	Deferred accounts and commitment charges.....			614,941.39
	Total.....			223,511,360.61

LIABILITIES

		Total	Receiptable offsets	Net
L-1	Accounts payable and unclaimed wages:			
L-1-1	Due sundry creditors.....	\$459,786.67	\$194,138.11	\$300,628.56
L-1-2	Due foreign governments.....	42,079.13	18,435.38	23,643.75
L-1-3	Unclaimed wages, salvage awards, and other unclaimed items.....	1,552,827.01		1,552,827.01
L-1-4	Accounts payable of managing agents.....	644,284.84		644,284.84
	Total.....	2,698,577.65	177,598.49	2,520,984.16
L-2	Deposits on sales and other contracts not consummated.....			34,446.22
L-3	Commitments.....	59,492.66	25,046.34	34,446.22
L-4	Reserve for protection and indemnity insurance claims and expenses.....			401,125.92
	Total.....			2,468,566.41
L-5	Total liabilities for general purposes.....			5,360,261.71
L-6	Accounts payable from insurance fund.....			148,203.04
L-6	Reserve for claims and unearned premiums, insurance fund.....			2,134,969.41
L-7	Reserve for claims and accounts payable, claims fund.....			24,800.41
L-8	Reserve for operation of vessels taken back from purchasers.....			5,000,000.00
	Net worth.....			210,864,867.34
	Total.....			223,511,360.61

SCHEDULE 1.—Cash and unrequisioned appropriations available for general purposes as at June 30, 1936

General cash (before adjustment)—Cash in U. S. Treasury, in banks, and in transit to depositories-----		\$8, 007, 668. 12
Unrequisioned appropriations:		
Emergency shipping fund-----	\$2, 991. 81	
U. S. Shipping Board Bureau, 1935-----	212. 30	
U. S. Shipping Board Bureau, 1936-----	5, 672. 94	
		<u>8, 877. 05</u>
		8, 016, 545. 17
Less: Amount to be transferred to marine insurance fund subsequent to June 30, 1936, representing balance of excess-sales receipts over liquidation expense requirements, in accordance with authorization of the Assistant Secretary of Commerce, dated June 29, 1936-----		<u>3, 173, 426. 98</u>
Total cash available for general purposes as of June 30, 1936-----		<u><u>4, 843, 118. 19</u></u>

The appropriation acts for each year have appropriated to the use of the U. S. Shipping Board Merchant Fleet Corporation the balances of general cash on hand at the beginning of the fiscal year; all amounts received during the year other than the proceeds from the sales of ships and surplus property, and additional amounts from the U. S. Treasury except for the fiscal years 1933, 1934, 1935, and 1936. The appropriation acts for each year since 1925 have also appropriated certain amounts of the proceeds from sales as is necessary to meet the expenses of liquidation, including the costs incident to the delivery of vessels to purchasers, the cost of maintaining the laid-up fleet, and the salaries and expenses of the personnel engaged in liquidation.

The general cash is available for general purposes, including administrative expenses, vessel and terminal operations, maintenance of laid-up fleets, and preservation of vessels therein, and other miscellaneous activities in connection with the establishment and development of the American merchant marine for which specific appropriations have not been made by Congress.

The general cash, as at June 30, 1936, as above shown, includes the operating funds, liquidation funds, and the fund for the engineering development program which was last available for the fiscal year 1933, viz:

Operations fund-----	4, 648, 804. 37
Liquidation fund, fiscal year 1935-----	10, 883. 87
Liquidation fund, fiscal year 1936-----	59, 137. 50
Engineering development program-----	124, 292. 45
Total-----	<u>4, 843, 118. 19</u>

SCHEDULE 2.—Cash and unrequisioned appropriations available for expenses of the United States Shipping Board Bureau as at June 30, 1936

Cash:		
Available for salaries and expenses, fiscal year 1936-----	\$10, 664. 28	
Texas Centennial Exposition (act Aug. 13, 1935)-----	775. 79	
Total cash-----		\$11, 440. 07
Unrequisioned appropriations:		
Salaries and expenses, fiscal year 1936-----	\$36, 941. 51	
Salaries and expenses, fiscal year 1935-----	57, 395. 10	
Chicago World's Fair Centennial Celebration (act June 19, 1934), 1934 and 1935-----	429. 71	
California Pacific International Exposition (act Mar. 21, 1930), 1935 and 1936-----	576. 03	
Texas Centennial Exposition (act Aug. 13, 1935)-----	1, 500. 00	
Total unrequisioned appropriations-----		<u>96, 842. 35</u>
Total cash and unrequisioned appropriations, U. S. Shipping Board Bureau-----		<u>108, 282. 42</u>

Gross appropriations and allotments from inception to July 1, 1936

	Original appropriation	Returned to U. S. Treasury surplus or reapropriated	Net appropriation	U. S. Shipping Board and U. S. Shipping Board Bureau	U. S. Shipping Board Merchant Fleet Corporation
For fiscal years ended prior to July 1, 1935:					
U. S. Shipping Board and U. S. Shipping Board Bureau:					
Acts of Sept. 7, 1916; June 12, 1917; July 1, 1918; July 19, 1919; June 5, 1920; Mar. 4, 1921; June 16, 1921; June 12, 1922; Feb. 13, 1923; June 7, 1924; Mar. 3, 1925; Apr. 22, 1926; Feb. 11, 1927; May 16, 1928; Feb. 20, 1929; Apr. 19, 1930; Feb. 23, 1931; June 30, 1932; June 16, 1933; and Apr. 7, 1934	\$42,791,540.41	\$910,857.07	\$41,880,683.34	\$41,880,683.34	
U. S. Shipping Board Merchant Fleet Corporation:					
Act of Sept. 7, 1916, permanent fund	50,000,000.00		50,000,000.00		
Acts of June 15, 1917, to June 12, 1922, Emergency Shipping Fund	3,363,553,000.00	37,689,497.61	3,325,863,502.39		
Acts of Feb. 13, 1923; June 7, 1924; Mar. 3, 1925; Apr. 22, 1926; Feb. 11, 1927; May 16, 1928; Feb. 20, 1929; Apr. 19, 1930; and Feb. 23, 1931, current maintenance and operations	167,354,250.00	387.70	167,353,862.30		
Act of June 12, 1922, claims, damage charges, and miscellaneous adjustments	50,000,000.00	11,745,815.10	38,254,184.90		
Acts of Apr. 17, 1917, and July 1, 1918, National Security and Defense—(Presidential allotments)	28,512,428.27	4,524,107.72	24,988,320.55		
Acts of Apr. 22, 1926; Feb. 11, 1927; May 16, 1928; Feb. 20, 1929; Apr. 19, 1930; Feb. 23, 1931; June 30, 1932; June 16, 1933; and Apr. 7, 1934, operation of trade lines; expurchasers (expenditures on approval of the President of the United States)	50,000,000.00	50,000,000.00			
Returned to the United States Treasury as required by act of Congress June 30, 1932 (Public Act 212, 72d Cong.), sec. 306 (f) and (h), exclusive of salary impoundments					
Total U. S. Shipping Board Merchant Fleet Corporation	3,710,419,676.27	2,138,240.00	1,572,237,436.27		\$3,604,321,648.14
Total for fiscal years prior to July 1, 1935	3,753,211,216.68	107,068,885.20	3,646,142,331.48		
For fiscal year ended June 30, 1936:					
U. S. Shipping Board Bureau:					
Act of Mar. 22, 1935; salaries and expenses	211,000.00		211,000.00		
Total U. S. Shipping Board Bureau	211,000.00		211,000.00	211,000.00	
U. S. Shipping Board Merchant Fleet Corporation:					
Act of Mar. 22, 1935, operation of trade lines; expurchasers (expenditures on approval of the President of the United States)	5,000,000.00	5,000,000.00			
Total for U. S. Shipping Board Merchant Fleet Corporation	5,000,000.00	5,000,000.00			
Total for fiscal year ended June 30, 1936	5,211,000.00	5,000,000.00	211,000.00		

1 Loss

Gross appropriations and allotments from inception to July 1, 1936—Continued

	Original appropriation	Returned to U. S. Treasury surplus of reappropriated	Net appropriation	U. S. Shipping Board and U. S. Shipping Board Bureau	U. S. Shipping Board Merchant Fleet Corporation
For fiscal year ending June 30, 1937:					
U. S. Shipping Board Bureau:					
Act of May 15, 1936, salaries and expenses.....	\$249,000.00		\$249,000.00		
Total U. S. Shipping Board Bureau.....	249,000.00		249,000.00	\$249,000.00	
U. S. Shipping Board Merchant Fleet Corporation:					
Act of May 15, 1936, operation of trade lines, expurchasers (expenditures on approval of the President of the United States).....	5,000,000.00		5,000,000.00		
Total U. S. Shipping Board Merchant Fleet Corporation.....	5,000,000.00		5,000,000.00		\$5,000,000.00
Total for fiscal year ending June 30, 1937.....	5,249,000.00		5,249,000.00		
Gross appropriations and allotments.....	3,783,671,216.68	\$112,008,885.20	3,654,662,331.48	42,340,683.34	3,609,321,648.14

Estimated operating profit or loss, fiscal year 1936

[Amounts shown in italics represent losses]

	Number of terminations	Operating agreement	Estimated		Profit or loss
			Revenue	Expense	
Freighters.....	89	1930		\$646, 419. 39	<i>\$646, 419. 39</i>
Freighters.....	73	1935	\$3, 881, 012. 23	4, 361, 063. 43	<i>480, 051. 20</i>
Chartered vessels.....			96, 090. 51	23, 743. 17	<i>72, 347. 34</i>
Total.....	162		3, 977, 102. 74	5, 031, 225. 99	<i>1, 054, 123. 25</i>
Inactive vessels:					
In custody of operations, Merchant Fleet Corporation.....	1			71, 521. 31	<i>71, 521. 31</i>
Managing operator.....				17, 314. 72	<i>17, 314. 72</i>
Administrative expense operating.....				548, 615. 22	<i>548, 615. 22</i>
Miscellaneous revenue and expense:					
Terminals.....			585, 701. 38	434, 304. 02	151, 397. 36
Others.....			119, 928. 95	39, 704. 96	80, 221. 99
Total.....			705, 628. 33	474, 008. 98	231, 619. 35
Total operations.....	163		4, 682, 731. 07	6, 142, 686. 22	<i>1, 459, 955. 15</i>
Administrative expense, employees assigned to United States Shipping Board Bureau.....				157, 029. 20	<i>157, 029. 20</i>
Total.....				6, 299, 715. 42	<i>1, 616, 984. 35</i>

¹ Number of vessels at end of year.

