TWENTY-SECOND

ANNUAL REPORT

OF THE

SECRETARY OF COMMERCE

▼

1934

Executive Assistant to the

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1934

For sale by the Superintendent of Documents, Washington, D. C. - - - Price 20 cents (paper cover)

ORGANIZATION OF THE DEPARTMENT

Secretary of Commerce	DANIEL C. ROPER.
Assistant Secretary of Commerce	JOHN DICKINSON.
Assistant Secretary of Commerce	EWING Y. MITCHELL.
Solicitor	SOUTH TRIMBLE, JR.
Administrative Assistant to the Secretary	MALCOLM KERLIN.
Chief Clerk and Superintendent	EDWARD W. LIBBEY.
Director, Bureau of Air Commerce	EUGENE L. VIDAL.
Director of the Census	WILLIAM L. AUSTIN.
Director, Bureau of Foreign and Domestic Commerce	C. T. MURCHISON.
Director, National Bureau of Standards	LYMAN J. BRIGGS.
Commissioner of Fisheries	FRANK T. BELL.
Commissioner of Lighthouses	GEORGE R. PUTNAM.
Director, Coast and Geodetic Survey	R. S. PATTON.
Director, Bureau of Navigation and Steamboat Inspection	JOSEPH B. WEAVER.
Commissioner of Patents	CONWAY P. COE.
Director, United States Shipping Board Bureau	J. C. PEACOCK.
Director, Federal Employment Stabilization Office	D. H. SAWYER.

CONTENTS

	Page
Expenditures	VII
Public works allotments	VII
Changes in organization	VIII
Discussion of functions of the Department	IX
Economic review	IX
Reciprocal trade program	XIX
Foreign and domestic commerce	XIX
Air commerce	XXI
Lighthouse Service	XXII
Enforcement of navigation and steamboat inspection laws	XXIV
Surveying and mapping	XXIV
Fisheries	XXVI
National standards	XXVII
Census activities	XXIX
Patents	XXIX
Merchant marine	XXX
Foreign-trade zones	XXXII
Street and highway safety	XXXIII
Business Advisory and Planning Council	XXXIII

REPORT BY BUREAUS

CHIEF CLERK AND SUPERINTENDENT

	Page
Space in the Commerce Building	1
A Century of Progress Exposition	1
Division of Accounts	1
Appointment Division	4
Division of Publications	4
Division of Purchases and Sales	5
Department Library	5
Traffic Office	5
SOLICITOR'S OFFICE	6
FEDERAL EMPLOYMENT STABILIZATION OFFICE	7

BUREAU OF AIR COMMERCE

Operation on reduced budget	9
Air Navigation Division	11
Air Regulation Division	13
Appropriations, personnel, and air navigation facilities	14

BUREAU OF THE CENSUS

Introduction	17
Financial statistics of State and local governments	17
Financial statistics of States and cities	18
Biennial census of manufactures	18
Quinquennial census of electrical industries	19
Vital statistics	19
Institutional population	20
Annual reports	20
Decennial reports	20
Marriage and divorce	21
Report on Negroes in the United States	21
Cotton and cottonseed	21
Monthly and quarterly industrial statistics	22
Monthly	22
Quarterly	22
Census of agriculture, 1935	22
Special censuses	23
Estimates of population	23

BUREAU OF THE CENSUS—Continued

Searching old population records	23
Machine tabulation	24
Work done for other Federal offices and outside organizations	24
The census of American business	24
Census record preservation	25
Real-property inventory	25
Urban tax delinquency	25
Unemployment relief and supporting local studies	25
Trial census of unemployment	26
Cooperation with the National Recovery Administration	26
Other special tabulations	26
Publications	27
Mechanical laboratory	27
Personnel	27
Office force	27
Field force	28
Appropriations	28

BUREAU OF FOREIGN AND DOMESTIC COMMERCE

World developments affecting the nature of the Bureau's work	29
Price movements and fiscal policies	29
Tariffs, quotas, and similar restrictive measures	30
Course of American export and import trade	30
Salient aspects of Bureau's position and activities	31
Contraction of scope in conformity with economy program	31
Services to recovery agencies and other Government units	31
Examples of increased volume and heightened value of work	34
Efforts to aid international commerce	35
Exceptional activity in study of foreign-trade restrictions	35
Foreign commercial laws	36
Finance and investment	37

BUREAU OF FOREIGN AND DOMESTIC COMMERCE—Continued

Page

Efforts to aid international commerce—Con.
General regional information on foreign developments 38
The foreign commerce service 38
Foreign-trade statistics 39
Export and import services by commodity divisions 40
Information as to actual or potential buyers abroad 42
Activities in the promotion of domestic trade 43
Marketing research and service 43
Domestic business aided by commodity divisions 44
New Division of Negro Affairs 45
Work of Bureau's district offices 46
Economic research 46
Services respecting vital problems of transportation 47
Publications of the Bureau 48
Conclusion 49

NATIONAL BUREAU OF STANDARDS

General activities 51
Electricity 53
Weights and measures 55
Heat and power 57
Optics 59
Chemistry 61
Mechanics and sound 62
Organic and fibrous materials 65
Metallurgy 67
Clay and silicate products 69
Simplified practice 72
Building and housing 73
Specifications 74
Trade standards 75
General financial statement 75

BUREAU OF FISHERIES

National planning council (of commercial and game fish commissioners) 77
Cooperation with States 78
Cooperation with other Federal agencies 80
Conservation of whales 81
Legislation 81
Construction activities 83
Statistical investigations 83
Fisheries of the United States, 1932 83
Manufactured products in the United States and Alaska, 1932 84
Marketing investigations 85
Technological investigations 85
Biological fishery investigations 87
Fishery investigations of the Atlantic and Gulf States 88
Fishery investigations in interior waters 90
Fishery investigations of the Pacific coast and Alaska 91
Aquicultural investigations 91
Shellfisheries investigations 92
Pollution studies 92
Alaska fisheries service 93
Administration of fishery laws and regulations 93
Alaska salmon hatcheries 94
Products of the fisheries 94
Alaska fur-seal service 95
General activities 95
Seal herd 95
Take of sealskins 95
Sale of sealskins 95
Foxes 96
Fur-seal skins taken by natives 96
Fur-seal patrol 96
Propagation and distribution of food and game fishes 96
Propagation of commercial species 97
Rescue operations 98
Aquarium 98
Black Bass and Anglers Division 99
Vessels 100

LIGHTHOUSE SERVICE

Page

Appropriations 101
Improvements in apparatus and equipment 104
Administration 106
Personnel 107
Lighthouse depots 108
Lighthouse tenders 108
Lightships 109
Operation and construction, Lighthouse Service, fiscal year 1934 109
Progress of vessels under construction or completed 109
Progress of special works under construction or completed 110
General service projects 117

COAST AND GEODETIC SURVEY

Review of the year 119
The Public Works program 120
Civil Works project 121
Summary of activities 122
Development of methods and instruments 124
Division of Charts 126
Division Hydrography and Topography 128
Division of Geodesy 130
Division of Tides and Currents 134
Division of Terrestrial Magnetism and Seismology 136
Terrestrial magnetism 136
Seismology 138

BUREAU OF NAVIGATION AND STEAMBOAT INSPECTION

American shipping on June 30, 1934 141
Safety of life at sea 142
Coasting trade 142
Shipping commissioners 143
Admeasurement of vessels 144
Load lines 144
Passenger act of 1882 144
Navigation receipts 144
Administration 145
Hulls and equipment statistics 147
Reinspections 147
Miscellaneous inspections 147
Vessels inspected and certificates of inspection issued to steam and motor vessels and to barges 148
Certificates withdrawn or refused 150
Cargo vessels examined to carry persons in addition to crew 150
New life preservers inspected 150
Life-saving apparatus inspected at factories 150
Work performed by inspectors in central office 150
Boilers 150
Marine boiler plates tested 151
Steel bars and forgings tested 151
Statistics concerning ships' personnel 152
Officers licensed 152
Results of action against licenses 153
Examinations for colorblindness 153
Certificates of service issued to able seamen and to lifeboat men 153
Transportation and loss of life 154
Passengers carried 154
Lives saved 154
Lives lost on vessels subject to inspection, by districts 155
Accidents resulting in loss of life 156
Vessels lost 156
Property lost 156
Navigation patrol service 156
Preventing overcrowding of passenger vessels 157

PATENT OFFICE

Volume of business 159
Condition of work 159
Surplus 160
Classification Division 160
Reallocation of examiners in grades P-1 and P-2 161

PATENT OFFICE—Continued

Page
The reestablishment of abolished positions.. 161
Registration of attorneys 162
Patent Office Advisory Committee 162
The conference at London 163
Patents 163
Trade marks 164
Aid to industry 165
Statistics 166
Other details of business for the fiscal year... 170

UNITED STATES SHIPPING BOARD BUREAU

Division of Loans and Sales 173
Division of Regulation 176
Division of Shipping Research 179

UNITED STATES SHIPPING BOARD BUREAU—Cont.

Page
Division of Traffic 179
Sea Service Section 181
Section of Public Information 181
Secretary 182

Merchant Fleet Corporation

Organization 183
Division of Operations 183
Division of Insurance 188
Treasurer 189
General Comptroller 191
Legal Division 191
Statistics 192

TWENTY-SECOND ANNUAL REPORT
OF THE
SECRETARY OF COMMERCE

DEPARTMENT OF COMMERCE,
OFFICE OF THE SECRETARY,
Washington, November 15, 1934.

To the PRESIDENT:

I have the honor to submit herewith, for transmission to Congress, the Twenty-second Annual Report of the Secretary of Commerce, covering the fiscal year ended June 30, 1934.

EXPENDITURES

The total amount appropriated directly by Congress for expenditure by the Department of Commerce, during the fiscal year 1934, was $35,404,775.[1] However, at the request of the President and in cooperation with the Director of the Budget, this Department agreed to exert its utmost endeavors to keep its normal expenditures at the lowest minimum consistent with proper and adequate service. It is gratifying to report that at the close of the fiscal year the total of authorized obligations was $28,603,509;[1] which is $6,801,266, or 16 percent less than the appropriation. The amount expended for the corresponding activities during the fiscal year 1933 was $39,669,450. This reduction in expenditures was effected without jeopardizing the safety of life or property at sea or in aviation and without detriment to trade and industry.

PUBLIC WORKS ALLOTMENTS

The regular annual appropriation act for the Department for the fiscal year 1934 did not contain any money for construction or Public Works activities by several of the bureaus, as has been the practice prior to the fiscal year 1933. All items of this character were omitted from our appropriations with the understanding that we should submit application to the Federal Emergency Administration of Public Works for such funds as might be deemed necessary. During the year the following allotments were granted by that organization to this Department and obligated by June 30, 1934:

Bureau	Allotments	Obligations to June 30, 1934
Coast and Geodetic Survey	$6,503,120	$3,164,855
Lighthouse Service	5,620,334	2,706,548
Air Commerce	2,058,803	939,159
Bureau of Fisheries	639,500	350,994
Bureau of Standards	100,000	87,691
Navigation and Steamboat Inspection	33,043	30,921
	14,954,800	7,280,168

[1] Does not include the Bureau of Mines, which was transferred to the Interior Department during the year.

The unobligated balances are available for expenditure during the fiscal year 1935, and numerous necessary repair and construction projects now in process will be completed, and other pressing items of public works will be performed.

In addition, the Department received the benefit of the services of personnel employed with funds granted by the Civil Works Administration, and considerable essential work was accomplished through this means.

The work performed by the various bureaus under allotments from these two agencies is discussed in greater detail under the chapters of this report dealing with the activities of the respective bureaus.

CHANGES IN ORGANIZATION

During the year the following changes affecting the organization of the Department were accomplished:

The Bureau of Mines was transferred from the Department of Commerce to the Department of the Interior by an Executive order issued on February 22, 1934.

That part of Executive Order No. 6166 of June 10, 1933, which provided for the abolition of the Federal Employment Stabilization Board and the transfer of its records to the Federal Emergency Administration of Public Works was revoked by an Executive order issued March 1, 1934. This subsequent order abolished the Board, established in the Department of Commerce an office to be known as the Federal Employment Stabilization Office and transferred to such office the functions, personnel, records, and property of the Board.

The above-mentioned Executive orders were issued pursuant to the provisions of section 1, title III of the act of March 20, 1933, entitled "An act to maintain the credit of the United States Government", and became effective 61 days from the date of issuance.

The Disbursing Office of the Department of Commerce was transferred to the newly created Division of Disbursement of the Treasury Department, effective March 1, 1934, pursuant to the provisions of Executive Orders 6166 of June 10, 1933, 6224 of July 27, 1933, and 6540 of December 28, 1933.

With the view to obtaining closer coordination and increased efficiency, by departmental orders issued December 11, 1933, the general supervision and direction of the bureaus of the Department concerned with industry and trade were grouped under one Assistant Secretary, and the bureaus dealing with marine and transportation activities, with the exception of the Shipping Board Bureau, were placed under the other Assistant Secretary. The Shipping Board Bureau is being administered directly by the Secretary of Commerce.

The name of the Bureau of Standards was changed to National Bureau of Standards by departmental order of April 27, 1934, to avoid confusion with State, municipal, and commercial organizations which have been designated by a similar title.

The name of the Aeronautics Branch of the Department was changed to Bureau of Air Commerce, effective July 1, 1934. This new designation describes more accurately the duties and functions of the organization.

The Sea Service Section of the Shipping Board Bureau was transferred to the Bureau of Navigation and Steamboat Inspection, effec-

tive July 1, 1934, as the activities of that Section are quite similar to certain phases of the work of the Bureau of Navigation and Steamboat Inspection.

DISCUSSION OF FUNCTIONS OF THE DEPARTMENT

Public protection and safety claimed a large share of the activities and expenditures of the Department of Commerce in 1934. Safety of life and property on land and sea and in the air are the concern of several of the Department's principal agencies. In the year covered by this report some 65 percent of its funds were devoted to the operation of lighthouses and to marine inspection necessary to the safe navigation of the coastal and inland waters; to the regulation and protection of air traffic; to the preparation of charts, and the protection of the public against false weights and measures.

Regulatory activities of the Department include the provision and maintenance of lights on the coasts and along the shores of lakes and rivers, the charting of coastal waters, the inspection of merchant vessels, the inspection and licensing of commercial aircraft, the enforcement of laws governing marine navigation, the promotion of air commerce and civil aviation, and the establishment and maintenance of aids to air navigation. These functions, while their chief purpose and effect are protective, are at the same time helpful to commerce, internal and international.

The Department also supplies other forms of assistance to industry and trade. It cooperates with manufacturers to facilitate processes; to enlarge production, and to improve products; to reduce waste in the making, transporting, and merchandising of goods, to increase employment, and to promote trade and commerce. It conserves the country's fisheries, an important item of its natural resources, and promotes their growth; it encourages inventive genius by the issuance of patents to inventors; it conducts the decennial census and collects other statistical information of great usefulness to the public and to the Government itself. It administers the acts of Congress to encourage, develop, and create a merchant marine and to regulate carriers by water engaged in the foreign and interstate commerce of the United States. In short, the Department's studies and services have grown steadily in value to an increasing number of public and private institutions and activities.

ECONOMIC REVIEW

The fiscal year just closed witnessed an improvement in business activity following 4 years of decline which had taken an unprecedented toll from our national income. The extent of the improvement in some of the major economic series may be seen by reference to the table on page x. Each of these series reveals an increase of substantial proportions compared with the preceding year, despite the fact that temporary interruptions of the upward movement occurred during the year. The smallest relative increase indicated in these 10 series was in electric-power production, where the gain amounted to almost 10 percent, and the largest was in construction

contracts awarded, which increased by about one-half from the extremely low level of the preceding year. Of especial significance is the gain of approximately 24 percent in industrial production, of 26 percent in factory employment, and of 43 percent in factory pay rolls. There was, further, a considerable increase in agricultural income during the year, a decrease in the number of commercial failures and of the volume of liabilities involved, and gains in retail sales and in foreign trade.

July 1933 marked the culmination of a four-month increase in production without parallel in the history of the Nation. The Federal Reserve Board index of industrial production, adjusted for the usual seasonal variation, advanced from the depression low of 59 percent of the 1923–25 monthly average in March 1933 to 99 percent of that base in July, a gain of 68 percent. The manufacturing component of this index advanced during this period from 56 to 101 percent of the 1923–25 monthly average.

Major economic indexes

[Based upon the calendar years 1923–25 as 100]

Year ended June 30, quarter and month	Industrial production [1]	Manufacturing production [1]	Minerals production [1]	Railroads, ton-miles freight carried	Electric power production	Department-store sales, value [1]	Factory employment [1]	Factory pay rolls	Wholesale prices	Construction contracts awarded [1]
1920	89	91	82	96	-------	88	112	112	152	77
1921	74	73	83	90	70	92	92	97	123	51
1922	74	75	69	79	72	84	84	74	93	70
1923	98	98	93	96	88	94	99	95	101	83
1924	98	97	101	98	95	99	102	102	97	89
1925	99	99	98	98	102	100	96	96	100	101
1926	105	106	99	105	116	104	101	103	102	130
1927	109	108	113	111	129	107	100	104	96	130
1928	106	106	103	104	138	107	98	100	95	133
1929	118	118	112	110	154	110	103	107	96	127
1930	110	110	110	104	163	108	101	102	92	107
1931	87	86	92	86	155	99	84	77	79	76
1932	70	69	78	66	146	80	71	56	68	40
1933	67	66	73	57	136	64	62	42	63	23
1934	83	82	87	67	149	72	78	60	72	34
Percentage change										
1934 from 1932	+18.6	+18.8	+11.5	+1.5	+2.1	−10.0	+9.9	+7.1	+5.9	−15.0
1934 from 1933	+23.9	+24.2	+19.2	+17.5	+9.6	+12.5	+25 8	+42.9	+14.3	+47.8
Monthly trend, fiscal year 1933–34:										
July	99	101	90	71	149	69	73	51	68	21
August	91	91	91	71	153	77	76	57	69	24
September	84	83	87	70	147	70	78	59	70	30
October	76	76	81	71	149	70	78	59	71	37
November	72	70	81	64	144	65	76	56	71	48
December	75	73	85	59	149	69	75	55	70	57
January	78	76	88	64	152	69	75	54	72	49
February	81	80	91	62	141	71	78	61	73	44
March	84	82	100	75	154	77	81	65	73	33
April	85	85	90	63	148	77	82	67	73	32
May	86	86	89	68	153	77	82	67	73	26
June	83	83	87	68	149	74	81	65	74	26
Comparison final month of fiscal years 1929–34:										
June 1929	125	127	114	109	155	113	106	111	95	126
June 1930	98	97	102	92	155	103	93	92	86	99
June 1931	83	82	87	76	150	96	79	70	72	63
June 1932	59	58	64	50	131	69	62	43	64	27
June 1933	91	93	84	64	144	68	67	47	65	18
June 1934	83	83	87	68	149	74	81	65	74	26

[1] Monthly figures adjusted for seasonal variation.

This advance was probably in part a "natural" cyclical upturn, but the forces that were operating to this end were greatly augmented by the increase in confidence which was engendered by the advent of the new administration, together with the belief that inflationary policies would be followed, and, during the latter part of the spectacular advance, by the desire of producers to turn out as much product as possible before the NIRA effected higher costs of production.

As demand was not sufficient to sustain the initial pace that had been set, declines in industrial output ensued during the succeeding 4 months following July, the adjusted index falling about 27 percent by November. At that time the movement was reversed and during the next 6 months the adjusted index of industrial production rose from 72 to 86 percent of the 1923–25 monthly average, an increase of approximately one-fifth. During the final month of the fiscal year the index declined three points.

Although production and distribution costs advanced during the year, the upward trend of activity was accompanied by an improvement in profits. A representative group of nearly 500 companies reported profits approximating $1,400,000,000, an increase of about 76 percent over the low total for the preceding fiscal year.

While evidences of the progress which has been made are concrete and numerous, the fiscal year closed with the capital-goods industry still greatly depressed, private construction very low, unemployment large, and relief demands making a steady and severe drain on the national budget. Further, the volume of bank loans outstanding, despite the plethora of bank credit available, remained at a very low level. Notwithstanding the lack of uniform improvement throughout the various aspects of our economic life, the year as a whole brought definite gains from the low point of the depression.

Commodity Prices Move Higher

Commodity prices advanced steadily throughout the year, there being only 3 months in which recessions occurred in the index of 784 commodity prices and price series as reported by the Bureau of Labor Statistics. In June 1933 this index was at 65 percent of the 1926 average of the prices composing this index, and in June 1934 it stood at 74.6 percent of the 1926 base, an increase of about 15 percent.

A significant feature of the price situation from the beginning of the depression until the index reached a low in the week ended March 4, 1933, was the growing disparity in the prices of the various groups of commodities and services compared with their previous relationship. Raw materials, including farm products, fell in price considerably more than did the prices of finished products. This disparity, which had been lessened from March to June 1933, was further reduced during the year under review. While the general wholesale price index of the Bureau of Labor Statistics advanced 14 percent, the prices of raw materials rose 20 percent and the prices of farm products 27 percent. Wholesale prices of farm products were still, however, relatively low in June 1934, being 36.7 percent below the 1926 prices, while the prices of all products other than farm products and foods were 21.8 below the prices of the 1926 period. Subsequent to the close of the fiscal year, the ravages of the drought resulted in a considerable increase in the prices of farm products and foods.

Financial Developments

In the field of finance, the devaluation of the dollar to 59.06 percent of its former gold parity, the continuation of relief to financial agencies on a large scale, the renewed confidence in the banking structure, and the continued liquidation of bank credit were outstanding.

Particularly notable was the assistance extended by the Reconstruction Finance Corporation in the reorganization or the liquidation of banks and in strengthening the capital structure of banks and other financial organizations. The Corporation authorized 2,516 loans aggregating $647,773,000 to banks and trust companies (including loans for distribution to depositors in closed banks). In addition, it purchased the preferred stock, capital notes, or debentures of 6,233 banks and 1 insurance company in the aggregate amount of $1,049,000,000, made 958 loans to banks and trust companies (secured by preferred stock) aggregating $22,240,000.

Confidence in the banks was further heightened by the establishment on June 16, 1933, of the Federal Deposit Insurance Corporation. Upward of 56,000,000 accounts in 14,170 banks were insured, more than 97 percent of the depositors in these banks being insured to the full amount of their deposits. Four of the insured banks, with a total deposit liability of about $1,410,000, closed during the fiscal year.

These efforts were supplemented by the activity of the Farm Credit Administration in establishing a complete credit system to finance agricultural enterprises by strengthening the existing farm credit institutions and by providing additional permanent lending agencies. During the fiscal year the Administration lent $1,405,140,000 to farmers and farmers' organizations.

In a somewhat similar manner the Home Owners' Loan Corporation was active during the fiscal year in making mortgage loans which enabled more than 400,000 home owners to avoid foreclosure on their properties, made available to closed banks about $166,000,000 on frozen assets, and to municipalities approximately $90,000,000 for back taxes.

With the restoration of confidence in the banking system by these and other measures, the total deposits of the banks of the country increased sharply, while interest rates were lowered, not only on prime commercial paper but also on loans to customers. Notwithstanding this large growth in deposits, the volume of outstanding loans of reporting member banks in 91 cities at the end of the fiscal year decreased by $438,000,000, or 5 percent. The decline in loans on securities and "all other" loans was identical for the year—$219,000,000 in each instance. Investments of the banks, on the other hand, increased $1,510,000,000 with all but $99,000,000 being accounted for by the increased holdings of Government securities.

Reserve bank credit outstanding increased from $2,200,000,000 in June 1933 to $2,472,000,000 in June 1934. This expansion resulted from the large-scale open-market operations of the system in the first half of the fiscal year.

The Treasury Department converted about $1,700,000,000 of wartime debt into obligations bearing lower interest rates and issued short-term obligations at rates as low as seven one-hundredths of 1 percent per year. The average annual interest rate on the outstanding interest-bearing debt was reduced from 3.35 to 3.18 percent dur-

ing the fiscal year. The gross national debt rose from $22,539,000,000 to $27,053,000,000. The net balance in the general fund at the end of the year, however, was about $1,720,000,000 larger than a year earlier.

General revenues increased more than a billion dollars during the year, while general expenditures were reduced by more than $765,000,000. Against the surplus thus achieved in the general Budget there should be set $4,000,000,000 of emergency expenditures. Part of these emergency outlays represent investments that will be largely repaid in due course. It is interesting to note that repayments to the Reconstruction Finance Corporation during the year were equivalent to 48 percent of the amount disbursed.

Unemployment Reduced, But Still a Major Problem

Definite progress was made during the past fiscal year in reabsorbing into gainful occupations the vast army of unemployed which had steadily increased until the final quarter of the year 1932–33. It has been estimated by the American Federation of Labor that about 2,300,000 more persons were employed in June 1934 than a year earlier, and that the total gain in the number employed since the low point in March 1933 was approximately 4,000,000. These figures do not include those directly employed under the relief or works programs of the Government.

Contributing to the employment gains during the past year was the program of shortening of hours under the NRA. The Civilian Conservation Corps afforded a source of income for more than 300,000 men throughout the year, and the Public Works program was providing direct employment for about double that number by the close of the fiscal year.

The employment gains since the low point of the depression have extended to both the durable- and the nondurable-goods industries. The number of workers employed in the durable-goods group, however, is still much lower, relative to the level of 1929 and the immediately preceding years, than for the nondurable-goods group.

The major employment problem, therefore, lies in the stimulation of the durable-goods industries, and this is receiving increasing attention. The extent to which such industries are contributing to unemployment may be apprehended from the segregation of the factory-employment data by the Bureau of Labor Statistics. On the basis of the average for the years 1923–25 as 100, employment in the durable-goods industries in June 1934 was 70.7, or about one-fourth less than in the base period, while the nondurable-goods index stood at 92.9, or only 8 percent below that for the period indicated.

In the nonmanufacturing industries, for which current data are available, employment increased in all but two of the groups; these were the telephone and telegraph, and the electric-railroad and motor-bus operation and maintenance groups, which declined 6.9 percent and 0.6 percent, respectively. The percentage gains for the year for those nonmanufacturing industries covered by the Bureau of Labor Statistics' monthly surveys varied from one of 3.4 percent for the electric light and power industry to one-fourth and more for the metalliferous mining and petroleum-producing industries.

With a continuing large volume of unemployment and the exhaustion of private resources, relief demands continued heavy throughout

the year. At the end of the fiscal year 3,717,000 families were on relief rolls, and, in addition, 513,000 single persons were receiving relief, the total number of persons reaching 16,600,000, compared with an estimated total of 15,282,000 in July 1933. Total obligations incurred for relief and administration (excluding the CWA) during the fiscal year amounted to $920,000,000.

Cash Income from Farm Marketings up One-fourth

Purchasing power in rural areas improved greatly during the year. Major factors in this improvement were the marked upward trend of farm prices and the payments made to farmers by the Federal Government in conformity with the Agricultural Adjustment program.

Cash income from farm marketings amounted to $5,284,000,000, an increase of 26 percent over the total of $4,182,000,000 in the preceding fiscal year. The increase of 45 percent in the value of crops was nearly four times as large relatively as the increase for livestock and livestock products. These figures do not include the income from rental and benefit payments, which amounted to $310,000,000. No payments of this kind were made in the preceding fiscal year. Thus, total cash income from marketings and from the AAA showed an increase of one-third.

Crop production during the calendar year 1933 was the lowest since the early years of the century, according to the Department of Agriculture index, which dropped to 86 percent of the pre-war average from 105 in 1932. While part of this decline resulted from the operations of the Government's crop-reduction program, unfavorable growing conditions were a major cause. The crop-curtailment program did not get into full swing until the current agricultural year. This program, together with the wide-spread damage resulting from drought, will reduce the 1934 harvests to a point far below the 1933 figure. The heavy surplus stocks of farm products have been greatly reduced by these developments.

Railroad Traffic Higher; Financial Position of Carriers Still Difficult

The increase in purchasing power resulting from the employment gains and from other sources was reflected in an increase in railway business for the first time since 1929. Total operating revenues of class 1 railways, which handle 95 percent of the railway tonnage, amounted to $3,310,067,000, an increase of 12 percent over the 1933 fiscal-year total, while net railway operating income rose to $545,532,000, an increase of 47 percent over the 1933 figure. The volume of traffic shipped rose to 31,208,000 cars of revenue freight originated, an increase of 14 percent for the fiscal year. The carriers earned 2.09 percent on their investment for the fiscal year, but after fixed charges were set aside they operated at a deficit during 5 months, of which 4 were in the final 6 months of the period.

The railroads entered on a program of rehabilitation during the fiscal year through the use of Public Works Administration funds; $191,089,000 was allotted for the repair of old equipment, the improvement of the right-of-way, and the purchase of new equipment. At the close of the fiscal year the railroads had on order 17,813 new freight cars, compared with 1,205 on the same date in 1933; 40 new steam locomotives, compared with 1 in 1933, and 107 new electric

locomotives. In the last 6 months of the year they installed 5,362 new freight cars, 1 new steam locomotive, and 8 new electric locomotives.

Important developments included the extension of fast freight service and the extension of pick-up and delivery service on many lines. In the passenger service the introduction of high-speed, stream-lined, articulated unit trains, constructed of light-weight material, by the Union Pacific and the Burlington was significant. These roads and others have placed further orders for similar equipment. Air conditioning was also carried forward. Another development of interest was the reduction of passenger fares in the western and southern districts, an experiment which has been accompanied by a substantial increase in revenue.

Construction Industry Lags

Although the value of construction contracts awarded increased by 50 percent, the construction industry continued in a depressed state throughout the fiscal year. During the calendar year 1933, the volume of construction dropped to about $3,000,000,000, an aggregate not much more than one-fourth of the total for the years prior to 1930. While some improvement occurred during the fiscal year 1934, mainly by reason of the expenditures of the Public Works funds, the volume was still extremely low.

As the Public Works program was accelerated, construction contracts awarded showed a rapid rise from August through December. Subsequently public awards declined, and, with private contracts continuing in restricted volume, the index of contracts awarded receded from a high of 58 percent of the 1923–25 average in December to 26 percent in the final month of the fiscal year. This latter figure compares with an index of 18 for the final month of the preceding fiscal year.

Contracts awarded during the fiscal year 1933–34 in the 37 States east of the Rocky Mountains, according to the F. W. Dodge Corporation data, amounted to $1,677,901,000, compared with $1,116,193,000 in the preceding year, an increase of more than 50 percent. Public Works awards contributed 46 percent of the total, compared with 38 percent a year earlier. These latter figures do not indicate the full extent to which public funds contributed to the awards, since, in addition to the public works, these were used also to finance other construction projects. In the latter half of the fiscal year, for example, publicly financed construction amounted to $571,696,000, or more than three times the total in the preceding year. Work privately financed was valued at $282,360,000, an increase of less than 5 percent over the preceding year.

Actual construction operations showed a different trend throughout the year, the number of men at work probably being greater during June than in any other month of the fiscal period. The number employed on projects (Federal and non-Federal) financed by funds from the Public Works Administration increased steadily throughout the year to a total of 592,000 in the final week of June.

Of the total of $3,700,000,000 made available for public works, all but $35,000,000 had been allocated by the early part of the fiscal year 1934–35. Exact data are not available as to the amount actually

expended, but the Public Works Administration estimated that by August 1, 1934, about 30 percent of all allotments had been spent.

Recognizing the failure of private activity to absorb the unemployed normally attached to the building industry, the Federal Government launched a housing program in the final month of the fiscal year. This plan contemplated facilitating the flow of mortgage credit, upon which private construction is to a large degree dependent, and reducing the interest charges on construction loans.

Retail Sales Improved

Retail trade, which had shown a lagging tendency in the initial stages of recovery toward the close of the fiscal year 1932–33, made steady progress during the last year. The increase in sales was relatively large in rural areas where the recovery in purchasing power was especially marked. The improvement in automobile sales was particularly pronounced during the year, as is evidenced by a gain of 57 percent in the index of new passenger-car sales. Other leading indexes of the dollar volume of retail trade show the following percentage increases over the preceding fiscal year: Department-store sales, 12.4 percent; variety-store sales, 11.8 percent; chain grocery-store sales, 3.7 percent; and rural sales of general merchandise, 30 percent. While these data reflect price increases as well as increases in the quantity of goods moved, it is noteworthy that retail sales were being maintained around the turn of the year at a time when productive activity was giving evidences of recession.

The record of commercial insolvencies during the year reflects the favorable influences of increased business activity and rising prices. While higher costs of operation were offsetting factors, the record for the year shows that the number of failures was the lowest since 1920. The liabilities involved in commercial insolvencies showed a corresponding decline.

Foreign Trade Increased in Both Volume and Value

Foreign trade expanded considerably in both quantity and value during the fiscal year. Exports increased 18 percent in quantity and 42 percent in value, in comparison with the preceding fiscal year, while the gains in imports were 20 percent and 47 percent, respectively. Summary data covering the value of our foreign trade are given in the accompanying table.

Foreign trade of the United States

[Millions of dollars]

Item	Year ended June 30—							Percent increase 1934 over 1933
	1922–26 (average)	1927–31 (average)	1929	1931	1932	1933	1934	
Exports of United States merchandise	4,248	4,515	5,284	3,032	1,908	1,413	2,009	+42.1
Exports, including reexports	4,332	4,599	5,373	3,084	1,948	1,440	2,042	+41.8
Imports, merchandise	3,646	3,795	4,292	2,432	1,730	1,168	1,721	+47.3
Excess of exports (+) or imports (−):								
Merchandise	+685	+805	+1,082	+651	+218	+272	+321	
Gold	+213	+65	−155	−297	+714	−264	−576	
Silver	+14	+16	+17	+5	−5	−27	−29	

Exports of finished manufactures were 34 percent larger in quantity than in the preceding fiscal period. Exports of semimanufactured articles showed about the same percentage increase as finished articles, while the increases in crude materials and manufactured foodstuffs amounted to 5 percent and 9 percent, respectively. Exports of crude foodstuffs were 14 percent less in quantity.

Total agricultural exports amounted to $787,259,000 during the year, an increase of 34 percent. This gain was due mainly to advances in commodity prices, since the total volume of agricultural exports declined about 2 percent. While tobacco and meat products showed increases in quantity of 18 and 3 percent, respectively, unmanufactured cotton, fruits, and grain showed, severally, declines of 3 percent, 3 percent, and 19 percent.

Among the nonagricultural exports, iron and steel-mill products, passenger automobiles and motor trucks, automobile tires, copper, and crude petroleum recorded increases in quantity, ranging from 157 percent for the item first mentioned to 36 percent for crude petroleum. Furthermore, exports of machinery, advanced manufactures of iron and steel, wood manufactures, and leather increased considerably in value. Advances in prices of lumber exports resulted in a decided increase in value of that commodity, although quantity shipments declined by 5 percent. The decline in the value of cotton-cloth exports was only 1 percent, notwithstanding a decline of 34 percent in the quantity of shipments.

Among the economic classes of imports, semimanufactures recorded an increase of 77 percent in value, crude materials advanced 67 percent, while the gain in value of finished manufactures and foodstuffs was 28 percent and 22 percent, respectively. Tin, crude rubber, wood pulp, and hides and skins showed increases in quantity that ranged from approximately 40 percent to 60 percent, and imports of wool and mohair were four times as large as in 1932–33. Each of these commodities showed decidedly larger increases in value than in quantity. The quantity of coffee imports increased about 9 percent, while the value declined slightly. Raw-silk imports aggregated 14 percent less in quantity than in 1932–33, but the value increased 5 percent.

The geographic distribution of United States foreign trade evidences an increase of 38 percent in exports to Europe, as compared with a gain of 46 percent for all other continents. Advances in the value of shipments to northern North America (Canada), Asia, and Africa reached 41 percent, 53 percent, and 77 percent, respectively, while the gains for Oceania and Latin America were 33 percent and 38 percent. The increase in value of exports to Asia was influenced by the advances in prices of raw cotton and by large foreign purchases of iron and steel-mill products, including scrap.

Imports from Europe advanced by about the same percentage as imports from all areas outside Europe. Sharp increases in prices of crude rubber, tin, wool, and skins and an increase in the quantity of our purchases of each of these four items, as well as of cane-sugar imports from the Philippine Islands, accounted primarily for the increase of 58 percent in the value of total imports from Asia. Im-

ports from Latin North America expanded only moderately in value and, as a result, the percentage increase in imports from the whole of Latin America was smaller than the increase for any other great trade region. Total imports from South America increased 40 percent.

The summary table below shows the distribution of the foreign trade of the country by geographic divisions and by classes of goods from 1922 to date:

Foreign trade of the United States, by geographic divisions and by economic classes

[Millions of dollars]

Geographic division and economic class	Year ended June 30—							Percent increase, 1934 over 1933
	1922–26 (average)	1927–31 (average)	1929	1931	1932	1933	1934	
TOTAL EXPORTS, INCLUDING REEXPORTS OF FOREIGN MERCHANDISE								
To:								
Europe	2,253	2,162	2,397	1,523	944	722	997	38.1
All other continents	2,079	2,438	2,977	1,561	1,004	718	1,044	45.5
Canada and Newfoundland	639	806	999	530	302	198	280	41.2
Latin America	722	806	970	512	252	212	293	38.0
Asia	502	558	686	385	364	240	367	53.0
Oceania	146	161	193	64	39	33	45	33.3
Africa	69	106	129	71	47	34	60	77.0
EXPORTS OF UNITED STATES MERCHANDISE, BY ECONOMIC CLASSES								
Foodstuffs	946	724	806	457	317	194	235	20 7
Raw materials	1,194	1,098	1,239	725	539	480	684	42.4
Semimanufactures	555	636	730	404	242	187	304	62.9
Finished manufactures	1,554	2,057	2,508	1,445	810	552	785	42.3
GENERAL IMPORTS								
From:								
Europe	1,093	1,145	1,302	719	526	361	536	48.4
All other continents	2,554	2,650	2,989	1,713	1,204	807	1,185	46.9
Canada and Newfoundland	406	463	516	334	235	152	227	49.5
Latin America	965	950	1,089	623	466	291	370	27.2
Asia	1,045	1,107	1,223	685	463	337	533	58.1
Oceania	57	47	57	25	13	6	17	195.0
Africa	80	83	104	46	27	21	38	80.5
By economic classes:								
Foodstuffs	849	867	971	591	460	384	[1] 471	22.4
Raw materials	1,400	1,355	1,510	765	506	305	[1] 510	67.4
Semimanufactures	655	719	849	453	296	196	[1] 346	76.7
Finished manufactures	743	853	960	623	468	283	[1] 361	27.5

[1] Imports for consumption beginning January 1934.

It will be noted by reference to this and to the preceding table that, despite the substantial gains during the fiscal year just closed, the total foreign trade of the United States for the year was less than half the average value for the years 1922–31.

The low value is attributable not only to the depressed economic conditions and the decline in prices throughout the world but also to the increased tariff rates and other trade-restrictive measures which have been imposed in nearly all countries.

RECIPROCAL TRADE PROGRAM

Outstanding among the activities of the Department undertaken last year was a series of studies in connection with the reciprocal trade agreement program initiated by the Trade Reciprocity Act signed June 12, 1934, and authorizing the President to promote trade between the United States and other countries by means of reciprocal agreements.

The foreign trade of the United States, as well as international trade in general, had sharply declined during the last few years to the point where it became necessary that definite and aggressive measures be taken to arrest and reverse the tide, if the volume of our foreign commerce considered essential to the country's economic well-being was to be recovered and maintained. The method of procedure which seemed to give promise of most effective results, and the one most in harmony with the practices of other countries and with general world trends, was that of reducing tariffs and relaxing or abolishing trade restrictions of other types by means of reciprocal trade agreements.

A movement in this direction had already been started in the latter part of the preceding year when exploratory studies were begun at the request of the Department of State, with a view to trade agreements with a selected number of foreign countries. However, the President felt it desirable that this procedure should be expedited as much as possible so that we should be able to cope adequately with the increasing number of restrictions which were being imposed by other countries on the products of American farms and factories, and as a result of this desire, which was reflected in Congress, the Trade Reciprocity Act was passed and signed in June.

Immediately upon the passage of this act an interdepartmental organization was set up at the direction of the President and under the auspices of the Department of State to carry out the purposes of the act. The Bureau of Foreign and Domestic Commerce has had an important share in the work of this organization, especially in the task of preparing studies preliminary to the negotiation of trade agreements. The studies made by the Bureau are particularly from the standpoint of developing such proposals for the moderation of tariffs and other trade barriers of other countries as might be sought in the course of negotiations.

As the first fruit of the general program, a highly satisfactory agreement with Cuba was signed on August 24 and put into effect on September 3. Negotiations are now pending with several other countries and the program will be expedited.

FOREIGN AND DOMESTIC COMMERCE

The progress and the expanding usefulness of the Bureau of Foreign and Domestic Commerce—following certain modifications of policy for this service unit—are demonstrated by the figures from varied fields of Bureau activity. It may be noted, among other items, that the Foreign Commerce Service registered an increase of more than 100 percent in the "output per man" of report material

desired by American business; the requests for specific information on foreign dealers were approximately one-third greater in number than in 1932–33; and the subscriptions to the valuable "processed" periodicals and statistical statements issued by the Bureau increased in some instances as much as 100 percent over the immediately preceding fiscal year.

The Bureau was especially helpful in providing data needed for the successful carrying out of new policies and major undertakings of the administration. Among the most significant and potentially beneficial of these has been the Government's decision to negotiate reciprocal trade agreements with various foreign countries, in a manner calculated to stimulate the currents of international commerce and thus to enhance the welfare of American productive industry. The Bureau's participation in connection with these agreements is discussed in the preceding section of this report entitled "Reciprocal Trade Program."

The Bureau has kept fully abreast of the flood of new nationalistic economic and commercial legislation in foreign countries during the past year and of the many new interpretations of older laws and regulations.

At increasingly frequent intervals, the Bureau has released information on the complex and rapidly multiplying foreign-exchange regulations which are proving so embarrassing to commerce throughout the world and has made available many fundamental facts with respect to the financial position of governments or corporations abroad which have defaulted—wholly or in part—on their obligations to American lenders and investors.

Particular attention has been given to the effort to increase the comprehensiveness and accuracy of the Bureau's highly valued study of the balance of international payments of the United States; at no time in the past have the data presented in this study been so urgently needed as during this last fiscal year, or so immediately applicable to the consideration of weighty problems of our national economy. Consequently, the Bureau hopes to effect still further improvements and expansion in this field of study.

The Bureau has made special studies of American branch factories abroad—a problem that has been appreciably complicated by the recent shifts in economic policy in major nations.

The experiences of foreign countries with cartels have been closely followed and scrutinized by the experts in the Bureau, with a view to enabling Americans to profit by exact knowledge of motives and results.

The Bureau's correspondence and research work on economic events and conditions in the Soviet Union have been considerably enlarged by reason of the reestablishment of diplomatic relations between the United States and that country.

There has been extensive cooperation between the Bureau of Foreign and Domestic Commerce and other Government organizations, particularly those that have been newly constituted to further the cause of national recovery. The National Recovery Administration has been aided in innumerable ways. The help of the Bureau's district offices was invaluable in carrying through the "Blue Eagle" drives. Bureau officials have acted as advisers to the

NRA at code hearings and in other ways; data on various industrial "set-ups" have been supplied; the Marketing Research and Service Division performed important tasks for the NRA in the early stages of that organization, by handling inquiries on procedure, instituting code analysis, furnishing basic facts of diverse kinds, and developing and maintaining mailing lists. The Bureau has helped the Agricultural Adjustment Administration by supplying information needed for the program of crop-control, processing taxes, and related matters. A considerable amount of data relative to enterprises to which loans were contemplated was furnished to the Reconstruction Finance Corporation. It has likewise made many compilations of statistics, and has assisted in the drawing up of graphic presentations, for the Office of the Special Adviser to the President on Foreign Trade.

At the request of the President's Transportation Committee, the Bureau made an elaborate study of "Railway and Highway Transportation Abroad: Existing Relationships, Recent Competitive Measures, and Coordination Policies."

A major achievement has been the carrying out of the Real Property Inventory, designed to revive and stimulate the Nation's building industry through the collection and dissemination of hitherto unavailable data on housing conditions—especially obsolescence, vacancies, overcrowding, and rentals. This project was financed by the Civil Works Administration and was undertaken cooperatively by the Bureau of Foreign and Domestic Commerce and the Bureau of the Census. Substantially beneficial results promise to follow this gathering of housing data, on 32 vital points, from 64 selected cities.

AIR COMMERCE

For the advancement of private flying, a phase of aeronautics which has had little encouragement in previous promotional projects of the Federal Government, the Bureau of Air Commerce during the last fiscal year initiated a program of development along three lines: Assistance to the industry in the introduction of a safe, simple, low-priced airplane: establishment of new airports and improvement of existing ones: and revision of the requirements in connection with noncommercial flying to the end that this type of flying activity shall become both safe and convenient.

In other fields the Bureau obtained funds from the Public Works Administration for the construction of nearly 3,000 miles of new lighted and radio-equipped airways: recommended the establishment of a trans-Atlantic airway by employment of refueling bases or seadromes; investigated and conclusively tested the blind landing system developed by the Army Air Corps and found it suitable for use by commercial aviation: advocated legislation, which was enacted, to enable the Bureau to make more thorough investigations of aircraft accidents, to strengthen air-line regulations, and to engage in development work on airplanes, engines, and accessories.

These special projects were in addition to the regular functions of air regulation and the operation of nearly 20,000 miles of Federal airways. The ordinary activities of the Bureau were conducted with a budget of about $5,200,000—nearly 2½ million less than the sum

originally appropriated by Congress for the fiscal year 1934. During the preceding 4 years the Bureau's expenditures for the same purposes had averaged more than $8,500,000. This reduction in expenditures was made possible by rigid economies in all divisions and sections but no essential service to airmen and the public was eliminated.

In connection with the program on behalf of private flying, the Bureau first made a survey of the potential market for low-priced airplanes. Contacting only licensed pilots, student pilots, and mechanics, it learned of the existence of approximately 60,000 prospective purchasers of such a craft. Legislation passed in the last session of Congress authorizes the Bureau to conduct research and development work on aircraft, engines, and accessories, and funds have been made available for the purpose from a special appropriation to be expended at the discretion of the President for further development of military and civilian aviation.

The airport-construction program, undertaken in cooperation with the Civil Works Administration, was organized last winter to provide work for the unemployed. More than 1,000 projects were involved. Of these about 60 percent were new landing fields and 40 percent improvements of existing airports.

Revisions of the Air Commerce Regulations governing activities of noncommercial airmen reduced the procedure necessary in obtaining and renewing pilot licenses in the grades for persons who do not fly for hire, and increased the privileges granted by these licenses.

The Bureau surveyed 2,700 miles of new Federal airways, and at the close of the year was practically ready for construction work to begin on the northern transcontinental route Seattle, Wash., to St. Paul-Minneapolis, Minn.; and on routes from Fargo to Pembina, N. Dak.; New Orleans, La., to St. Louis, Mo; Tulsa, Okla., to St. Louis, Mo., and from Galveston to Waco, Tex.

A recommendation for construction of an airway from Nashville, Tenn., to Washington, D. C., was approved by the Public Works Administration, after the close of the fiscal year.

Besides revising the requirements for noncommercial airmen, the Bureau promulgated a policy calling for promotional and development work by aeronautical inspectors. Aircraft engineering requirements were brought abreast of advances in aerodynamics, and the involved procedure in connection with submission of applications for approval of aircraft for licensing was modified.

In view of the increase in aviation activities in Alaska and the potentialities of the industry in that Territory, a full-time aeronautical inspector was assigned to Alaska.

LIGHTHOUSE SERVICE

At the close of the fiscal year the total number of aids to navigation under supervision by the Department was 23,597, a net increase of 1,088 compared with the previous year's total, notwithstanding the discontinuance of 1,984 aids which were found to be no longer necessary or which were replaced by more suitable types. Special improvements designed to secure greater efficiency in the aids con-

sisted in changing 92 lights from fixed to flashing or occulting, and in changing the illuminant of 119 lights to electric, and that of 41 lights to acetylene. Two new radiobeacons were established, the total number now being 105.

Continuous study and experiment have been carried on to improve apparatus and equipment used in the Service. The use of electricity has been extended to include such functions as illumination for major and minor lights, power supply for fog signals and radiobeacons, lighting for quarters, and for timing apparatus for signal controls. A lightship equipped for remote control of all facilities, including light, fog signal, and radiobeacon, is about ready to be placed in operation as an unwatched aid to navigation, being the first of its kind in this Service; and a completely automatic light and fog signal station, requiring attendance only at infrequent intervals, has been designed. Test has been made of an electric siren buoy, with results that are promising. Control equipment for synchronizing radiobeacons has been improved, and the elimination of interference with radiobeacons has been largely effected.

The technical staff of the Bureau was reorganized by coordinating all branches of the engineering work of the Service under a chief engineer. The subordinate technical activities have been further developed and systematized.

Three new lighthouse tenders were completed during the year, each replacing an old tender worn out in service; a fourth is under construction, and still another is about to be contracted for.

No additional lightships were constructed during the year, but two were extensively reconditioned. The efficiency of these ships will thus be materially increased and their useful life prolonged. Two lightship stations were discontinued during the year, resulting in appreciable economy. Five old ships now out of commission are shortly to be condemned and sold.

The Lighthouse Service made its contribution to the general effort for industrial and economic recovery by participating in the Federal Public Works activities. An allotment of approximately $5,620,000 was made for this purpose by the Public Works Administration. Projects of the Lighthouse Service, making up this program, more than 190 in number, were carefully selected with a view to their necessity for the safety of navigation, the preservation of existing stations, and equipment of the Service, and, so far as practicable, with regard to reduction of or economy in expense of future operation and maintenance. Special efforts have been made to prosecute these works as rapidly as possible, with the result that about one-half of the allotted funds was obligated by June 30, 1934, notwithstanding various obstacles encountered both in physical conditions and in contractual requirements. Further provision for relief of the unemployed was undertaken through cooperation with the Civil Works Administration, which furnished funds for labor and also for a portion of the materials on 87 projects of minor improvements for the Lighthouse Service, in 14 States. The Lighthouse Service provided necessary supervision and inspection, together with much of the materials and tools used for this work.

ENFORCEMENT OF NAVIGATION AND STEAMBOAT INSPECTION LAWS

During the year the Bureau of Navigation and Steamboat Inspection collected more than $1,686,000 in revenue through tonnage duties, navigation fees, and fines, or approximately $47,000 in excess of collections from similar sources during the previous fiscal year.

On June 30, 1934, the merchant marine of the United States, including all kinds of documented craft, comprised 24,904 vessels of 14,861,814 gross tons, as compared with 24,868 vessels of 15,060,157 gross tons on June 30, 1933. On June 30, 1934, of this total 3,842 vessels of 4,606,623 gross tons were engaged in the foreign trade, as compared with 3,902 vessels of 4,710,169 gross tons on June 30, 1933. During the year, 724 vessels of 66,649 gross tons were built and documented, and on July 1, 1934, there were building or under contract to build in American shipyards for private owners, 53 vessels of 38,102 gross tons.

The above figures of tonnage of our merchant marine indicate an increase of 41 vessels, but a decrease of 198,343 gross tons.

The crews for the merchant marine, excluding masters, numbered approximately 181,999. Of the aggregate, 35,224 were serving on the laid-up vessels. During the year there were shipped, reshipped, and discharged before our shipping commissioners, 508,898 seamen on American vessels. Of this number, 219,306, or 80.8 percent, were American citizens. While the number of men signed on and discharged by the shipping commissioner is not an indication of the number of seamen in our merchant marine, it is a fair index of the proportion of Americans in the crews.

A special committee of marine experts is conducting a comprehensive study for the purpose of making recommendations for legislation, and the revision of the rules and regulations, with the view of providing the maximum safeguard of life and property at sea, with particular reference to fire and other types of disasters. Specific recommendations will be submitted to the Congress shortly after it convenes in the next session.

The Department desires to emphasize anew the importance of the early ratification by the Senate of the International Convention on Safety of Life at Sea. This convention places the United States on a parity with the other principal maritime nations of the world in promoting the safety of ships, passengers, and crews at sea. It is also recommended that the Congress give consideration to the extension of the applicable portions of the steamboat inspection laws to the great number of Diesel-engine-propelled ocean-going vessels: the exclusion of aliens from our domestic fisheries, and the further protection of our domestic coastwise trade.

SURVEYING AND MAPPING

The work of the United States Coast and Geodetic Survey in hydrography, topography, and geodetic triangulation, reconnaissance, and leveling more than doubled that of the previous fiscal year. The Bureau has continued to make effective use of National Recovery funds, not only in the interests of human safety and to

meet the ever-growing demands of the mariner, aviator, and engineer, but in the relief of unemployment, for most of the Recovery funds—fully 70 percent—allotted to the Survey was expended as wages.

Among the Bureau's accomplishments were the devising of more proficient surveying instruments and the development of more efficient methods. The fathometer, used in determining water depths, based on the precise measurement of the elapsed time required for a sound made on the vessel to go to the bottom and return as an echo, was adapted to surveys in water varying in depth from a few feet to 20 fathoms. With this newly-devised fathometer a survey launch traveling at 12 miles per hour will get 400 soundings every 20 seconds, or 1 sounding every 12 inches, furnishing a comprehensive profile of the under-water configuration.

Aerial topography, done with a 5-lens camera with separate films for each lens requiring the resulting 5 photographs for each exposure to be assembled, fitted, and mounted, is being superseded, with the use of National Recovery funds, by a 9-lens camera designed for the rays of light at exposure for all 9 lenses to be projected onto a single film and one large photograph. A new camera constructed in the Washington office successfully makes precise negatives up to 50 inches square.

During part of the year the Survey supervised the work of a representative charged with the direction of geodetic surveys under emergency relief allotments in each of the 48 States engaged in supplementing the country's geodetic control surveys. The resulting data are indispensable for any comprehensive long-range planning of public works as a means of avoiding waste and to insure that various and widely separated surveys have perfect junction when separate engineering projects meet.

The trend of earthquake investigation by the Survey has been directed to obtaining information necessary for the saving of life and property from earthquake damage, stress being laid on fundamental measurements needed by engineers and architects for the safe design of buildings and other structures. An instrument convenient for making building-vibration records was also designed and is now in use.

Need for a National Map

I have been much impressed by the evidence reaching the Department indicative of an urgent need for completing the mapping of the country. An accurate map is indispensable to all large enterprises concerned with any considerable portion of the earth's surface. It is inefficient and wasteful to undertake any large developmental work without the aid of good surveys and maps.

Only about 25 percent of this country is adequately mapped at the present time: less in proportion than most of the other nations. This situation is a direct result of the individualistic policy under which our Nation developed. The immediate profits to be derived from short-visioned exploitation were so great that waste and inefficiency in this respect were tolerated. In undertaking each new enterprise, industry and commerce would have profited immeasurably by such a map if it had been available, but they were unwilling to defer im-

mediate profits for the additional time required to produce the map. They lacked the vision to anticipate future needs.

It is now the national will that there must be a saner and wiser use of the heritage of wealth latent in our soil, our streams, our forests, and our mineral resources. We must think in terms of future generations as well as of the present. The map is one of the lowly and unspectacular devices needed to accomplish that purpose.

Industry and commerce have been the principal sufferers from the lack of such a map and will be the principal beneficiaries from its production, and they will pay a large part of the very considerable cost of production. It is, therefore, appropriate that this Department should be the pioneer in seeking to bring the many uncorrelated needs for maps to a common focus so that they can be viewed in their entirety as a national problem.

FISHERIES

The last fiscal year brought some encouragement to the commercial fisheries in that there was an increase in price during most of the period, compared with the same months of the preceding year. The catches, too, have shown a steady increase in size. The complete statistics will not be available until late this year, but the trend was indicated by the monthly returns from the principal producing centers.

The need for economy, which has prompted the closure of 9 fish-cultural stations and 1 biological station, has made it essential to determine where reductions could be made with the least harm to the fisheries. In fish-cultural work, the emphasis was placed on the production of the so-called " sport " fishes, as the drain on these has grown with the increased fishing on the part of those not gainfully employed, as a means of augmenting the family food supply. The production of 10 species of these fish was increased from 25 to 70 percent, while the total output of all fish, by reason of closed stations and curtailed operations at others, was decreased slightly.

One of the important advances of the year was the formation of the National Fisheries Planning Council to coordinate the activities of the Federal and State departments. The Commissioner of Fisheries called the meeting and set forth the plans that led to its formation in the latter part of April, at St. Louis. All the States are represented in the council.

Sportsmen's clubs and other such organizations distributed many fish for the Bureau and in some cases took the fry in the spring, raised them until fall and then distributed them, thereby reducing the expenses of the Bureau in this respect.

Stream surveys were inaugurated by the Bureau with PWA funds in the waters of many of the national parks and forests, with a view to determining what species of fish they should support, the population already present, and the carrying capacity of the waters. During the year plans were being evolved for the passing of the big salmon run of the Columbia River over the dam to be built at Bonneville, Oreg.

The take of fur seals during 1933 was over 54,500 and was the largest since the Government has taken charge of the Pribilof Islands. The fur-seal herd has increased to over 1,313,500 animals.

It is proposed to operate the byproduct plant at these islands to produce oil and meal from the carcasses of the seals, rather than to permit them to decompose and endanger the health of the inhabitants. The plant was reconditioned and equipped with new machinery in 1931 but has not been operated because of the low price of oil and meal. The prices for these commodities have increased and, in view of the existing insanitary conditions, the plant should be operated.

Studies by the technologists of the Bureau during the past year have indicated the salmon waste is capable of yielding an oil comparable to cod-liver oil in vitamins A and B, and also a fish meal of high feeding value. It was also brought out that swordfish-liver oil contains a higher content of vitamins A and D than halibut-liver oil.

Water Pollution a National Problem

The growing menace of pollution of natural waters in the United States and its disastrous effects upon aquatic life, including particularly the more valuable food and game fishes in interior waters as well as the shell-fisheries resources of the coastal regions, is rapidly gaining recognition as a problem of national concern. When communities were scattered and industries were small, the effects of stream pollution were usually of limited extent. At the present time, however, domestic sewage and industrial wastes are produced in such great volume that in a great many coastal and interior rivers their effects are projected downstream through several State jurisdictions, and the problem of control, therefore, becomes a national rather than a local interest.

Domestic sewage may be sterilized to prevent the spread of disease, but when poured into streams may still deplete the oxygen supply below the limit necessary to sustain life of fishes. Traces of oil pollution in coastal waters may ruin the shellfish industries, but pollution must become flagrant before it interferes with navigation. Similarly, natural water supplies heavily laden with dissolved minerals or erosion silt may actually be potable or may be readily rendered suitable for domestic use, even though they are incapable of supporting fish or the smaller organisms which become fish food.

Provision should be made, therefore, for the Bureau of Fisheries to undertake a national survey of the extent of stream pollution and its effect upon the fisheries. In addition to this survey, detailed field and laboratory investigations should be undertaken to determine the effects on aquatic life of the various stream pollutants, to discover means of recovering industrial trade wastes, and to utilize valuable organic constituents of domestic sewage in order to increase fish production. As a result of such surveys and investigations, a national policy of correcting stream pollution could be developed, Federal legislation could be proposed as necessary, and local legislation could be improved.

NATIONAL STANDARDS

The extensive testing service of the National Bureau of Standards is conducted for all departments and bureaus of the Federal Government. In the past year, 146,390 tests were made. This service keeps the purchase of Government equipment and supplies on a scientific

basis of proved merit. The largest item tested was 5,500,000 barrels of cement, including a large amount of low-heat cement for the Boulder Dam and other Government projects.

The Bureau made 23,629 tests for the public, all of which were of such a nature that they could not well be made by private laboratories. Approximately 2,000 lots of radium and radioactive preparations for medical and scientific purposes were tested and certified, their total market value exceeding $1,000,000.

In promoting accuracy in standards of length and in their intercomparison, the Bureau must keep in advance of the most exacting needs of industry. To this end the Bureau has constructed length standards of fused quartz 0.1 meter long and accurate to within 1 part in 2,000,000 with ends plane and parallel to within 1 part in 4,000,000. The necessary measurements were made by interference of light waves.

Following up the world-wide adoption of the standard international temperature scale, and to ascertain the accuracy with which that standard scale is actually used, accurate international comparisons have been made.

The freezing points of gold, silver, antimony, and zinc were measured with three distinct kinds of temperature-measuring devices. The agreement reported is within a tenth of a degree centigrade.

As a basis for the world tables of the properties of steam, fundamental to the design of boilers and turbines, the Bureau has lent its expert cooperation in measuring the constants of saturated steam. The International Steam Table Conference plans to adopt the new international tables based, in part, on the Bureau's determinations.

As a service to the Government's transport units, Bureau automotive investigations assist in solving major problems; adapting fuel to the motor and adapting the motor to the fuel. Car experts seek good performance with current fuels, while fuel experts aim to develop liquid fuel suited to motors of current design.

High-Voltage Laboratory

A high-voltage laboratory is an urgent and immediate need at the National Bureau of Standards. This laboratory is necessary to enable the Bureau to perform the same service in the high-voltage field that it is now supplying in connection with low-voltage apparatus and equipment. There is a pressing demand for this service from public-utility commissions and manufacturers of equipment used for measuring electric power delivered over high-voltage lines. High-voltage X-ray tubes are now on the market so powerful that the radiation from one tube is equal to that of all medical radium in the world combined. These powerful tubes have tremendous possibilities in the treatment of cancer, but serious injury to the patient may result if the proper dosage is not used. It is imperative that suitable methods be developed for measuring the quality and quantity of the radiation from these tubes and for calibrating dosage meters, similar to what the Bureau has already done for low-voltage X-rays. The present equipment of the Bureau is wholly inadequate for this work. A very large working room or hall is required for accurate measurements on high-voltage apparatus. Clear spaces of at least 20 feet all around the apparatus are needed for insulation and safety and to avoid errors arising from electrical charges on the

walls and ceiling. The Bureau does not have this needed working space, nor does it have the equipment necessary for generating and measuring high voltages. Commercial laboratories do not possess the equipment and facilities which are needed for precise high-voltage measurements and they have indicated great interest in the proposed construction of such a laboratory by the Government.

CENSUS ACTIVITIES

The last fiscal year fell within what is called by the Bureau of the Census an intercensal period; that is, an interval between two decennial census periods. During such intercensal intervals the Bureau conducts its small decennial, quinquennial, and biennial inquiries required by law. During the last fiscal year the Bureau conducted the decennial Census of Financial Statistics of State and Local Governments, the quinquennial Census of Electrical Industries, and the biennial Census of Manufactures, in addition to its regular annual, quarterly, and monthly inquiries.

Because of restricted printing funds, eight of the final volumes of the Fifteenth Decennial Census were not published upon completion of the work. Funds were made available in the fiscal year just ended to print these eight volumes and thus to complete the record of the largest statistical canvass ever undertaken. The Fifteenth Decennial Census report fills 32 volumes, containing 31,654 pages. The complete report is, of course, available for consultation at all large libraries throughout the country, at educational institutions, and in many other places. Copies of the separate volumes, as well as of the smaller reprints and reports, may be purchased from the Government Printing Office.

As a means of measuring the ravages of the depression and of obtaining data on which to base activities looking to economic recovery, the Federal Civil Works Administration authorized the Bureau of the Census to conduct the following projects during the past year:

Census of American Business.
Census of Record Preservation.
Real Property Inventory (conducted field canvass and machine tabulations; project assigned to Bureau of Foreign and Domestic Commerce).
Urban Tax Delinquency.
Unemployment Relief Census and supporting local studies (assigned to the Federal Emergency Relief Administration).
Trial Census of Unemployment (assigned to Bureau of Labor Statistics).

Some of these projects were completed within the past fiscal year and substantial progress was made on the remainder. The most comprehensive of these projects was the Census of American Business. Its results are comparable with those of the 1929 Census of Distribution and supply a measurement of present business conditions compared with 5 years ago.

PATENTS

Notable features in the operation of the Patent Office are the surplus of monetary receipts over expenditures—the first to be reported by this Bureau since 1922; the checking of the decline in the filing of new applications, and a gain in the disposal of work, not-

withstanding a considerable decrease in the technical and clerical staffs.

The aggregate receipts of the Patent Office for the year were $4,383,468.11, exceeding expenditures by $506,683.10. This total of receipts was much less than that for 1932–33, but the curtailment of expenditures by upward of $700,000 resulted in the surplus.

The number of applications filed during the year was 79,690, compared with 79,822 in the previous year. This halting of the steady diminution of new business, which began with 1929, is cause for encouragement and may be taken as a sign of industrial recovery.

Progress in the disposal of applications is epitomized in these comparative figures: On June 30, 1934, the number of applications awaiting amendment by the applicants, or action by the Office, was 112,576; on January 2, 1934, the total of such applications was 119,869; on February 3, 1932, it was 180,355, and on January 2, 1931, it was 198,177. The number of cases awaiting action by the Patent Office was reduced from 49,050 to 39 226. This gain was accomplished with a much smaller force than that employed in the Office in the previous year.

Both from considerations of equity and of sound policy the Department has recommended the reallocation of junior examiners from grade P–1 to grade P–2. This change is in harmony with previous practice and will be not only a recognition of their services but also a means of retaining them in the work for which they have been trained at great expense to the Government.

There was inaugurated in the course of the year a new system for the registration of attorneys applying for admission to practice before the Patent Office. As amended the rules require the applicants to submit to an examination which shall determine their fitness to perform the services for which they are retained by inventors. It is expected that this procedure will assure a higher standard among practitioners before the Office.

Members of the advisory committee which I appointed in June 1933, to inform me with respect to conditions in the Patent Office, have submitted many recommendations looking to the improvement of the practice and procedure. This committee's usefulness has prompted me to make it a permanent body and to enlarge its membership to 15 so as to include in it not only patent lawyers but also representatives of industrial and engineering groups interested in the Patent Office. Their work has merited the appreciation of all those whom they have served so unselfishly and effectively.

MERCHANT MARINE

On August 10, 1933, the activities of the United States Shipping Board and Merchant Fleet Corporation were, by Executive order, transferred to the Department of Commerce, and the Shipping Board was abolished. The Board's activities have since been carried on in the United States Shipping Board Bureau, under a director who reports to the Secretary of Commerce. By this reallocation of functions the Government's principal activities with respect to the American merchant marine were coordinated under one Federal department. Following this, the Shipping Board Bureau and Mer-

chant Fleet Corporation were reorganized, with the result that on June 30, 1934, the pay rolls of the two units showed a reduction for the year of 128 employees, involving annual salaries and wages totaling $267,103.

During the fiscal year important changes were instituted in the administration of the shipping laws, steps taken to safeguard the Government's large investment in shipping, and studies made looking to such changes in the law as will strengthen the national policy with respect to the merchant marine.

Operating methods and financial returns of carriers holding ocean-mail contracts have been scrutinized more carefully in order that the public interests may not suffer because of unwise expenditure of Federal funds. Shipowners indebted to the Government for ships purchased, or for loans advanced from the construction loan fund, have been required to meet their obligations to the best of their ability. An important feature of this new financial policy developed during the year is the requirement that contract-holding lines meet their current payments out of subsidies and amortize their overdue obligations with reasonable dispatch.

An outstanding development during the year was the decision to exercise more vigorously the Department's regulatory powers over the rates, fares, charges, and practices of carriers by water engaged in interstate and foreign commerce. This course of action, predicated upon the generally accepted principle that regulation affords the most effective means of stabilization, gave rise to two important investigations. The first of these, ordered by the Secretary of Commerce on February 5, 1934, had to do with common carriers in the intercoastal trade. The second, ordered by the Secretary on March 9, 1934, sought to determine whether conditions unfavorable to shipping in the foreign trade exist as the result of competitive practices by operators or agents of foreign-flag vessels, and if so, what remedial action could be taken by the Department under existing statutes. At the close of the fiscal year both investigations were still in progress.

Some idea of the extent to which the Bureau's work has been enlarged by the additional regulatory activities it has undertaken may be gained from the statement that besides the 2 cases mentioned, 46 other cases were entered on its formal docket during the fiscal year, while 81 cases were handled on its informal docket. In the period covered by this report, 2,879 schedules of rates and charges, 1,045 agreements between carriers and other persons subject to the Shipping Act of 1916, and 109 conference agreements were also acted upon by the Bureau.

The Secretary of Commerce, on June 20, 1934, designated an interdepartmental committee to make an intensive study of ship subsidies and related phases of the shipping industry, with special reference to our future policy in the development of a strong merchant marine.

Pending a determination of the future policy with respect to subsidies and related problems, no additional ocean-mail contracts were entered into during the fiscal year. As a result, the Bureau is still in possession of five foreign-trade lines, which continue to be operated for Bureau account by managing agents who receive compensation on the basis of a stipulated sum per voyage.

The cost to the Government of vessel operation during the year was $1,870,750, as compared with $4,634,196 for the fiscal year 1933. The saving thus accomplished was due in part to the sale of services operating from the Gulf of Mexico, and in part to reduced compensation paid to three of the managing operators. In this connection it is well to note that for the fiscal year 1934, as in the previous fiscal year, no congressional appropriation was required for the Merchant Fleet Corporation, the administrative and operating expenses of which were met from its own unexpended balances.

At the close of the year the Bureau's laid-up fleet numbered 234 vessels, as compared with 246 vessels on June 30, 1933. Cost of maintenance of these reserve vessels was reduced materially during the year. A careful survey of the Bureau's laid-up ships has been instituted to determine what ultimate disposition shall be made of them.

Important adjuncts of the merchant marine are the large terminals over which the Shipping Board Bureau has jurisdiction. During the year the leases of three of the terminals were canceled on the ground that they had been entered into without due advertising and competitive bidding. By giving everyone interested a chance to bid, and by leasing the terminals for a fixed sum per annum (instead of on the old profit-sharing basis), the Department is assured of rentals more nearly commensurate with the value of the properties.

FOREIGN-TRADE ZONES

By an act approved June 18, 1934, Congress provided for "the establishment, operation, and maintenance of foreign-trade zones in ports of entry of the United States to expedite and encourage foreign commerce and for other purposes." These trade zones are designed primarily to aid our reexport and transshipment trade. This legislation established a board consisting of the Secretary of Commerce, chairman, the Secretary of War, and the Secretary of the Treasury, to make rules and regulations and to grant the corporations the privilege of establishing, operating, and maintaining foreign-trade zones in or adjacent to ports of entry of the United States. The Cabinet officers named on the board appointed alternates constituting an interdepartmental committee which will act for the Board in the preliminary investigations attendant upon the establishment of such zones. The Director of the Bureau of Foreign and Domestic Commerce was designated as alternate for the Secretary of Commerce.

The Board has issued an informational bulletin, Establishment of Foreign Trade Zones in the United States, containing an explanation of the law, and explaining the economic, financial, and physical conditions which are of necessity involved in the setting up of such zones and in the selection of the proper sites therefor.

The departments of the Government concerned with the administration of the law have formulated general rules and regulations to govern the establishment and operation of foreign-trade zones. After the issuance of the rules and regulations, formal applications for charters will be received and studied by the Board.

Analyses of the data submitted by the applicants will be necessary not only to inform the Board, but also to advise communities of the financial responsibilities they will be required to assume in establishing a zone, and to assist them in appraising the benefits.

STREET AND HIGHWAY SAFETY

The Fourth National Conference on Street and Highway Safety, of which the Secretary of Commerce was chairman, was held in Washington, May 23 to 25, 1934. Public officials and private citizens from 40 States and representing all interests concerned with motor traffic participated in the conference. The standards for traffic regulation were thoroughly reviewed and extensively revised following preliminary committee study. The Uniform Vehicle Code for adoption by States, heretofore in 4 acts, was amplified by the inclusion of a safety responsibility act and by other rearrangement, so that it now consists of 5 acts. The study showed that the basic principles incorporated in the 1930 edition of the code are still applicable in the main, but certain revisions, particularly with respect to speed, automobile lighting equipment, and permissible sizes and weights of vehicles, appeared desirable in view of further experience. Provision for periodic inspection of motor vehicles was also added.

The Model Municipal Traffic Ordinance for cities and towns was rearranged for convenience and revised in harmony with the Uniform Vehicle Code. The manual of signs and markers for rural highways and the manual of street traffic signs, signals, and markings for municipalities, prepared some years ago, respectively, by the American Association of State Highway Officials and the National Conference, were consolidated and amplified into a single Manual of Uniform Traffic Control Devices embodying the latest experience.

A report entitled "Guides to Traffic Safety" was adopted, setting forth a general program for improving conditions through administration, study of accidents, engineering, education, enforcement and research as well as legislation.

While pressure of emergency legislation during the last 2 years has interfered somewhat with consideration of and legislation on traffic matters by the States, it is believed that there is more widespread appreciation than ever before of the need for modern uniform motor-vehicle laws and that, with these revised standards available, there is special opportunity for progress in uniformity in 1935, when most of the legislatures will meet.

BUSINESS ADVISORY AND PLANNING COUNCIL

The anticipation of the Department of Commerce of obtaining valuable assistance and cooperation from the members of the Business Advisory and Planning Council, when that organization came into existence on June 26, 1933, has been more than realized. This group, now numbering 52 of the Nation's most representative and distinguished business leaders, has been unremitting in its efforts to make available to the Department of Commerce its seasoned judgment on matters vitally affecting the Department and business, and on questions of a broader nature, concerned with Government relationship to commerce and industry.

The recommendations of the council committees specifically concerned with the activities of the Department of Commerce have been of valuable assistance in the conduct of the Department's affairs

throughout the year. Important phases of the departmental program have come up before these groups for review and suggestions. The Department has had the benefit of business men's advice on questions involving its services to business. Before the initiation of new services or changes in the existing program have been effected, counsel and advice was secured from this advisory group of representative business men, thus providing business with a direct voice in the affairs of the Federal department representing it.

It is the desire of the Department of Commerce to further cooperation between Government and business to the fullest extent. It is felt that the culmination and highest point in this endeavor is to be found in the work of the committees of the Business Advisory and Planning Council and of the council as a whole with reference to Federal activities affecting trade and industry. A score of small organized groups within the council have devoted their attention during the past year, and are at this time continuing their efforts, to the presentation, through the proper channels, of the "business man's point of view" on subjects of current significance. In this manner the careful judgment and practical experience of industrial leaders are utilized by the Government, while business sees its views and opinions registered in an effective manner.

The following list of committees conveys a general idea of the scope of the activities of the council and of the complex problems which are being carefully analyzed and studied:

Executive.
Plan study.
Planning.
Decentralization of industry.
Small industries.
Foreign trade.
Subcommittee to study the question of import quotas by code authorities.
Industrial relations.
Unfair trade practices in production and distribution.
Statistical reporting and uniform accounting for industry.
Securities Act.
Elimination of waste in distribution.
Installation of labor-saving machinery.
Government purchases.
Bureau of Standards.
Bureau of Air Commerce.
Domestic commerce work and the Census Bureau of the Department.
Shipping.
Patent Office.
Coast and Geodetic Survey.
Government lending and the extent of its competition with existing operating industries.
Private construction.
Scope of the Federal Trade Commission's activities in the control of unfair trade practices.
Amendments of Agricultural Adjustment Act.
Social legislation.
NRA.
Revenue Act.
Transportation.

The work of but a few committees may be cited as examples of this cooperative endeavor. At present the committee on decentralization of industry is working closely with the Federal organizations concerned with the process in order that a statement of policy from industry may be formulated and thus expedite the Government's work of business approval and cooperation. The social-legislation committee is now in constant contact with groups formulating recommendations for unemployment and relief legislation in future congressional sessions. Particularly helpful to the statistical work of the Department of Commerce have been the recommendations of the committee on statistical reporting and uniform accounting for industry and those of the committee on elimination of waste in distribution, both of which have presented the advice of those using the Department's

services, on methods of improvement and expansion. The problem of a coordinated transportation system for the Nation is now being vigorously attacked by a council committee on that subject.

Since many council members are also members of other Federal advisory groups, the council has developed into a body of business representatives, a clearing house and a center of coordination for industrial views on governmental matters which affect business. For this result both business and the administration may be gratified. From its past record, the Department is confident of the continued invaluable assistance of the council.

In view of the remarkably hearty cooperation of these business men, their participation in these important conferences at the Department at a time when undoubtedly their own affairs must require the closest attention, and as they defray their own expenses and the Government has not reimbursed them in any respect, I believe that the names of the members of the council should be recorded in this report.

GENERAL COUNCIL MEMBERS

M. L. Benedum, Pittsburgh.
David R. Coker, Hartsville, S. C.
Karl T. Compton, Cambridge, Mass.
F. B. Davis, Jr., New York City.
Henry S. Dennison, Framingham, Mass.
Ernest G. Draper, New York City.
Joseph H. Dryer, New York City.
Robert J. Dunham, Chicago.
Gano Dunn, New York City.
Pierre S. du Pont, Wilmington, Del.
R. G. Elbert, New York City.
John B. Elliott, Los Angeles, Calif.
John H. Fahey, Worcester, Mass.
Philip J. Fay, San Francisco, Calif.
Lincoln Filene, Boston, Mass.
Austin Finch, Thomasville, N. C.
Ralph E. Flanders, Springfield, Vt.
Walter S. Gifford, New York City.
A. P. Greensfelder, St. Louis, Mo.
Everett G. Griggs, Tacoma, Wash.
Lew Hahn, New York City.
Henry I. Harriman, Washington, D. C.
William A. Harriman, New York City.
Henry H. Heimann, Niles, Mich.
William A. Julian, Cincinnati, Ohio.
H. P. Kendall, Boston, Mass.
Fred I. Kent, New York City.
C. F. Kettering, Detroit, Mich.
de Lancey Kountze, New York City.
Morris E. Leeds, Philadelphia.
C. K. Leith, Madison, Wis.
Fred J. Lingham, Lockport, N. Y.
Arthur W. Little, New York City.
Robert L. Lund, St. Louis, Mo.
Thomas H. McInnerny, New York City.
George H. Mead, Dayton, Ohio.
Lionel J. Noah, New York City.
James H. Rand, Jr., New York City.
John J. Raskob, New York City.
H. R. Safford, Houston, Tex.
Alfred P. Sloan, Jr., New York City.
E. T. Stannard, New York City.
Robert Douglas Stuart, Chicago, Ill.
Gerard Swope, New York City.
Myron C. Taylor, New York City.
Walter C. Teagle, New York City.
Edmond C. Van Diest, Colorado Springs, Colo.
W. J. Vereen, Moultrie, Ga.
Thomas J. Watson, New York City.
Sidney J. Weinberg, New York City.
Clay Williams, Winston-Salem, N. C.
R. E. Wood, Chicago, Ill.
William E. Woodward, New York City.

Sincerely yours,

DANIEL C. ROPER,
Secretary of Commerce.

REPORT BY BUREAUS

CHIEF CLERK AND SUPERINTENDENT

SPACE IN COMMERCE BUILDING

The matter of space in the Commerce Building continues to be a problem, and shifting and readjustment is constantly necessary. Approximately 192,900 square feet of office space in the building is now occupied by Federal agencies other than the Department of Commerce, although five divisions of the Bureau of Foreign and Domestic Commerce are located in rented quarters. Only a small portion of the Shipping Board Bureau is housed in the Commerce Building, and the complete transfer of that Bureau from the Navy Building is necessarily delayed until space becomes available.

A CENTURY OF PROGRESS EXPOSITION

The United States Commission for participation in the Chicago World's Fair Centennial celebration, of which the Secretary of Commerce is a member, arranged, in accordance with authority of Congress, for the Federal Government's participation in the exposition for the second year. The Department has reinstalled substantially the same exhibits as were on display last year, in which are depicted the many and varied functions of the several branches of the Department.

DIVISION OF ACCOUNTS

The following table shows the total amount of all appropriations for the various bureaus and services of the Department for the fiscal year ended June 30, 1934:

Bureau	Annual appropriation acts	Funds reappropriated from prior years	National Recovery Act allotments, etc.	Special acts	Allotments by other departments	Total
Office of the Secretary	$959,590				$29,929	$989,519
Federal Employment Stabilization Office	65,000					65,000
Bureau of Air Commerce	7,660,780		$2,039,303	$112		9,700,195
Bureau of Foreign and Domestic Commerce	3,514,370				234,000	3,748,370
Bureau of the Census	1,903,000					1,903,000
Bureau of Navigation and Steamboat Inspection	1,405,000		33,043	42,889		1,480,932
National Bureau of Standards	2,056,045				28,865	2,084,910
Bureau of Lighthouses	9,121,100		5,528,334	483		14,649,917
Coast and Geodetic Survey	2,205,090		6,503,120	9,246	28,251	8,745,707
Bureau of Fisheries	1,778,850		639,500	1,111	20,076	2,439,537
Patent Office	4,197,113					4,197,113
Bureau of Mines	1,514,300	$226,860	272,800		30,386	2,044,346
U. S. Shipping Board Bureau	252,500					252,500
Total	36,632,738	226,860	15,016,100	53,841	371,507	52,301,046

Disbursements during the year ended June 30, 1934, from appropriations and from funds transferred from other departments were as follows:

Bureau	Appropriation for—				Total
	N. R. A.—Commerce	1932	1933	1934	
Office of the Secretary		$159.17	$94,378.61	$804,506.87	$899,044.65
Bureau of Foreign and Domestic Commerce		1,813.63	138,738.60	2,054,778.43	2,195,330.66
Bureau of the Census		318.14	56,756.65	1,534,722.98	1,591,797.77
Bureau of Navigation and Steamboat Inspection	$19,043.00	198.50	33,976.13	1,263,540.83	1,316,758.46
Patent Office		477.37	130,575.75	3,852,586.18	3,983,639.30
Coast and Geodetic Survey	2,584,941.56	405.09	316,494.60	1,813,379.58	4,715,220.83
National Bureau of Standards	75,830.52	2,757.35	79,754.63	1,659,990.88	1,818,333.38
Bureau of Lighthouses	1,307,221.02	502.05	225,157.11	8,068,388.87	9,601,359.05
Bureau of Fisheries	327,012.03	411.39	35,227.14	1,131,214.81	1,493,865.37
Bureau of Air Commerce	392,172.75	35,006.43	443,193.19	4,559,146.46	5,429,518.83
Bureau of Mines	41,243.69	146.30	67,303.12	1,283,956.55	1,392,549.66
Federal Employment Stabilization Office		14.40	2,175.36	28,005.32	30,195.08
U. S. Shipping Board Bureau			1,958.37	298,318.59	300,276.96
Total	4,747,464.57	42,380.32	1,625,689.26	28,352,536.35	34,767,960.50

MISCELLANEOUS RECEIPTS

Office of the Secretary:	
Copying fees	$87.25
Sale of scrap and salvaged materials	2,250.75
Bureau of Air Commerce:	
Violation of air-traffic rules	610.00
Reimbursements, excess cost over contract price	520.80
Government property lost or damaged	158.35
Sale of scrap or salvaged materials	1,424.36
Sale of stores	72.05
Sale of service, profits from business operations	2,361.60
Sale of work done	42.00
Interest: Exchange and dividends, interest on deferred collections or payments	53.32
Sale of:	
Equipment	7,387.14
Buildings	455.50
Bureau of Foreign and Domestic Commerce:	
Fees under China Trade Act	925.00
Sale of:	
Photo duplications	13.92
Publications	7,969.90
Stores, waste paper, refuse, etc	25.57
Service, other	6.88
Rent of equipment	40.00
Sale of Government property, equipment	266.77
Bureau of the Census:	
Copying fees	91.00
Work done	210.84
Bureau of Navigation and Steamboat Inspection:	
Tonnage tax	1,432,737.82
Tonnage tax, Philippine Islands (decision of Comptroller General, Feb. 6, 1931, A–18469)	52,284.66
Fines and penalties	28,630.50
Fees	172,333.09
Unidentified wages and effects of American seamen	7,568.66
Customs Service	3,446.45
Sale of:	
Stores, waste paper, refuse, etc	53.11
Publications	631.09

Bureau of Navigation and Steamboat Inspection—Continued.	
Reimbursements, Government property lost or damaged	$3.50
Sale of equipment	35.00
Proceeds from wages and effects of American seamen, Commerce (decision of Comptroller General, June 29, 1929, A–2766)	983.10
National Bureau of Standards: Fees, testing	52,229.38
Bureau of Lighthouses:	
Commissions on telephone pay stations in Federal buildings outside of Washington, D. C	66.24
Forfeitures, bonds of contractors	71.20
Refund on empty containers	347.06
Reimbursement of expenses	396.80
Excess cost over contract prices	636.88
Government property lost or damaged	5,259.10
Transportation, reimbursement	.76
Sale of:	
Scrap and salvaged materials	5,119.41
Stores	7,108.04
Subsistence, reimbursement	249.22
Fines and other penalties	70.00
Permits, privileges and licenses, fishing and hunting	56.00
Business concessions	5.00
Pipe-line water rights	85.00
Rent of public buildings and grounds	3,897.67
Furlough and compensation deductions and vacancy savings (special deposit accounts)	58.02
Telegraph and telephone service	16.22
Work done	1,029.98
Sale of:	
Equipment	11,769.66
Buildings	433.76
Land	5,943.52
Coast and Geodetic Survey:	
Copying fees	593.34
Reimbursement, expenses	10.77
Government property lost, destroyed, or damaged	7.50
Sale of:	
Charts	37,411.69
Maps	5,087.59
Publications	5,445.09
Telephone and telegraph	4.24
Work done	3.00
Sale of equipment	2,801.52
Bureau of Fisheries:	
Refund on cable and radio messages	12.56
Contractors, for excess cost over contract price	4.62
Sale of furs	2,525.79
Fox skins	16,230.13
Sale of scrap and salvaged materials, condemned stores, waste paper, refuse, etc	594.54
Reimbursement, subsistence	572.52
Sale of stores	528.65
Others	4.22
Sale of equipment	90.90
Patent Office:	
Patent fees, 1934	4,089,229.90
Patent fees, 1933	191,012.65
U. S. Shipping Board Bureau:	
Interest on moneys loaned from Construction Loan Fund	3,446,170.92
Copying fees	89.66
Furlough and compensation deductions and vacancy savings (special deposit accounts)	41,907.00
Funds received from sale of ships, etc., and deposited for construction loans under sec. 11, Merchant Marine Act, 1920, as amended (45 Stat. 690)	4,182,067.01

Bureau of Mines:	
Sale of gas from helium plants, net profits	$10,726.12
Rent of land for grazing	1,600.00
Miscellaneous: Reimbursement, gasoline State tax	435.01
Total, Department of Commerce	13,853,695.84

APPOINTMENT DIVISION

At the close of the year the personnel of the Department numbered 14,844 (13,086 permanent and 1,758 temporary). Of the total number 3,997 are employed in the District of Columbia, and 10,847 constitute the field force. The total personnel as of June 30, 1933, was 17,842 (15,864 permanent and 1,978 temporary) of which number 4,998 were employed in the District of Columbia, and 12,844 in the field. The total personnel for the fiscal year 1934 therefore shows a decrease of 2,998.

The number of employees retired on annuity during the year under the Civil Service Retirement Act was 124—44 by reason of age, 46 on account of disability, and 34 by reason of involuntary separation. In addition, 74 retirements were effected under the 30-year provision of the Independent Offices Appropriation Act, 1934. The average annuity of those retired under both acts is $928.10. Under the Lighthouse Service retirement system 28 were retired for age and 56 on account of disability, with an average annuity of $1,103.93. A total of 1,617 civilian employees have been retired under the various applicable statutes to the close of June 30, 1934.

DIVISION OF PUBLICATIONS

The following statement gives, for the fiscal years 1933 and 1934, the amounts available to the Department for printing and binding, the amounts expended, and the unused balances.

	Fiscal year—	
	1933	1934
Services other than the Patent Office:		
Amount available	[1] $476,000.00	[2] $487,473.85
Expenditures	347,307.02	[3] 471,360.75
Balance	128,692.98	16,113.10
Patent Office:		
Amount available	1,300,000.00	950,000.00
Expenditures	1,274,639.49	[4] 931,928.30
Balance	25,360.51	18,071.70

[1] The appropriation for printing and binding for 1933 was $600,000. This amount was reduced by the Bureau of the Budget to $476,000.

[2] The amount available during 1934 included an appropriation of $460,000, plus $56,790 transferred from "Salaries and expenses, Bureau of the Census, 1934", and a credit of $127.39 for miscellaneous blank forms furnished to the National Recovery Administration, a total of $516,917.39. From that amount the following sums were deducted: $3,000 transferred to the Civil Service Commission when the issuance of the Official Register was transferred to that organization, $26,377.54 transferred to the Interior Department and $66 transferred to the Treasury Department by reason of the transfer of the Bureau of Mines and the Disbursing Office from the Department of Commerce.

[3] Includes actual cost of work delivered and estimated cost of all other work ordered. Increased rate of charges on undelivered work ordered prior to Apr. 1 not included in this total.

[4] Estimated; exact figures for 1934 cannot be given until all work ordered in that year is completed and billed.

NOTE.—In addition to amounts shown above, expenditures for printing and binding during 1934 from funds allotted from the emergency organizations amounted to $46,028.27.

Receipts from sales of the Department's publications for the fiscal year 1933 (the latest period for which complete data are available) were $549,726.65, compared with $632,005.55 for 1932. The following table presents a comparison for the 2 years by selling agencies:

Sales	Receipts	
	1932	1933
By the Superintendent of Documents: Miscellaneous sales and subscriptions	$204,922.99	$170,176.22
By Coast and Geodetic Survey: Coast pilots, inside route pilots, tide tables, current tables, charts, and airway maps	56,042.86	51,269.48
By Patent Office: Specifications of patents, reissues, etc., trade-mark section and decision leaflet of Official Gazette, and classification bulletins and definitions	371,039.70	328,280.95
Total	632,005.55	549,726.65

DIVISION OF PURCHASES AND SALES

During the fiscal year 1934 there were placed 16,373 purchase orders, which, including freight, travel, rent, and miscellaneous accounts, involved the expenditure of $2,526,804.66. This is an increase in expenditures of $1,308,728.08 over the fiscal year 1933.

Through the cooperation of the Treasury Department, Procurement Division, material comprising the S. S. *Lake Fairlee*, valued at $45,173.77, and two motor launches, machine tools, platinum, assay equipment, and other material valued at approximately $8,000 was obtained from surplus stocks of other Government departments without the transfer of funds. In this connection, surplus material valued at approximately $15,200 was transferred without the exchange of funds from this Department to other branches of the Government, the principal items being eight airplane motors valued at approximately $10,000.

DEPARTMENT LIBRARY

With the transfer of the Bureau of Mines, approximately 17,000 books were transferred to the library of the Department of the Interior. The number of books now in the library, including the fisheries collection of 43,000 volumes, is approximately 208.640. During the year 8,344 books were cataloged and 21,019 cards added to the card catalog. There was an increase of 30 percent in book circulation. The library is being used extensively by the emergency organizations.

TRAFFIC OFFICE

The traffic office has been alert in keeping current with changes in rates for both passengers and freight, taking advantage of economies wherever possible and using transports and standard and special rates by water, in addition to land-grant rail routes, in order to reduce transportation costs.

In addition to regular Department work, this office has also assisted in handling passenger and freight movements for the Home Loan Bank Board, the Home Owners' Loan Corporation, and the National Recovery Administration.

SOLICITOR'S OFFICE

During the fiscal year ended June 30, 1934, the number of formal legal opinions rendered totaled 390 (a great many verbal opinions of which no record is kept were also rendered during the year); 550 contracts, totaling $4,345,747, together with 70 contracts of indeterminate amounts; 1,973 leases, amounting to $155,123.48; 13 insurance policies, amounting to $1,636,566; 63 revocable licenses, amounting to $2,528; 35 deeds, amounting to approximately $90,000; 235 contract bonds, amounting to $1,530,464; 83 annual bid and performance bonds; 160 official bonds, amounting to $1,433,000, were examined (approved, disapproved, drafted, redrafted, or modified).

Legislative matters handled which concern the Department of Commerce (drafting and redrafting bills, reports relative thereto, etc.) numbered 160. Power of attorney cards, authorizing agents to execute official and contract bonds for surety companies, totaled 3,000. In addition, approximately 6,000 miscellaneous matters, embracing everything submitted for the advice or suggestion of the Solicitor, or for the formulation of departmental action, not included in the foregoing items, were handled by this office.

The legal work in connection with the United States Shipping Board Bureau, which work is under the direction of the Solicitor of the Department, is discussed in the section of this report pertaining to that Bureau.

FEDERAL EMPLOYMENT STABILIZATION OFFICE

The advance planning programs of the various agencies of the Government and the District of Columbia, covering the 6-year period 1936–41 have been collected, analyzed, and summarized, as in previous years. Besides this study, additional material was obtained relative to the Public Works Administration's allocations for Federal projects. This office is now the principal agency within the Government from which historical and current data are obtainable covering all phases of public and private construction.

The regular activities of the office have been somewhat augmented through the creation of a subcommittee on private construction under the business advisory and planning council of the Department of Commerce. The director of this office has been appointed secretary of the subcommittee, and the other members of the staff are engaged in detail work incident to the functioning of the group. The primary purpose of the subcommittee is to offer its suggestions and assistance to the administration in furthering private building. This office is acting as a concentration point within the Government for the accumulation and dissemination of pertinent data and the drafting of recommendations essential to the recovery of private construction.

BUREAU OF AIR COMMERCE

The Aeronautics Branch was reorganized during the year with two major divisions instead of three, its name was changed to Bureau of Air Commerce, and it was put under the supervision of a Director of Air Commerce. The position of Assistant Secretary of Commerce for Aeronautics was changed to Assistant Secretary of Commerce, with authority extended over a number of important activities of the Department. The present Air Navigation Division and Air Regulation Division have the functions formerly assigned to the Airways Division and Air Regulation Service which preceded them. The duties of the former Aeronautic Development Service were transferred to the new divisions. Each is headed by an Assistant Director of Air Commerce. In addition to other general supervision, the Director of Air Commerce supervises directly the activities of the Aeronautic Information Section and the Administrative Section.

At the close of the fiscal year plans were being made for a Development Section, to be under the direct supervision of the Director. This is not to be a successor to the old Aeronautic Development Service, but is to be a new section organized to pursue research and development work on airplanes, engines, and accessories, a function never before carried out by the Bureau. As its first major task the section will undertake the development of a new craft for the private flyer.

OPERATION ON REDUCED BUDGET

The Bureau of Air Commerce was able to operate and maintain its Nation-wide organization at a high degree of efficiency on a budget $2,400,000 less than Congress provided for the fiscal year 1934. Appropriated funds available for expenditure during that fiscal year were $5,172,500. During the last 4 years the Bureau has been averaging expenditures of more than $8,500,000 annually.

To accomplish the reduction noted above, the Director of Air Commerce called upon every activity under his jurisdiction to engage in thorough house cleanings to eliminate all unnecessary duties and practices that had accumulated during the past. Some of the measures adopted to keep the Bureau within the reduced budget were:

The eight airways districts were transferred from the Lighthouse Service of the Department to the Bureau of Air Commerce and reduced to six in number.

The Air Navigation Division was reorganized and limited in scope to operation and maintenance of the airways. All construction procedure was separated from the Division and the personnel were placed on Public Works Administration pay rolls in connection with airways projects financed by that establishment.

Airway mechanician districts were consolidated; many intermediate landing fields were discontinued as being no longer necessary

with the advent of faster aircraft; the contract for leased circuits for the teletypewriter communications system was reduced 25 percent and substantial savings were made on rearrangement of the existing circuits; power contract charges for beacon lights and radio were reduced, as were the cost of leases of beacon sites and emergency landing fields.

Two of the nine inspection districts were consolidated, travel procedure was reorganized, the repair base at Bolling Field in Washington was discontinued and the Department airplane repair work is now being done more economically in the field by private contract; aircraft, obsolete or expensive to operate, were replaced by new planes less expensive to operate and maintain.

Scores of many smaller economies, administrative in character, were effected.

The part-time operation of lights which had been inaugurated in the spring of 1933 was discontinued following the appointment of the Director of Air Commerce and their operation returned to full-time service.

In addition to the foregoing and above and beyond its routine duties, the Bureau of Air Commerce can point to the following salient accomplishments during the fiscal year 1934:

A. Commenced the construction of nearly 3,000 miles of lighted and radio-equipped airways and modernization of existing equipment and relocation of present airways with funds from the Public Works Administration.

B. Launched a campaign on behalf of private flying which embodies these principal features:

(1) Urged the need for a volume-produced, low-priced, two-seated airplane. This was met with great enthusiasm throughout the country and the Bureau of Air Commerce has dedicated its fullest efforts to the realization of this objective, as there cannot be a natural, healthy growth in the private flying business until a plane is available on a volume-production basis. This project will be further pursued by the new Development Section to which reference is made hereafter.

(2) Requested the Civil Works Administration to include airports and landing fields and air markings of cities and towns in its unemployment-relief program with the result that 50,000 men were given work, more than 1,000 landing-field projects were undertaken, and approximately 5,000 municipalities were air marked. Of the airports and landing fields, about 60 percent were new fields and 40 percent improvements to existing airports. Although work remains to be done on many of the fields, the Federal Emergency Relief Administration has authorized the States to use their direct-work relief funds for the completion of these projects. At the end of the fiscal year some four hundred additional sites were scheduled for construction work.

(3) Made studies of the Air Commerce Regulations as they pertain to noncommercial airmen and carefully analyzed their needs and desires as presented in formal communications and through the contacts made by the field forces. This resulted in a revision of the regulations to the end that ownership of a noncommercial pilot's license is now more to be desired than before because of the increased privileges granted and the reduction in troublesome procedure here-

tofore required. Ways are still being sought to make further improvements.

C. Recommended that PWA funds be made available to the Bureau of Air Commerce for the establishment of a trans-Atlantic airway by employment of refueling bases or seadromes. Eighty percent of the cost of the project would be for labor and as a high speed, heavier-than-air service between Europe and the United States is inevitable, and as the PWA is providing funds for Federal projects to foster employment, it is felt that this is an opportunity for the United States to anticipate by 5 or 10 years such a reality and at the same time own and operate the airway for the equal use of all nations. The project would be self-supporting, and would solve the problem of tremendous gas loads and small pay loads now of such concern in long-distance flights. The PWA now has the matter under consideration.

D. Investigated and conclusively tested the blind-landing system developed by the Army Air Corps and found it suitable for use by commercial aviation. During this work Air Commerce Bureau test pilots employed a tri-motor transport plane and made repeated and unassisted landings under a hood. Heretofore the Department of Commerce had conducted blind landings with a small training plane, but the real value of any system could not be demonstrated until a large, heavily loaded transport plane could use it successfully. It is this type of aircraft that will be the most consistent user of any blind-landing method in order to provide continuous and uninterrupted air transport service.

E. Sponsored legislation to enable the Secretary of Commerce to hold public hearings on all serious accidents to civil aircraft and to make public the causes of such accidents; to strengthen the Department's authority to provide for minimum safety standards on the air lines, and to engage in development work on aircraft, engines, and accessories. This legislation was enacted in the closing days of Congress and was approved by the President.

F. Made plans for a new Development Section to engage in the work on new types of aircraft, engines, and accessories. The last Congress appropriated to the President $1,000,000 to use at his discretion for further development of civil and military aviation, and $100,000 of this appropriation has been allocated to the use of the Department of Commerce. The section's first project will be the low-priced airplane for private flying, and it will investigate types which give promise of being suitable for that purpose.

While the foregoing major projects have been in the process of development, the two main divisions into which the Bureau of Air Commerce is now divided—Air Navigation and Air Regulation—have been persistently at work on a multitude of details looking to increased efficiency and service to the public and the industry.

AIR NAVIGATION DIVISION

This division's accomplishments are summarized below:

Operated nearly 20,000 miles of lighted and radio-equipped airways, substantially the same system as that in existence during the previous year, but with 30 percent less funds.

Surveyed 2,700 miles of new Federal airways, and construction work is now ready to begin in most cases.

Completed the construction of the Louisville-Indianapolis lighted airway.

Relocated and improved facilities on eight Federal airways.

Introduced a maintenance-control procedure which will place the operation of the aids to air navigation on a business basis and will give the Department of Commerce a reliable check on the cost of airway maintenance, operations, and the efficiency of all equipment.

Developed a new method of airway construction whereby there will be complete landing facilities and aeronautic radio at 50-mile intervals. These will include miniature radiobeacons with an effective range of 25 miles as against the 100-mile range of the larger beacons which have developed problems of transmission in mountainous country. This method will be installed on the new airways now being surveyed.

Modernized radio and other aids to air navigation throughout the country.

Installed lower wattage lamps in beacon lights for economy purposes, after thorough tests demonstrated the public safety would in no way be jeopardized by the change.

Installed distant control mechanism at 39 points to enable Air Commerce Bureau radio operators to be at airports to serve all airmen and at the same time to operate the radio communication stations and radio range beacons which, because of their high towers, must be away from the approaches to the fields.

Installed new type antennas for improved radiobeacon service at 26 points.

Entered upon a practical and theoretical investigation of multiple or split courses in the radio range beacons which are found in mountainous country. To this end, extensive flight tests were made by Bureau experts, and 87 engineering universities and colleges were requested to cooperate in the solution of the theoretical aspects of the problem.

Developed a method for visually interpreting, on aircraft instrument boards, the radiobeacon signals now received by airmen through their headphones.

Studied various methods of operating teletypewriter machines and otherwise communicating by radio with automatically produced records of the messages. Adoption of some such system will effect substantial savings by eliminating tolls for land wires. However, this is still in the experimental stage.

Introduced symbols and improved the technique of teletypewriter operators so that weather information and special messages are being transmitted over land wires along the Federal Airways System at the mechanical limit of the machines—about 40 words per minute as against 20 words in the past.

Obtained a substantial reduction in charges for leased telephone circuits used in the airways communications system.

Experimented and still working with a system which will make it possible for airmen to receive directional signals and voice broadcasts at the same time instead of stopping the one to get the other, as they have to do now.

AIR REGULATION DIVISION

This Division has accomplished the following:

Contributed to the advancement of private flying through changes in the Air Commerce Regulations and policies; created a new type of pilot license known as the "amateur grade", for which 25 hours of solo flying is required; extended the validity of student licenses from 1 to 2 years; extended the physical examinations for noncommercial airmen from 1 to 2 years; permitted the renewal of noncommercial licenses by mail instead of through personal appearance before an inspector; reduced fees for physical examinations; permitted credit as solo flying time for all hours spent flying with an instructor after 10 hours of actual solo work; and authorized private pilots to operate aircraft carrying guests, executives, or employees of companies by which they are employed, provided no payment is made for the transportation, and also to demonstrate aircraft in flight to prospective buyers.

Promulgated a policy which calls for promotional and development work among the aeronautical inspectors. In this connection the inspectors no longer confine their duties in the field to licensing and inspection work, but cooperate with municipal and State aviation authorities, help in the development of airports, and hold themselves in readiness for general assistance to civil aeronautics. Already this policy has borne fruit in numerous commendations from widely separated sources.

Revised the aircraft engineering requirements to encourage manufacturers to bring out new models and at the same time to eliminate much troublesome procedure for both the industry and the Bureau of Air Commerce. This "red tape" has directly and indirectly increased the cost of manufacturing. Sufficient progress has been made to date to enable the Bureau to eliminate these voluminous steps in connection with Federal approval of aircraft designs without affecting the public safety.

Established more direct methods of Federal approval of alterations and repairs to licensed aircraft to eliminate delay and reduce costs to the plane owner.

Segregated and enlarged the air-line inspection service, increasing its scope and efficiency, and strengthened the Federal requirements for air-line equipment by specifying multiengined aircraft on all lines carrying passengers in interstate commerce after dark. Conducted inspections of all lines and prescribed the type of equipment to be used in daylight operations after taking into consideration the condition of the terrain, the average weather conditions, and the volume of traffic. Thus in flat country, single-engined aircraft may carry passengers during the daylight hours, and in rough and mountainous regions multiengined equipment is required in the daytime.

Gave assistance to the Territory of Alaska in its further development of aviation by assigning a full-time Department of Commerce aeronautical inspector to live there the year round, with a view to a fuller cooperation with the Territorial Government and commercial and private aeronautical activities. Heretofore, an inspector made a visit to the Territory once or twice a year to conduct inspections and examinations.

98223—34——4

Established special rules for air races and air meets that are conducted under waivers of the Air Commerce Regulations. These are designed to protect the spectators and to safeguard the contesting airplanes from interference by other aircraft.

Declared a policy which permits passengers to sit at the controls of a dual controlled aircraft, if it is operated by a pilot licensed in the higher grades and no passengers are carried for hire. This is intended to enable the passenger or prospective purchaser of an aircraft to become familiar with the instruments and controls.

Reduced the number of Department inspection districts from 9 to 8; redistributed the field inspectors; budgeted inspectors' travel, gasoline, and repair expense; and divided the inspection division into three separate groups—air line, general, and manufacturing.

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—	Aircraft in commerce	Air navigation facilities	Total	Fiscal year—	Aircraft in commerce	Air navigation facilities	Total
1927 [1]	$250,000	$300,000	$550,000	1931	$1,260,830	$7,944,000	$9,204,830
1928	700,000	3,091,500	3,791,500	1932	1,369,660	8,992,640	10,362,300
1929 [2]	859,500	4,659,850	5,519,350	1933	1,000,000	7,553,500	8,553,500
1930	958,000	5,458,620	6,416,620	1934	1,070,570	6,590,210	[3] 7,660,780

[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] However, 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.

Statistics on personnel employed by the Bureau of Air Commerce on June 30, 1934, and at the same date of the preceding year, and paid from the appropriations Aircraft in Commerce and Air Navigation Facilities, follow:

Item	June 30, 1933			June 30, 1934		
	District of Columbia	Field	Total	District of Columbia	Field	Total
Paid from Aircraft in Commerce	135	133	268	119	97	216
Paid from Air Navigation Facilities	50	1,715	1,765	44	1,490	1,534
Total	185	1,848	2,033	163	1,587	1,750

Besides the above, there were on June 30, 1934, 85 special employees on Public Works Administration projects.

Air navigation aids in operation on the Federal Airways System at the close of the fiscal year 1934, and at the close of the preceding fiscal year, were:

Item	June 30, 1933	June 30, 1934
Airway mileage:		
Lighted—miles	18,100	17,315
Day (unlighted)—do	256	256
Lighted routes on day airway status (lights not operating)—do	644	1,499
New routes under survey—do	0	2,747
Intermediate landing fields—number	269	256
Beacon lights in operation—do	1,831	1,626
Radio communication stations—do	68	70
Radio range beacons—do	99	97
Radio marker beacons—do	70	78
Teletypewriter circuits—miles	13,000	11,814

BUREAU OF THE CENSUS

INTRODUCTION

The 32 volumes comprising the Fifteenth Decennial Census Report contain 31,654 pages and cover the subjects of population, including occupations and unemployment; manufactures, including mines and quarries; agriculture, including horticulture, irrigation, and drainage; and distribution, including wholesale and retail trade, construction, and hotels. Twenty-four of these volumes were printed prior to July 1, 1933, and the remaining eight volumes were made available to the public during the fiscal year just closed. To meet the demand for information on the different subjects covered by the complete report, monographs, reprints of chapters, and special reports were printed. The complete report is available for consultation in all large public libraries, at universities, and in the libraries of many smaller educational institutions. These volumes are also available for purchase from the Superintendent of Documents.

During the last fiscal year the Bureau conducted its regular annual, quarterly, and monthly inquiries, as well as the decennial census of Financial Statistics of State and Local Governments, the biennial Census of Manufactures, and the quinquennial Census of Electrical Industries. Preliminary or final reports were issued on all of these subjects.

In addition to its regular work, the Bureau conducted during the last fiscal year the following projects of the Federal Civil Works Administration:

Census of American Business
Census of Record Preservation
Real Property Inventory (conducted field canvass and machine tabulations. Project assigned to Bureau of Foreign and Domestic Commerce)
Urban Tax Delinquency
Unemployment Relief Census and Supporting Local Studies (assigned to the Federal Emergency Relief Administration)
Trial Census of Unemployment (assigned to Bureau of Labor Statistics)

Some of these projects were entirely completed within the past fiscal year, and substantial progress was made on the others.

FINANCIAL STATISTICS OF STATE AND LOCAL GOVERNMENTS

During the fiscal year just ended, the Bureau completed the collection of statistics of revenues, expenditures, indebtedness, assessed valuation, and tax levies for the year 1932 for the 48 State governments and the District of Columbia, the 3,062 counties, the 16,442 cities, towns, villages, and boroughs, the 19,978 townships, the 128,548 school districts, and the 14,572 other civil divisions, or a total of 182,659 political units having the power to levy and collect taxes and

incur debt. Such statistics are collected by the Bureau every 10 years and have heretofore been published under the title, "Wealth, Public Debt, and Taxation." The title of the current report is "Financial Statistics of State and Local Governments." At the close of June separate reports of this census had been issued for 46 States and manuscript had been completed for the two remaining State reports, for a summary for the entire country, and for the final volume.

Arrangements have been made to publish as a part of this investigation separate State reports showing respective laws relating to taxation and revenue. Twelve such reports had been issued at the close of the fiscal year and manuscript had been prepared for 16 additional reports.

FINANCIAL STATISTICS OF STATES AND CITIES

The Bureau has issued annual reports over a period of years presenting detailed financial data for States, and for cities having a population of 30,000 or over. By Executive order of June 10, 1933, however, the annual compilation of financial statistics of cities is limited to cities having 100,000 population or over until after the fiscal year ending June 30, 1935, and the State reports have been discontinued for that period also. The first report affected by this order relates to the year 1932.

The 1931 report on Financial Statistics of States was issued during the past fiscal year, having been delayed on account of lack of printing funds. Manuscript for the 1931 report for cities is at the Printing Office.

During the past year reports were collected from cities having 100,000 population for the year 1932, a preliminary bulletin presenting the more important data was issued, and manuscript was sent to the printer for the final report.

BIENNIAL CENSUS OF MANUFACTURES

Because of inadequacy of the funds provided to defray the cost of the 1933 Census of Manufactures, it was necessary to reduce the number of "special schedules" (each adapted for use in canvassing a single industry or a small number of closely related industries) from 175 to 81 and to substitute the general schedule for those abandoned; to curtail the inquiries calling for data on quantities and values of particular kinds of products manufactured; to abandon practically all inquiries in regard to materials consumed (except total cost) and equipment in use; and to use an abbreviated schedule for canvassing the relatively unimportant manufacturers in most industries (those whose combined values of products amounted to less than 10 percent of the total values for the respective industries). This abbreviated schedule called merely for data on number and compensation of officers and salaried employees, number of wage earners employed in March, June, September, and December, total wages paid during the year, cost of materials, fuel, etc., and total value of products, with no break-down as to kind or quantity.

The total number of returns received from manufacturing establishments which were in operation during all or any part of 1933 was approximately 141,000. At the close of June, 33 preliminary indus-

try reports had been issued for this census, leaving approximately 220 such reports to be published.

Because of the lack of an adequate fund for printing, only 48 of the 76 final reports (each covering a single industry or a few related industries) and a summary for States, industrial areas, and industries, for the 1931 Census of Manufactures, were printed prior to June 30, 1934. The remaining 28 reports are on press.

QUINQUENNIAL CENSUS OF ELECTRICAL INDUSTRIES

Preliminary work in connection with this census was completed prior to the beginning of the last fiscal year. The canvass, which was made entirely by mail, was also started in the preceding year and was well advanced by July 1, 1933. It was completed about December 1, 1933.

The Census of Electrical Industries covers the operation of electric light and power plants, electric railways, telephones, and telegraphs. The editing of all of the schedules, tabulation, preparation of tables for final reports, and the printing of the final reports were all completed during the fiscal year just ended. These reports are:

Central Electric Light & Power Stations.
Electric Railways and Motor-Bus Operations of Affiliates and Successors.
Telephones and Telegraphs.

VITAL STATISTICS

Mortality and birth statistics published by the Bureau of the Census for the year 1933 reflect for the first time returns from the entire United States, since it was not until that year that all States had been admitted to the birth and death registration area. A special campaign to promote complete registration in the State of Georgia was inaugurated and completed in the last fiscal year, and similar campaigns will be instituted in other States to hold this work up to the highest standard. The Bureau compiles both birth and mortality statistics for Hawaii and the Virgin Islands and mortality statistics for Puerto Rico.

The total number of births reported for the year 1933 from the entire United States was 2,081,232, the birth rate per 1,000 population being 16.6. The deaths reported for that same area numbered 1,342,106, the death rate being 10.7 per 1,000 population, which was slightly lower than the death rate for 1932. In 1933 there were 77,059 stillbirths, the rate per 100 live births being 3.7, and the infant mortality rate (deaths of infants under 1 year of age per 1,000 live births) was 58.1. The provisional summary of birth, stillbirth, and infant mortality statistics for 1933, including data for all States, was distributed widely among State registration officials, sanitary and health organizations, insurance companies, libraries, and public-health officials.

The Weekly Health Index, usually published Thursdays, presents for 86 cities of 100,000 or more population the total number of deaths, the death rates per 1,000 population, the deaths under 1 year of age, and infant mortality rates. Data for these reports are obtained by telegraph. Similarly a 4-week summary is issued by the Bureau monthly showing deaths from automobile accidents.

At the close of the last fiscal year, the 1931 and 1932 Birth Statistics Reports were in process of printing and manuscript was practically completed for the Mortality Statistics Reports for the same years. The printing of these volumes has been delayed in consequence of the depletion of printing funds, and in order to offset this condition, a 100-page report of Mortality Statistics presenting selected tables from the volumes was printed and distributed.

Because of limited appropriations, it was necessary to reduce the rate of pay for transcripts of birth and death certificates furnished by State officials from 3 cents to 2 cents each in the fiscal year ended June 30, 1933. In view of this reduced payment, the Bureau authorized transcribers to discontinue temporarily copying the data relating to birthplace and occupation on the death certificates and the data relating to occupation of parents on the birth certificates. On January 1, 1934, a restoration of one-half of this pay reduction was made, but it is not yet possible, at the present rate of payment, to secure data necessary to restore the tabulation of deaths by nativity.

INSTITUTIONAL POPULATION

ANNUAL REPORTS

Reports on Mental Patients in State Hospitals, for 1931 and 1932, and on Mental Defectives and Epileptics in State Institutions, for 1929 to 1932, were published during the fiscal year. The report on Prisoners in State and Federal Prisons and Reformatories, for 1931 and 1932 is on press.

Schedules for 1933 for the two classes of institutions first mentioned have been somewhat expanded as a part of the more detailed decennial census of institutions, and in addition data are being collected from private hospitals and institutions for mental patients and defectives, as well as added information concerning the criminally insane. Complete returns have not been received for these inquiries. All schedules have been received, however, for the 1933 report on prisoners and are in course of tabulation.

Complete data on judicial criminal statistics for 1932 were received and compiled for 15 States and for the District of Columbia, and two tables presenting summary statistics were issued during the past fiscal year for each State, as well as a summary table presenting percentages for all of the States covered by the 1932 investigation. Judicial criminal statistics for 1933 are now being collected from 31 States and the District of Columbia.

DECENNIAL REPORTS

The decennial census of institutions covers, in addition to the classes for which annual statistics are collected, inmates of county and municipal penal institutions, juvenile delinquents, and dependent and neglected children. The reports for the county and municipal penal institutions have all been received and the tabulations are well under way; over four-fifths of the returns have been received for juvenile delinquents; and all but 10 percent of the returns from institutions for dependent and neglected children have been re-

ceived. Data for the institutional population reports are collected by mail.

MARRIAGE AND DIVORCE

The tables for the 1932 report on marriage and divorce were completed in September 1933, but because of reduced allotment for printing they had to be revised to permit publication in a 30-page pamphlet. Copy for this report was sent to the printer in October and the printed report issued in January 1934. The collection of statistics on marriage and divorce has been temporarily discontinued.

REPORT ON NEGROES IN THE UNITED STATES

This is to be a special report embodying in one volume all available data concerning Negroes collected by the Bureau subsequent to the census of 1910. This volume, consisting of 20 chapters and approximately 1,000 pages, will be based on the published reports of the 1920 and 1930 censuses and unpublished census statistical data relating to the Negro. It is to be supplemental to the volume, "Negro Population in the United States, 1790–1915", issued by the Bureau in 1918.

Census statistics pertaining to the Negro are scattered in many different volumes, all of which are not easily accessible to the general public. These data cover population, agriculture, occupations, families, mortality, religion, and other subjects of general interest. It is the object of this presentation to embody in a single comprehensive volume the principal and most recent data relating to the social and economic status of the Negro race in the United States as reported at the decennial censuses of 1920 and 1930. To all persons interested in the study of racial groups, particularly to educators and public officials, it is believed that this volume will be of great value.

Work on the volume was started in March 1933 and was well advanced at the end of the fiscal year. It is expected to send this to the printer in December 1934.

Along with the work on this volume, 20 press releases regarding Negroes have been issued covering various subjects.

COTTON AND COTTONSEED

There were published during the past fiscal year, as provided by law, 12 reports of cotton ginned to specified dates during the ginning season; monthly reports of cotton consumed and on hand and of spindles and spindle hours; monthly reports of cotton held in independent warehouses, compresses, and public cotton yards; monthly reports of cottonseed received, crushed, and on hand, and cottonseed products manufactured, shipped out, and on hand; and monthly reports of crude cottonseed oil refined and refined cottonseed oil produced and stocks of crude and refined oil at refining and consuming establishments and in transit to the same.

Two bulletins were published in the last fiscal year on this subject, one at the close of the ginning season showing ginning by States and counties from the crop of 1933, and the other showing cotton

production and distribution for the year ending July 31, 1933, which contained revised and detailed figures for cotton ginned, cotton consumed and on hand, cotton imported and exported, and cottonseed and products. Current data concerning cotton are secured from individual ginneries and from consuming and storage establishments by 772 local special agents employed on a part-time basis.

MONTHLY AND QUARTERLY INDUSTRIAL STATISTICS

The Bureau collects and publishes current statistics for 57 industries or commodities (in addition to cotton and cottonseed), 50 on a monthly basis and 7 on a quarterly basis. The collection of monthly statistics on plumbers' woodwork and quarterly statistics on glues of animal origin was discontinued during the fiscal year. A monthly report on corsets and brassieres and a quarterly report on wool stocks were begun. The statistics for the monthly and quarterly reports issued during the year for these 57 industries or commodities were compiled from returns from 13,222 manufacturers and other concerns. The Bureau is now publishing current statistics for the following:

MONTHLY

Air-conditioning equipment
Automobiles
Automobile financing
Babbitt metal
Bathroom accessories
Boots, shoes, and slippers
Cellulose plastic products
Commercial steel castings
Convection-type radiators
Corsets and brassieres
Distillate-oil burners
Domestic pumps and water systems
Domestic water-softening apparatus
Electric industrial trucks and tractors
Fabricated steel plate
Fire-extinguishing equipment
Floor and wall tile
Hosiery
Leather and knit wool gloves and mittens
Malleable castings
Measuring and dispensing pumps (gasoline and other pumps)
Mechanical stokers
Men's and boys' clothing cut
Methanol
Oil burners
Paint, varnish, and lacquer products
Paperboard
Plastic paints, cold-water paints, and calcimines
Plumbing brass
Porcelain enameled flat ware
Porcelain plumbing fixtures
Prepared roofing
Public-merchandise warehousing
Pulverizers
Pyroxylin-coated textiles
Railroad locomotives
Range boilers
Steel barrels
Steel boilers
Steel furniture and fireproof safes
Structural-clay products
Sulphuric acid
Superphosphates
Terra cotta
Underwear and allied products
Vitreous-china plumbing fixtures
Wheat ground, and wheat-milling products
Wool consumption
Wool-machinery activity
Work clothing

QUARTERLY

Animal and vegetable fats and oils
Edible gelatin
Electric (mining and industrial) locomotives
Electrical goods (orders)
Lacquers (sales)
Wheat and wheat-flour stocks
Wool stocks

CENSUS OF AGRICULTURE, 1935

In January 1934 the first preliminary work was done on the forthcoming Census of Agriculture. A series of tentative schedules for use at this census were prepared and developed in collaboration

with committees of the Department of Agriculture, the American Farm Economics Association, and the Central Statistical Board, and at the close of the fiscal year the form of the final schedule had been agreed upon. As stated elsewhere in this report, some preparatory work for the Census of Agriculture was accomplished through the medium of Federal Civil Works projects.

SPECIAL CENSUSES

Special censuses were taken during September and October 1933 under the supervision of a representative of the Bureau of the Census, for four places in Indiana, and certificates of population were issued shortly after the completion of the enumerations.

ESTIMATES OF POPULATION

Recent estimates of county and city populations, usually computed annually in intercensal years, have proved unsatisfactory, no doubt, as a result of the many economic changes which have resulted in an abnormal movement of the population. This Bureau has been doing considerable experimental work in an effort to arrive at a sound method for computing post-censal population estimates for counties and cities. Such estimates are required for computing per capita rates, as well as birth and death rates. Estimates of population made annually for the United States and for the several States are about as satisfactory as possible without an actual population canvass. Estimates, however, become less and less satisfactory as the 10-year intercensal periods advance. The corrective of this difficulty is a quinquennial census of population. Such a census was contemplated by the Lozier bill which failed of passage at the last Congress. This bill was strongly endorsed by public-health officials, economists, Government officials, and many others.

SEARCHING OLD POPULATION RECORDS

During the year 21,169 searches of the population schedules were made in compliance with requests of persons desiring information to establish age for annuities, citizenship, old-age pensions, passports, record of births, retirement, working papers, school enrollment, etc., as well as for genealogical purposes and the settling of estates. In addition 4,405 visitors consulted the records for 1790 to 1880. The records for later years are confidential and can be examined only by sworn employees of the Bureau.

The enactment of old-age-pension laws in many States has increased the demand for information from the old population records, primarily because of the lack of local birth and marriage records. These early records were rapidly becoming mutilated from age and constant use and, therefore, the Bureau, under a Civil Works project, had the records for the years 1800, 1810, and 1820 photostated and bound. These bound photostat copies, comprising 449 volumes, are available for consultation by the public and the original schedules have been filed away in order to preserve them.

MACHINE TABULATION

The machine tabulation work of the Bureau of the Census during the past fiscal year represented the passing of 230,437,914 cards through one machine once. These tabulations were divided between the current inquiries of the Bureau and work for other governmental or outside organizations.

WORK DONE FOR OTHER FEDERAL OFFICES AND OUTSIDE ORGANIZATIONS

The sum of $2,614,346 was received by the Bureau of the Census during the last fiscal year, either directly or through transfers of governmental funds, to defray the cost of Federal Civil Works Administration projects assigned to the Bureau of the Census or to pay for special tabulations made for other Federal agencies or for outside organizations or individuals. The greater part of this fund covered the cost of Federal Civil Works projects.

THE CENSUS OF AMERICAN BUSINESS

This census was authorized and preparatory work commenced on December 10, 1933. The field canvass, which was started January 2, 1934, was completed early in April. The census includes data on retail and wholesale trade, and service, amusement, and hotel establishments, for which a total of 2,187,494 schedules were collected, distributed among the inquiries as follows: 1,522,234 from retailers, 163,826 from wholesalers, 472,163 from service and amusement establishments, and 29,271 from hotels.

The purpose of this census was to obtain at the earliest possible date information relating to business conditions throughout the country. For that reason preliminary reports on the various subjects covered were issued in mimeograph form as rapidly as the more important and general features of the returns could be tabulated. These preliminary reports, the first of which was issued on May 24, included for each State and county, by subjects (wholesale, retail, service, or amusement establishments), the number of stores, sales, number of full-time and part-time employees separately, and salaries and wages for full-time and part-time employees separately. A preliminary report, by States, was also published showing the number of full-time and part-time employees separately for each month of the year 1933. All of these preliminary reports had been published by the end of August. The following totals have been established for the year 1933: Retail sales amounted to $25,037,225,000, wholesale sales to $32,030,504,000, and receipts from service and amusement establishments to $2,760,881,000. Employment was given in that year to an average of 2,691,310 full-time and 730,900 part-time employees in retail trade, to 1,058,767 full-time and 120,591 part-time employees in wholesale trade, and to 434,014 full-time and 178,663 part-time employees in service and amusement establishments. These figures do not include proprietors and firm members of whom there were 1,572,588 in retail trade, 84,971 in wholesale trade, and 503,441 in service and amusement establishments. In view of the fact that no funds are available for printing the full report of the Census of

American Business, series of final reports are being issued, by kinds of business, in mimeograph form for States and cities on all the subjects covered. All of these reports will have been completed by December 1.

CENSUS RECORD PRESERVATION

This project was established primarily in the interest of preserving old census records for posterity. The work of photostating and binding the population census returns for the years 1800, 1810, and 1820 is spoken of elsewhere in this report. Other work authorized as a part of this project included the compiling and printing of a limited number of State outline maps showing minor civil divisions, the preparation and writing up of enumeration districts for use in the canvass of the forthcoming census of agriculture, and the allotment to blocks of the 1930 population returns for cities of New York State, subsequently tabulated for use of the secretary of the State of New York to serve as a basis for redrafting assembly districts.

REAL-PROPERTY INVENTORY

This project was assigned to the Bureau of Foreign and Domestic Commerce and covered 62 selected cities. The canvass was conducted by the field agents of the Bureau of the Census and the machine tabulation work was done in the central tabulating unit of the Department of Commerce which is maintained by this Bureau.

URBAN TAX DELINQUENCY

This project was assigned to the Bureau of the Census with the prime object of obtaining much needed information concerning the ad valorem tax levies on real estate that are uncollected and usually termed "delinquent." The reports of this project covered the amount of current tax delinquency in all States, with totals on a county basis; the amounts of both current and accumulated tax delinquencies in cities of over 25,000 population; the distribution by types of property of current tax delinquency in 62 selected cities; the legal provisions as to tax enforcement, particularly as to recent changes; and the trends in the amount of taxes that remain unpaid, as of both penalty date and as much as 1, 2, 3, or 4 years after the date when first due and payable. The results of this census were published in mimeograph form.

UNEMPLOYMENT RELIEF AND SUPPORTING LOCAL STUDIES

This project included the unemployment relief census tabulations, a study of the composition of families and persons on relief rolls between specified dates, and the survey of former members of the Civilian Conservation Corps. The studies of unemployment relief covered 3,178,089 relief families. Final reports for this inquiry were completed on March 30, 1934. The study of composition of families and persons on relief rolls was commenced March 10, 1934, and will be completed before the close of the present calendar year. The survey of former members of the Civilian Conservation Corps is being made, by months, for use of the various agencies whose work is affected by this activity.

TRIAL CENSUS OF UNEMPLOYMENT

This project was assigned to the Bureau of Labor Statistics but the results were tabulated in this Bureau. It covered unemployment in Springfield, Ohio; Lancaster, Pa.; and Bridgeport, Conn. These tabulations were commenced in May 1934 and have been completed.

COOPERATION WITH THE NATIONAL RECOVERY ADMINISTRATION

As the work of the National Recovery Administration developed, certain tabulations for specified industries became necessary and this Bureau was requested to assist in the formulation of the questionnaires used, to transmit the schedules to the proper organizations, and to tabulate the results when returned. Such tabulations have been made for more than 30 industries during the past fiscal year. In addition, this Bureau tabulated returns of the President's questionnaire sent out by the National Recovery Administration in October 1933. This work involved the handling of nearly 1,000,000 schedules and the tabulation of 643,060 complete returns. The purpose of this survey was to ascertain the extent of increased employment and the amount of increased pay rolls resulting from the appeal of the President made 2 months previously to all employers of labor. This tabulation was completed in December 1933.

Under authority of section 8 of the act of February 14, 1903, the Secretary of Commerce authorized and instructed the Director of the Census to make special investigations and reports in cooperation with the proper authorities designated by duly approved codes established under the National Industrial Recovery Act, a suitable share of the expense involved to be borne by such authorities. Accordingly, arrangements were made during the past fiscal year for the collection of statistics, in cooperation with code authorities and the National Recovery Administration, for the following industries:

Boots, shoes, and slippers
Corsets and brassieres
Leather and knit wool gloves
Men's and boys' clothing
Underwear and allied products
Wool consumption
Wool machinery activity
Wool stocks

OTHER SPECIAL TABULATIONS

The provision carried in the Legislative Appropriation Act of 1933, approved June 30, 1932, whereby one Government bureau or office could place orders for work with another bureau or office, and pay therefor, has facilitated the work of all Government offices. During the past fiscal year the Bureau of the Census has made special tabulations for the following governmental organizations which have not been previously mentioned herein:

Department of Commerce:
  Bureau of Fisheries
  Bureau of Foreign and Domestic Commerce
Department of Labor: Bureau of Labor Statistics
Department of Justice: Bureau of Investigation
Department of Agriculture:
  Forest Service
  Bureau of Agricultural Economics
Federal Emergency Relief Administration
Federal Reserve Board (and banks)

Agricultural Adjustment Administration
Emergency Conservation Work
United States Public Health Service
The Congressional Joint Committee on Ways and Means
Reconstruction Finance Corporation

PUBLICATIONS

Two monographs, presenting detailed statistics and interpretations for the census of 1930, were printed during the fiscal year, namely, Types of Farming in the United States, and Age of the Foreign-born White Population by Country of Birth. In addition, the following special reports of the trade and agricultural commodity series issued at that census were published: Automobile Trades, Distribution of Grain, Food Retailing, and Cooperatives in the Distribution of Agricultural Commodities.

Through a grant of funds from the Institute for Social and Religious Research, it was possible to publish a Topical Index of the Population Census Reports, 1900–1930, which was compiled at the solicitation of the committee on social statistics of the Social Science Research Council. This is the first index of the kind that has been prepared by the Bureau of the Census.

Manuscripts were completed in the fiscal year for the following 1930 census studies and press summaries presenting summarized data were issued, but owing to depleted printing funds the full reports have not been published: Indian Population in the United States and Alaska; Ratio of Children to Women, 1930; Farm Animals; and Fruits and Vegetables.

During the past fiscal year 1,048,348 copies of press releases were distributed by the Bureau on the various features of the Bureau's work, and 150,792 printed reports (mostly pamphlets) were distributed.

MECHANICAL LABORATORY

Experimental work with a view to the betterment of tabulating equipment; together with the maintenance of equipment in use, are the chief functions of the mechanical laboratory of the Bureau. In this connection equipment is interchanged to take care of unit or adding tabulations. One of the unit tabulators was constructed on a new design materially increasing the efficiency of the machine. During the last fiscal year experimental work was done on a new adding tabulator principle.

PERSONNEL

OFFICE FORCE

Number of employees.—The permanent office force at the close of June 30, 1934, comprised 643 officials, clerks, etc.; 16 experts and assistants in the mechanical laboratory, and 2 special agents, making a total of 661 employees. (There were also employed 129 temporary special agents engaged in examining schedules for other Government establishments or outside agencies for information not published in our printed reports.)

Appointments.—The total number of appointments on the regular roll (including reappointments, extensions, etc.) made from July 1,

1933, to June 30, 1934, was 261 (permanent, 3; temporary, 216; reappointments, 42). There were nine changes in grade.

Separations.—The total number of persons separated from the service during the fiscal year was 246. Of this number, 24 (including 4 under section 213) resigned, 19 were transferred to other bureaus or departments, 8 retired on account of age or disability, 12 held limited appointments which expired, 6 died, and the services of 177 were terminated.

Emergency appointments.—The work which the Bureau has done since October 1933 under the recovery program for the various emergency organizations, made necessary 4,323 appointments and 3,367 separations to June 30, 1934.

FIELD FORCE

The field force at the close of June 30, 1934, numbered 1,317 and comprised a permanent force of 6 consulting experts, 757 special agents employed throughout the Cotton Belt to collect data for cotton reports showing quantity of cotton ginned to specified dates, cotton consumed, and stocks held, bale weights, etc., and 48 local special agents engaged in querying for the Bureau incomplete returns of births and deaths within their respective areas; 17 temporary agents engaged in collecting data for the financial reports of States and of cities; 2 special agents employed on statistics of institutions and criminals; 10 special agents employed on the census of agriculture; 69 special agents employed on vital statistics; 273 special agents employed on census of manufactures; 17 special agents employed in cooperation with chambers of commerce; and 118 special agents, without compensation, employees of the Forest Service.

During the fiscal year 1,400 field employees were appointed, including enumerators and special agents, and 1,074 persons were separated from the rolls.

Emergency appointments.—There were 320 supervisors, 43 special enumerators, and 111 special agents employed in connection with the field work for the census of American business and the real property inventory, as well as 233 special agents (employees of other services) who served without compensation. (The enumerators employed in the field, approximately 20,000, were paid from funds supplied to the States by the Federal Emergency Relief Administration.)

APPROPRIATIONS

During the fiscal year ended June 30, 1934, the Bureau was operated under an appropriation for salaries and expenses in the amount of $1,903,000. Expenditures amounting to $1,360,618 were made from funds assigned to the Bureau for Federal Civil Works Administration projects, in addition to which the expenditure of $1,928,316 was made for these projects by the disbursing officers in the field in payment of salaries of clerks and enumerators engaged on the work.

BUREAU OF FOREIGN AND DOMESTIC COMMERCE

WORLD DEVELOPMENTS AFFECTING THE NATURE OF THE BUREAU'S WORK

Inevitably the character of the work performed during the fiscal year by the Bureau of Foreign and Domestic Commerce was determined in large measure by the salient economic developments throughout the world. The nature of the demand for Bureau services was shaped to a dominant degree by the significance of these outstanding tendencies and events. It therefore seems essential to give a terse outline of them, in order to facilitate an adequate understanding of what the Bureau has been striving for, and has, in part at least, achieved. It must be noted at the outset that many of the factors which contributed to the confusion and uncertainty of international economic relations during the fiscal year 1932–33 still prevailed throughout the year.

PRICE MOVEMENTS AND FISCAL POLICIES

The direction of wholesale price movements in terms of the various national currencies was in general influenced by the monetary standards of the respective countries. In countries which adhered to the gold standard the price trend was on the whole downward—although there were exceptions, as, for example, the Netherlands. The rise in the wholesale price index in the United States was much more pronounced than in other leading paper-currency countries, such as the United Kingdom and Japan.

An important element in the fiscal year's general foreign-trade situation was the exchange value of the dollar. After the official suspension of gold payments by the United States on April 20, 1933, the dollar depreciated rapidly during several weeks, after which it entered upon a series of fluctuations which brought its range, until the end of October, roughly between discounts of 26 percent and 35 percent. During the succeeding months it fluctuated within narrow limits at a discount of about 36 percent until its formal devaluation on January 31, 1934.

As a result of the changes attendant upon the establishment of a new gold value of the dollar and the lodging of ownership in the Treasury of the Nation's monetary gold stocks, a new parity was established between the dollar and foreign gold currencies. The difference between the new parity and existing quotations led to an enormous influx of gold, chiefly from France, which set a new monthly record (in both value and weight) during February, when $453,000,000 of the metal entered this country. In the exchange markets actual quotations on the French franc reached the new

parity of 6.63375 cents on March 21, after which gold imports occurred on a considerably reduced level.

Although exchange restrictions were somewhat relaxed in certain countries, the tendency was quite the contrary in others. There were instances in which the emphasis in control measures was shifted from exchange restrictions to import restrictions.

TARIFFS, QUOTAS, AND SIMILAR RESTRICTIVE MEASURES

The world-wide extension of the number and complexity of international trade barriers—characteristic of the entire depression period—continued during this past year. The number of changes in tariff duties, import quotas, and other restrictions abroad (each involving from one to scores or even hundreds of individual commodities), as reported to and announced by this Bureau, was 26 percent greater than in the preceding year and about 60 percent greater than the normal annual average.

Yet it may be confidently asserted that probably the outstanding development of the year was the almost universal effort—largely through the medium of reciprocal trade agreements—to arrest and reduce the hitherto steadily tightening restrictions on the flow of international commerce. To facilitate this movement, and to permit of prompt adjustment of controls upon foreign trade under the prevailing unstable conditions, practically all of the leading commercial nations have taken action to give their respective executive authorities increased power to modify tariffs and other trade-restricting measures in the course of the negotiation of reciprocal trade agreements with other nations, or as needed to meet changing trade conditions or control measures by other countries. The United States took an active part in this movement by the passage of the Trade Reciprocity Act, approved June 12, 1934, which authorizes the President to promote trade between the United States and other countries by means of reciprocal agreements. The great influence of this enactment upon the activities and the objectives of the Bureau of Foreign and Domestic Commerce will be indicated in succeeding pages of this report.

COURSE OF AMERICAN EXPORT AND IMPORT TRADE

The foreign trade of the United States in the fiscal year 1934 registered a very substantial improvement over such trade in the immediately preceding fiscal year. Our exports (including reexports of foreign merchandise) were valued at $2,042,000,000, or 42 percent more than in the fiscal year 1933, and general imports at $1,721,000,000, an increase of 47 percent. Important factors contributing to the much larger value of trade were the depreciation in dollar exchange, higher dollar prices, and the expansion in industrial activity both at home and abroad. The indexes of this Bureau reveal that the quantity of goods exported in the fiscal year 1934 was one-fourth smaller than in the base period 1923–25, while the quantity of goods imported was only one-tenth less than in the base period. Values of exports and imports were both about 56 percent below the average values in the period 1923–25.

The upward swing in foreign trade as compared with the preceding year has tended naturally to heighten "export consciousness" throughout the Nation and to accelerate the flow of requests for the typical services afforded by the Bureau of Foreign and Domestic Commerce.

SALIENT ASPECTS OF BUREAU'S POSITION AND ACTIVITIES

CONTRACTION OF SCOPE IN CONFORMITY WITH ECONOMY PROGRAM

The reduction in the Bureau's appropriation for the fiscal year 1934 has naturally constituted a major influence upon the potentialities and physical scope of its work. The amount appropriated for the fiscal year was $3,514,370 as compared with $3,988,000 for the fiscal year 1933, but the amount available for obligations for the fiscal year 1934 was only $2,030,050, which does not include the legislative reduction amounting to something over $300,000. It became necessary, therefore, to discontinue the services of 360 employees in Washington. Twenty-one foreign offices were eliminated and 107 employees in the Foreign Commerce Service dropped, while in the district-office service in the United States 10 offices were closed and the services of 106 employees were discontinued. In the section of customs statistics in New York City 56 employees had to be dropped. It is gratifying to be able to record that many of those whose services were discontinued in the Bureau were employed by new recovery agencies.

The original allotments for printing the periodical and special publications of the Bureau were reduced from $315,500 in 1932 and $145,000 in 1933 to $95,000 in 1934. Since more than $85,000 of the amount allotted for the year had to be used for the regular periodical publications of the Bureau, a very small amount was left for the publishing of important commercial and industrial studies in both the domestic and the foreign fields. Such studies would be of eminently practical help to American business at the present time. The Bureau of Foreign and Domestic Commerce is essentially an informational and economic-research agency, and it therefore seems peculiarly vital that its findings should be made available to the public in the most acceptable form—through the medium of printed text.

SERVICES TO RECOVERY AGENCIES AND OTHER GOVERNMENT UNITS

In view of the critical emergency and the tremendous scope and potency of the recovery drive, it is only natural that an outstanding phase of the Bureau's work should have comprised cooperation with many other governmental organizations, particularly those newly constituted for the purpose of coping with the depression. The Bureau's general and technical assistance has been of indisputable value and has produced significant results. The major activities of this cooperative character are indicated below.

National Recovery Administration.—The assistance of the trained personnel of the Bureau's district offices and Washington staff, with

their experience and knowledge of industrial and commercial problems, has been acknowledged by the National Recovery Administration as being exceedingly valuable. During a considerable part of the fiscal year, the field offices were engaged in handling an enormous amount of National Recovery Administration work in the various cities throughout the country. The Bureau's district managers were loaned or transferred to the National Recovery Administration for the field work in connection with the reemployment program. Many of the Bureau's division chiefs were detailed for varying periods to the National Recovery Administration headquarters in Washington. The Bureau's Domestic Commerce Division rendered service to the National Recovery Administration in its initial activities—handling thousands of inquiries on procedure, developing and maintaining lists, and instituting code analysis, besides supplying basic data on many industries and trades. Another division of the Bureau handled an assignment from the National Recovery Administration to classify all commodities, industries, and professions in the United States, as well as to cross-index all trade associations in the country relative to commodity coverage. Bureau personnel participated as technical and economic advisers in the hearings leading up to the formulation of the ranking steel code and more than 50 other codes concerned with iron, steel, and hardware; and comparable service was rendered on countless other codes. Various Bureau chiefs are serving as administrative members of code authorities.

Real Property Inventory.—Of major proportions as a contribution to the administration's recovery program was the real property inventory which was undertaken by the Bureau in cooperation with the Census Bureau as a Civil Works Administration project.

In November 1933 the Bureau, in anticipation of the need for basic facts with which to attack the housing problem, submitted to the Federal Civil Works Administration the outline of a plan for surveying residential properties in selected communities. The intent was to coordinate this necessary and important study of real estate conditions with the endeavor of the administration for employment relief. It was formally approved on December 11, 1933, by the Civil Works Administrator. The Bureau proceeded to conduct a survey of all dwelling structures in a selected group of 64 cities. A total of several thousand white-collar unemployed were thus provided with respectable and worth-while work during the winter months.

The project as originally conceived included two phases, a census or inventory emphasizing the physical characteristics of real property and a more intensive sample study of such financial items as rents, value of property, mortgage status, and income of owners and tenants.

The degree of interest aroused was evidenced by the determination of some 35 cities not included in the selected list to conduct independent canvasses of their own. Such cities were allocated a portion of the local funds received from the Civil Works Administration to conduct real-property inventories in their communities. These cities were given technical assistance by the Bureau for the training of enumerators and for setting up the machinery of the survey. In addition, they were supplied with a complete set of schedule forms and printed instructions required for the work.

Much of the basic data secured in this survey was available to provide a sound factual basis for planning the housing program of the Administration.

Agricultural Adjustment Administration.—A member of this Bureau's Textile Division took part in a study conducted by the Agricultural Adjustment Administration relative to the question of a levy of a compensatory processing tax on commodities alleged to compete with cotton. That division also afforded help to the Agricultural Adjustment Administration in connection with "conversion factors", drawback schedules on exports, and cotton-acreage curtailment. Our Division of Foreign Trade Statistics helped the Agricultural Adjustment Administration to obtain material necessary to the administration of the sugar and molasses quota. Special work for the Agricultural Adjustment Administration was performed by the Foodstuffs Division. The Marketing Research and Service Division helped the Agricultural Adjustment Administration to design a method for establishing the cost of handling milk in grocery stores. The Bureau also gave advice in the matter of naval stores.

Public Works Administration.—In October 1933 Secretary Ickes requested that the chief of this Bureau's Forest Products Division be loaned to the Public Works Administration to develop the industrial program of subsistence homesteads; in April 1934 the Bureau official was made chief of the industrial unit of that organization (while at the same time administering his work for the Bureau). The Bureau's Transportation Division supplied the Public Works Administration with operating-cost data relative to inland waterways and steamship operations, and these facts were utilized in important special studies. The Public Works Administration sought the advice of the Bureau's Chemical Division concerning possible shortages of essential raw materials.

Emergency Conservation Work.—An expert from the Bureau's Forest Products Division served for a time as special assistant to the Director of the Emergency Conservation Work and aided in procuring 300,000,000 feet of lumber for the camps of the Civilian Conservation Corps.

Federal Alcohol Control Administration.—By assignment of the President, the Director of the Bureau served as a member of this unit, whose principal duty is to administer, in cooperation with industry, the codes of fair competition covering the production and sale of alcoholic beverages, except at retail.

Petroleum Administration.—A member of the Minerals Division staff was loaned to the Department of the Interior for several months for work incident to the activities of the Petroleum Administration, charged with the duty of promoting conservation of the petroleum resources of the Nation.

Office of the Special Adviser to the President on Foreign Trade.—In accordance with an Executive order, the Secretary of Commerce designated the Assistant Secretary, together with the Director of the Bureau of Foreign and Domestic Commerce, for contact work with the Special Adviser on Foreign Trade. A wealth of data and statistics has been furnished to the Adviser by the Bureau. In compliance with the Adviser's request, the Bureau compiled informa-

tion which was used in the preparation and drafting of a series of valuable charts on foreign trade.

Reconstruction Finance Corporation.—The Bureau has furnished to the Reconstruction Finance Corporation much data relative to enterprises to which loans were contemplated. For example, the Bureau's Iron and Steel Division has received frequent calls from the Reconstruction Finance Corporation for statistical and other basic information on which to evaluate applications for loans. The Forest Products Division gave the Reconstruction Finance Corporation advice and technical data on cooperage markets and problems, lumber manufacture, pulp and paper, and related matters.

Tennessee Valley Authority.—An example of service rendered to the Tennessee Valley Authority is a study by the Chemical Division relative to "Chemical industries largely dependent upon cheap electric power."

Further activities of the Bureau in cooperating with governmental agencies included, among many others, the following:

Business Advisory and Planning Council.—When committees of the Council were designated in June 1933, various members of the Bureau's staff were named as secretaries. One division chief served on the Committee on Decentralization of Industry, while another expert worked with the Foreign Service Committee.

Commercial policies.—By direction of the President, the Director of the Bureau served as a member of the Executive Commercial Policy Committee.

International debts.—The Bureau, through two of its division chiefs, cooperated with the Treasury Department in a study of international debts. Other services of importance were rendered to that Department.

Planning Committee on Mineral Policies.—The Director of the Bureau and the chief of the Minerals Division of the Bureau served as members of the committee to undertake a study of the mineral resources of the United States with a view to establishing a sound and advantageous mineral policy.

Reciprocal foreign-trade agreements.—Substantial assistance was given to the Department of State in the matter of the Cuban Reciprocity Treaty and in collecting data for use in negotiations for reciprocal foreign-trade agreements.

Retail prices in Washington.—Members of the Bureau's staff cooperated with the Committee on Government Statistics and the Bureau of Labor Statistics in connection with the emergency survey of retail prices in Washington.

Strategic raw materials.—Two of the Bureau's division chiefs were chosen to discuss with members of the staff of the Secretary of the Navy the cooperation that might be rendered in the preparation of route charts showing the movement of strategic raw materials.

EXAMPLES OF INCREASED VOLUME AND HEIGHTENED VALUE OF WORK

The effective functioning of the new Bureau policies and the potent usefulness of the organization in the American economic scheme are strikingly demonstrated by certain outstanding advances in the number and value of services rendered during this past fiscal

year—increases which were achieved by a staff materially reduced in size and operating with greatly lessened appropriations.

For example, during the 12-month period ended June 30, about five times as many visitors as in any previous year came to the Bureau's Chemical Division in Washington, seeking data on trade trends and opportunities for the expansion of markets.

Subscriptions to the "processed" periodicals and statistical statements of the Forest Products Division registered increases ranging from 50 to 100 percent as compared with the figures for the preceding fiscal year.

Despite the great restriction of facilities resulting from the requirements of the Government's economy program, an analysis of the reports submitted during the year by the Bureau's offices in foreign countries shows that the "output per man" has more than doubled.

In actual volume and proved importance, the work performed by the Transportation Division has been very appreciably increased—responding to the needs of the administration's aggressive program for the rehabilitation of American transportation facilities.

The demands for the services of the Commercial Intelligence Division (which supplies a variety of vital facts with respect to business firms abroad) increased by no less than 30 percent over the preceding fiscal year, and more than 250 new users of these services were added to the rolls.

The scope of the experimental Foreign Legislative News (issued by the Commercial Laws Division)—the purpose of which is to give brief notice of "spot-news" legal developments abroad—has been substantially enlarged and its practical usefulness materially enhanced.

The advances above cited are, of course, merely a few varied examples of the progress that has been proved possible under the recast and newly defined plans of the Bureau.

EFFORTS TO AID INTERNATIONAL COMMERCE

EXCEPTIONAL ACTIVITY IN STUDY OF FOREIGN-TRADE RESTRICTIONS

Each one of the unprecedented number of changes in foreign tariff duties and similar restrictions which occurred during this past year necessitated careful study, analysis, and interpretation for the information and guidance of American foreign traders, and therefore the work of the Bureau's Division of Foreign Tariffs was proportionately greater than ever before. In addition, extensive special studies were made in preparation for the new program of reciprocal trade agreements, and in connection with the World Economic Conference at London, at which the chief of the Division represented this Department as technical adviser on tariffs and commercial policy.

The highly important movement in the direction of reciprocal trade agreements between the United States and foreign nations had already started during the latter part of the preceding fiscal year, when this Bureau, at the request of the Department of State, began exploratory studies with a view to possible trade agreements with a selected number of countries. Immediately upon the passage of the

Trade Reciprocity Act in June 1934, the Division of Foreign Tariffs was called upon to participate in the interdepartmental organization and the studies preparatory to the actual negotiation of such trade agreements, its particular contribution being the development of proposals for moderation in the tariffs and related trade barriers of other countries that are to be sought in the course of those negotiations. This reciprocity work will constitute a major activity of the Division during the current year and will call for material strengthening of its staff, as well as the assistance of other divisions of the Bureau and of selected members of our foreign service.

The Tariff Division cooperated even more closely than ever with the Departments of State, Agriculture, and Treasury, the Tariff Commission, and other Government agencies concerned with foreign trade, particularly in connection with trade-agreement work. Moreover, the division has been called upon for information and advice by the Pan American Union in connection with various conferences between the American Republics. It has also cooperated closely with various trade associations, particularly as to the import quota arrangements of certain foreign countries.

In addition to announcements, through the usual channels, of the substantially increased number of tariff changes throughout the world, a special review of recent developments in foreign tariffs and commercial policies was published in Commerce Reports, the Bureau's weekly magazine; a partial revision of the handbook on Foreign Tariffs and Import Regulations on Fresh Fruits and Vegetables was prepared and published; a handbook on Preparing Shipments to British Countries was sent to the printer, and work was carried forward on a similar publication for continental Europe.

FOREIGN COMMERCIAL LAWS

The fiscal year just ended has been productive of much new nationalistic economic and business legislation, designed to alleviate local economic conditions, to produce a maximum of new revenue, and to further (without particular regard for the effect on international trade) the economic aims and ideas of each nation. Many new interpretations of older laws and regulations have been made in the hope of accomplishing similar results. The Bureau has therefore been intent on keeping abreast of these foreign legal developments and advising American business interests of the developments that affect them.

The Division of Commercial Laws has given special attention to the improvement of its General Legal Bulletin (Foreign Laws Affecting American Business) and the Industrial Property Bulletin (Patents, Trade Marks, Copyrights, and Unfair Competition under Foreign Law) as the most feasible means of disseminating information with the greatest economy in time and personnel.

Protection for Americans against unfair competitive practices in foreign jurisdictions has been stressed. The simulation abroad of American trade marks and designs has gone on unabated, but through the services of the Bureau many of our manufacturers have been afforded the opportunity of protecting their marks and other industrial property in foreign markets.

In the insurance field, in one country alone, the enforcement of legislation that contemplated taxation on all marine-insurance premiums was withheld upon the basis of official representations made through the American Embassy on the Bureau's initiative, while, in another country, contemplated increased deposit requirements were deferred as a result of similar American representations, made this time in conjunction with another foreign embassy.

The Division has rendered special assistance to other governmental organizations in such matters as foreign sales taxes, foreign corporation laws, world insurance conditions, and instructions to the American delegates to the Montevideo Conference.

FINANCE AND INVESTMENT

The Bureau's Finance and Investment Division gave more than the usual amount of attention to its study of the balance of international payments of the United States, as a consequence of the depreciation of the dollar, the defaults on war debts due this Government, and the results of investigations made by the Office of the Special Adviser to the President on Foreign Trade and by other Government agencies. In no previous year have the results of this study of our balance of international payments been put to so much practical use.

It is therefore not surprising that from many quarters the Division has been strongly urged to extend its work in this field so as to provide estimates of the country's international income and outgo at least quarterly instead of annually, and to make more detailed analyses of the studies issued by other countries. In a period in which the international exchanges are so subject to disturbance, and when executive trade agreements of a reciprocal character are being negotiated, a continuous study of our balance-of-payments position is unquestionably of great importance. The Division therefore contemplates a considerable extension of its activities in this field.

The frequent changes in foreign exchange regulations and their increasing complexity have brought numerous inquiries from American exporters and investors, who have found it more difficult than ever to effect payment of their claims on countries that control the sale of foreign exchange. The Finance Division has issued frequent "releases" to our district offices and to the press and has given an unusual amount of space to this subject in its fortnightly Financial Notes covering Latin America and Europe, respectively.

This Division was called upon to do a considerable amount of research in connection with banking and currency legislation. Of special significance were the extensive studies it made of various subjects covered in the Stock Exchange Act.

The increasing number of defaults on foreign loans issued in this country in the period 1921 to 1929 has led to numerous inquiries regarding the position of defaulting governments or corporations. The adjustment of these defaults—which now total more than $2,000,000,000, if partial as well as complete defaults are included—requires more detailed studies of the finances of foreign governments.

GENERAL REGIONAL INFORMATION ON FOREIGN DEVELOPMENTS

Figuring prominently in the work of the Division of Regional Information have been its specialized studies of international trade problems, the tendency of American industry to establish branch factories abroad, and the experiences of foreign countries with cartels. In January the Senate released the Department's second report on the subject of American manufacturing investments in foreign countries, consisting of summary tables showing the distribution of branch factories and other forms of direct foreign investments. A special report was prepared dealing with the new German cartel legislation under the National Socialist Government.

The Division has made very elaborate statistical studies of the foreign trade of a number of countries with which reciprocity negotiations are now under way or are to be undertaken in the near future. Several members of the divisional staff have participated in the work of preparing drafts of reciprocal agreements.

One of the Division's outstanding contributions was the preparation of the foreign-countries section for the first issue of the World Economic Review covering the calendar year 1933. The data thus presented have achieved wide usefulness.

There has naturally been increasing interest in the Russian situation since recognition, and this was reflected in the Division's enhanced correspondence and research work on that region. The activities of old and new Government organizations concerned with Soviet matters have involved the supplying of much statistical and other material and frequent cooperation.

The Division's correspondence with private concerns, individuals, and other Government offices has embraced a wide variety of subjects, and much important information has been disseminated in the form of special circulars, articles in Commerce Reports, and periodic releases.

THE FOREIGN COMMERCE SERVICE

During the fiscal year just ended, a distinct change in policy went into effect in connection with the activities of the foreign offices of the Bureau. An abandonment of activities was effected which might be considered as coming properly within the sphere of private sales representatives of American firms. A greater emphasis was placed on reporting and other services designed primarily to promote specifically the interests of American foreign trade—business conditions in the foreign markets; the competitive situation with respect to products of other countries consumed in the market in question; particulars concerning import restrictions, import duties, and tariff administrative regulations; sales methods and credit terms; foreign-exchange situation and control. The information gathered by the Foreign Commerce officers and the officers of the Consular Service is made available through 24 district offices of the Bureau of Foreign and Domestic Commerce located in the leading commercial cities of the Nation, by trade and commercial associations, and through the many and various publications of the Bureau.

Allotments for the Bureau's foreign offices during the fiscal year 1932–33 totaled $1,132,876. During the year just closed they were

reduced to $542,050. This resulted in a curtailment of the number of offices from 53 to 32 and a reduction of commissioned personnel from 168 to 77.

The Field Service Division, which administers the foreign offices, instituted a new system of analysis and evaluation of field reporting which has resulted in a marked improvement in quality.

Information submitted to the Bureau in the cabled and written reports of its commercial attachés and trade commissioners has been in constant and often urgent demand by other branches of the Government, notably the Department of State, the Tariff Commission, and the Office of the Special Adviser to the President on Foreign Trade.

The analyses of American trade with foreign countries, prepared by the Bureau's personnel abroad, have been of direct value in studying bases for possible reciprocal trade agreements. As progress is made in negotiations of this sort, there will be still greater need for the cooperation of these officers.

To a greater degree than ever before, business men who have utilized the services of the Bureau have been given particularly accurate and timely information upon which they might plan their foreign-trade campaigns. This has been especially true with respect to the reporting and interpretation of foreign developments connected with tariff changes, import quotas, and exchange-control measures.

In keeping with the recognition of the fact that imports into the United States form an essential element in this Nation's foreign trade, the officers abroad have extended their reporting to include factors bearing on the significance of foreign territories as actual or potential sources of commodities marketable in this country.

Genuine hardship among the officers and employees of the Foreign Commerce Service were considerably mitigated by the passage of a law authorizing appropriations to meet losses sustained in consequence of the appreciation of foreign currencies in their relation to the American dollar. Through this legislation, the Bureau's officers and employees abroad may be paid their salaries and allowances in foreign currencies in amounts sufficient to render the buying power of their dollars approximately equivalent to what it would be in normal times. Congress also restored the allowances for quarters, light, heat, and fuel (which had been drastically reduced under previous legislation) to the 1932 level. These two measures have done much to strengthen the morale of the Service and to intensify its capacity for practical helpfulness.

FOREIGN-TRADE STATISTICS

A number of significant accomplishments have been recorded by the Bureau in the handling of foreign-trade statistics. In cooperation with the Tariff Commission, the Treasury Department, the Department of Agriculture, the Office of the Special Adviser to the President on Foreign Trade, and other Government agencies, special research has been carried out and special compilations made, in response to a variety of vital needs that have arisen. A special weekly service recording the imports of alcoholic beverages was

initiated for the convenience of the Treasury Department. Charts showing the foreign trade of the United States (81 in number) and charts portraying the foreign trade of about 30 foreign countries (22 to a country) were planned, the basic material was assembled, and the work was effectively started. At the close of the fiscal year, charts for the United States and 8 foreign countries had been completed.

The Division of Foreign Trade Statistics completed indexes of the volume of imports by economic classes for the year 1913 and from 1919 to date, similar to the indexes on export volume completed during the preceding fiscal year. Monthly indexes of both exports and imports for the fiscal year 1934 have also been completed. The Division continued to prepare and issue about 150 mimeographed special monthly statements for the use of 8,000 subscribers, as well as 160 typewritten statements. Publication of the Monthly Summary of Foreign Commerce has been continued, though in a somewhat abbreviated form. The annual volume of Foreign Commerce and Navigation of the United States covering the calendar year 1932 was issued, and practically all of the required statistical tables for the 1933 volume were sent to the Printer before the close of the fiscal year.

Inadequacy of funds has materially hampered the work of this Division. By reason of that situation, the monthly and annual reports of exports by parcel post have been eliminated (vitiating the statistics for certain commodities), statistics showing exports by States have likewise been discontinued, and other modifications, of dubious expediency, have had to be instituted. The divisional staff has been put under such added pressure as to endanger accuracy, and the checking and verifying of documents and reports have, of necessity, been lessened. Upon occasion, other Government agencies have been greatly inconvenienced by the inability of this Bureau to provide special tabulations and urgently needed reports covering American foreign trade; they have found it necessary to send representatives to the Bureau to prepare certain tabulations that they require.

EXPORT AND IMPORT SERVICES BY COMMODITY DIVISIONS

Notwithstanding the heightened stress which the Bureau's commodity divisions have recently been placing on their assistance to American business men in the solution of domestic problems, their activities in aid of foreign commerce continue to loom large. Inevitably, the nature of such endeavors varies with the characteristics of the industries and merchandise that come within the purview of the several divisions. The following selected examples will serve to show the significance of the export and import services rendered by the commodity divisions during the fiscal year just ended.

The Automotive and Aeronautics Trade Division made careful and elaborate studies of the competitive position of American motor cars and other automotive products in foreign markets. It studied also the imported articles used by our automotive industry. Figures were obtained and disseminated with respect to production and registrations of automobiles throughout the world. In many ways the Divi-

sion's efforts helped to stimulate highway development abroad and to encourage the greater use of American methods, materials, machinery, and motor vehicles.

The Chief of the Bureau's Chemical Division made a personal survey of the existing conditions in the chemical industry of Europe, and subsequently, through the cooperation of the Bureau's field service, a comprehensive study of world chemical developments in 1933 and early 1934 was made available to American interests in this field.

The Electrical Division has embarked upon the preliminary stages of preparation of a manual for export managers of electrical goods, giving current characteristics, wiring regulations, types of plugs, and other pertinent data for all foreign countries; such a compilation has long been needed but hitherto has never been made available anywhere.

The Foodstuffs Division has carried out a survey of alcoholic-beverage production, stocks, and import and export trade, as well as the regulations governing such products, for the principal producing and trading countries of the world. The Bureau's correspondence on this timely subject has been exceedingly heavy. At the beginning of the fiscal year 1934 the Washington Government had only the scantiest information on alcoholic beverages in foreign countries, but during the year the Bureau has been rapidly building up its files until at the present time they contain practically complete records for all important countries.

On behalf of the pea growers and shippers in our northwestern States, the Foodstuffs Division made a survey of the production and trade in dry peas in the principal European countries. The Division made a survey of the market for grape juice in the Far East; made an extensive compilation of cocoa-powder and cocoa-butter statistics; analyzed figures on molasses; and, on behalf of the coffee industry, obtained from the Bureau's Mexico City office an extensive report on the development of the coffee cooperative movement.

Because of increasing interest on the part of the lumber industry in reciprocal-tariff matters, the Bureau's Forest Products Division has afforded substantial help to importers and producers by supplying them with statistical data to be used in presenting briefs to the State Department on tariff matters.

The consideration of certain questions relating to the export trade in arms and munitions of war brought the Bureau's Iron and Steel Division to the fore. Since, for years past, the Division had been engaged in tabulating data on our foreign sales of these products, its records came to be regarded as the primary official source of information on this business—information which, in fact, could hardly have been found elsewhere.

With the cooperation of the Foreign Tariffs Division and our foreign offices, the leather and leather-goods section was able to secure larger quotas for certain types of American leather in such countries as France and Turkey. Significant services were rendered to the Tanners' Council of America in connection with the allocation of quotas on patent leather exported to France. In preparation for changes in American foreign-trade policy, surveys were made of leather production and consumption in the important leather-produc-

ing countries of Europe. An elaborate analysis—on quantitative, price, and value bases—of American leather exports since 1920 was published.

The Bureau compiled, and relayed to the rubber trade, full details concerning the recent international rubber regulation agreement, with information regarding laws making it applicable in the various producing regions. It is expected that the Bureau will be increasingly relied upon for information with respect to developments in this control plan.

Under the guidance of the Machinery and Agricultural Implements Division, a foreign-trade meeting was arranged for the builders of machine tools; interest in export trade was keenly stimulated thereby, and those attending the gathering expressed gratification at the practical benefits that accrued.

The motion-picture industry of the United States obtains from foreign markets about 30 percent of its gross income, and it is therefore vitally dependent upon this foreign business. In recent years it has become increasingly difficult to hold these foreign markets, because of growing competition from foreign producers, foreign governmental restrictions in the form of quotas and contingents, language barriers, and the generally depressed economic conditions throughout the world—and in consequence there has arisen an especially insistent demand for the furnishing of data and direct ameliorative services by the Bureau's Motion Picture Section and our offices in foreign countries. Such efforts have been productive of highly satisfactory results. For example: 2 years ago American companies withdrew from the market in Czechoslovakia because of the hampering restrictions that had been placed upon them. Our Prague office, working of course through the instrumentality of the American Legation, and enjoying also the cooperation of one of our trade commissioners now assigned to the Berlin office, has been carrying on negotiations with Czech officials for an early return to this market by the American distributors, and it is expected that this desirable objective will be obtained. In France a modification of the motion-picture quota has enabled American companies to operate more freely in this important market, and the change may be partly attributed to the earnest representations of our Bureau men.

The Specialties Division has successfully initiated, on behalf of the office-equipment industry, a special reporting service with respect to the extent and source of foreign competition and, through the cooperation of the industry's Institute, it has been possible to perform more valuable service to this industry than had been rendered in the past.

The Bureau's office at Shanghai assisted in the reorganization of the Shanghai Leaf Tobacco Board of Trade and, through this measure, important readjustments of the American leaf-tobacco business in China have been effected.

INFORMATION AS TO ACTUAL OR POTENTIAL BUYERS ABROAD

The Commercial Intelligence Division has vigorously continued its work of gathering from all trade centers of the world (outside of the United States) authentic information relative to potential and actual buyers of American products, and of locating in the foreign markets

exporters of such raw materials as are essential to American manufacturers. During this past year the primary sourch of the data thus accumulated has been the American Consular Service.

The Division handled more than 7,500 requests from American business men for "trade lists", for which fees of about $4,000 were received. These lists are classified by commodities and countries, and from them American foreign traders are enabled to select desirable distributors for their products, or foreign suppliers of necessary materials. Back of each name on such a list is a detailed report in the World Trade Directory file, summarizing the business set-up of the foreign firm and its relative ability to handle specific American commodities. American business utilized more than 25,000 of these reports during the fiscal year just ended, and the persons who requested their compilation by the Bureau paid fees amounting to more than $6,000.

This Division "rated" more than 3,000 foreign trade opportunities destined to be utilized by the Bureau's commodity divisions in advising American traders as to the world's wants. More than 170,000 pieces of mail were handled in the Division, involving trade practices of buyers and sellers, changes in foreign credit conditions, variations in channels of distribution, and trends in buyers' wants and needs. As a service unit, the Commercial Intelligence Division is consulted by practically every Government agency, being widely recognized as a valuable depository of source material on foreign trading.

Corollary to the specific functions of this Division is an important, if somewhat "intangible", merchandising service to foreign traders, by which the Division equips inexperienced traders with data and counsel on the "elements of exporting", finds new and additional outlets in foreign countries for American products, and ascertains sources of supply for articles required in American industry. The Division advises as to proper methods of merchandising, credit practice, and terms of payment in foreign countries.

It is hoped that, during the coming fiscal year, every Bureau trade list made obsolete by changing world conditions can be revised so that current "spot" information may be available for American business, upon demand, in every district office of the Bureau.

ACTIVITIES IN THE PROMOTION OF DOMESTIC TRADE

MARKETING RESEARCH AND SERVICE

The Bureau unit that is now called the Marketing Research and Service Division is a consolidation of three divisions which previously functioned in domestic-commerce activities, the Merchandising Research, the Marketing Service, and the Domestic Regional Divisions. The most valuable functions of those three divisions have been retained in the present organization. As now set up, it serves as a reservoir of business information, cost data, and facts on trade practices, and is a central point for the assembly of trade-association information and for market-research activities. It continues to serve in a general advisory capacity, on questions of distribution, to other Government agencies, trade groups, and individuals. It is also the

agency for the promotion and distribution of all of the Bureau's publications and reports.

The Retail Credit Survey, a semiannual report (to be placed on an annual basis during the current year), continues to be one of the Bureau's significant publications. It has recently been supplemented by a monthly national collection report, through cooperation with the Federal Reserve Board, providing a current index on the promptness with which the public pays its bills.

Other reports completed and in process of publication bear upon the perplexing and much-discussed problem of "returned goods"; wholesale confectioners' operations: differences in operating costs within a city; and mark-downs, their causes and control.

A number of processed reports and charts have been issued dealing with data from the real-property inventory (in cooperation with the real-property inventory unit of the Bureau), air conditioning, business indicators, current statistics, estimated retail and wholesale sales, costs and profits by trade groups, commodity cost accounting, code provisions, trade structures, and trade associations. Also, three times a month, the Division issues Domestic Commerce, a publication concerned with distribution research and trade promotion.

A new service was developed during the year in the monthly retail-sales indexes of variety stores, chain groceries, and country general stores, and for new automobiles and automobile financing. Plans for the coming year contemplate an expansion of these indexes, which are valuable indicators of retail trends and important guides as to consumption.

The Marketing Research and Service Division has produced a number of charts and pamphlets for the National Manufacturers' Association, the National Association of Trade Executives, and trade associations in general, on vital matters related to the recovery program. The Division's direct services to governmental recovery agencies are mentioned elsewhere in this report.

DOMESTIC BUSINESS AIDED BY COMMODITY DIVISIONS

As already noted, the commodity divisions of the Bureau have been experiencing a certain reorientation, and their services to domestic business have been sharply accentuated during this past fiscal year. The examples of such service cover a wide range.

The Electrical Division has been formulating plans to publish the first comprehensive list of world short-wave radiophone stations. No such list is now available anywhere in the world, and, therefore, the complete, dependable compilation which the Bureau plans should materially assist the radio industry in stimulating the public interest in all-wave receiving sets.

In cooperation with the National Confectioners Association, the Foodstuffs Division conducted a survey of confectionery distribution in the United States for the years 1932 and 1933 and collected monthly figures on sales of confectionery; this latter series has become one of the recognized indexes of trends in business. Quarterly surveys of stocks of seven principal canned-food items in canners' and distributors' hands were made during the fiscal year, in coopera-

tion with national and regional trade associations. At the request of, and in cooperation with, the Mayonnaise Institute, a survey was made of production and distribution of mayonnaise, salad dressing, and related products for the years 1932 and 1933.

The assistance of the Forest Products Division was enlisted by numerous trade associations, including the National Lumber Manufacturers Association, the Associated Cooperage Industries of America, the American Paper and Pulp Association, and others which have been engaged in economic studies of the countless new problems developing during the past year. This Division also made a study of pulp and paper consumption for the United States Forest Service; made a survey of the quantity of wood pulp held in storage, for the above-mentioned trade association; and prepared a statistical report on newsprint, for the Newsprint Service Bureau.

Early in the fiscal year, the Leather-Rubber-Shoe Division initiated a series of Rubber Industry Letters, reviewing and analyzing official data relative to profits and losses, production and prospects, employment, manufacturing costs, and use of materials in the domestic industry. Not only have these bulletins proved helpful in the preparation of codes, but they have been in continuing demand by research specialists.

The chief of the Motion Picture Section of the Specialties Division assisted in the reshaping of the objectives of the Theater Equipment Supply Dealers Association and the Theater Equipment Manufacturers Association, with a view to heightened efficiency in operation and more helpful cooperation with governmental agencies.

An important study made by the Textile Division deals with domestic flax production, preparation, and utilization for paper and fabrics. The Department of Agriculture is assisting in the production program and the Bureau of Standards in certain phases of utilization. Textile schools, a number of paper and textile laboratories, and others are cooperating. The Chief of the Textile Division is handling the preliminary arrangements for a comprehensive investigation of the textile mill-village situation which is about to be launched by an educational institution with the support of the Textile Foundation. A thoroughgoing study of the production and marketing of silk and rayon goods will soon be published, and in its preparation this Bureau has been cooperating with the National Federation of Textiles, the Textile Foundation, and Harvard University.

NEW DIVISION OF NEGRO AFFAIRS

In September 1933 the Secretary of Commerce called together a conference of 10 Negro leaders to advise with him on the action that might best be taken by the Federal Government to advance the economic life of the American Negro, by stimulating Negro business and enhancing the Negro consumer's purchasing power. The result of this conference was the establishment in this Bureau, on November 1, 1933, of a Negro Affairs Division.

This Division has prepared a very useful bibliography on Negro business. It has furnished to inquirers occupational statistics, data on retail distribution, and information on Negro commercial activi-

ties of varied types ranging from hotels to insurance companies and from aeronautics to motion-picture enterprises. The chief has served as chairman of the subcommittee on labor of the interdepartmental group concerned with the special problems of Negroes. In many instances the Division has acted as liaison between Negro business and various governmental agencies—as, for example, in the case of the effort by the National Negro Business League to make arrangements for loans to Negro business enterprises. A series of public addresses by the Adviser on Negro Affairs has been exceptionally well received.

WORK OF BUREAU'S DISTRICT OFFICES

The outstanding feature of the work of the Bureau's district offices during the past fiscal year was the assistance given to the National Recovery Administration, particularly during the first 6 months. In view of the urgent nature of that organization's requirements, it became necessary to subordinate temporarily the customary activities of the Bureau's offices. The district-office managers and numerous members of their staffs were furloughed to the National Recovery Administration, and in many instances temporary office quarters and equipment were supplied to that agency.

As quickly as possible, however, successful efforts were made by the Bureau to resume the usual district-office work. Separate office space was obtained by the National Recovery Administration, and the Bureau appointed acting district managers, under whose direction the regular routine was taken up again. Close cooperation with local chambers of commerce and numerous civic and trade organizations has been resumed to the fullest possible extent. Persistent interest in and demand for the Bureau's services, despite the continuance of certain adverse business conditions, has been strikingly evidenced by the great number of commercial inquiries handled, the trade letters written, and the visitors seeking trade information.

ECONOMIC RESEARCH

The increased emphasis upon the importance of factual data relative to industry, commerce, and finance has tended to augment the significance of the work of the Division of Economic Research during the past fiscal year.

The Survey of Current Business, containing more than 2,100 series of basic economic statistics and summaries of leading economic trends, was furnished monthly, together with a supplement each week, to Government officials and to 5,600 subscribers. The data thus provided served as a highly valued means of guidance to Government agencies and to business men. For the second successive year, lack of printing funds has prevented the publication of the Annual Supplement of the Survey.

In addition to the current reports made through the Survey, the Division has also furnished a weekly summary of business conditions to Government officials and to the district offices of the Bureau of Foreign and Domestic Commerce, and a weekly review of domestic business conditions to the press and to some 1,000 private subscribers.

In order to fill the need for a yearly review of economic developments and trends, formerly provided by the two volumes of the Commerce Yearbook, the World Economic Review, 1933, was prepared and published. Part I pertains to the United States and part II to foreign countries, the former having been prepared in the Division of Economic Research and the latter in the Division of Regional Information. The response to this volume has been so favorable that provision has been made to publish a similar volume annually.

In March 1933 the Division completed, with some assistance from the National Bureau of Economic Research, a study of the income of the people of the United States for the 4 years 1929 to 1932, which was published as Senate Document 124, National Income, 1929–32. This study has evoked such keen and widespread interest that plans have been made to continue this work and to make annual reports with respect to the volume of income and its distribution among the different economic groups, as in the present study, and to provide a further "breakdown" of the income by States.

In accordance with a recommendation of the Business Advisory and Planning Council of the Department of Commerce (following the submission of the project by the Twentieth Century Fund, Inc.), the Division of Economic Research has undertaken a study of the long-term debts of the individuals, firms, and Government units in the United States from 1913 to date, including data with respect to the time the debts were incurred, the interest rates specified, and the experience in regard to the payment of interest and principal when due and concerning defaults and adjustments. It is planned that this study shall be completed during the next fiscal year and that similar data shall be compiled currently in subsequent years.

Other studies of a statistical nature, dealing with vital aspects of economic developments, are in process of formulation, but the extent to which additional work is undertaken is limited by the budget of the Division, which is only slightly above the substantially reduced level of 1933–34.

For a period of nearly 2 months at the close of the fiscal year, the Division loaned the services of one of its experts to the Special Adviser to the President on Foreign Trade for the purpose of outlining the work which the various Government departments will be asked to do in preparing data for the Adviser.

SERVICES RESPECTING VITAL PROBLEMS OF TRANSPORTATION

The governmental agencies dealing specifically with the transport problem achieved marked improvement of the situation during the year.

The Transportation Division of this Bureau cooperated with the Coordinator of Transportation and the National Recovery Administration in their efforts to bring the existing transport structure within the lines of current economic progress.

During the year, the "Trinity River, Texas, study", to determine the economic justification for the expenditure of $50,000,000 to $70,000,000 for the proposed improvement of the Trinity River was com-

pleted and submitted to the Chief of Engineers, United States Army. A somewhat more extensive study on the proposed waterway from Cumberland Sound, Georgia-Florida, to the Mississippi was completed and submitted to the Chief of Engineers; this study involved the practicability of constructing a ship and barge canal across Florida at a cost of from $150,000,000 to $200,000,000. Both studies were made in cooperation with the Board of Rivers and Harbors, War Department.

The Transportation Division prepared economic and shipping data relative to the proposed Great Lakes-St. Lawrence Seaway, the material being incorporated in Senate Document No. 116, entitled "Survey of the Great Lakes-St. Lawrence Seaway and Power Project." The Division cooperated with the Department of State in drafting recommendations relative to the withdrawal of the coastwise shipping laws from one of the island possessions of this country, and also in studying the effect of a shipping bill proposed by a foreign Government which would reserve to that country certain coastwise shipping. In cooperation with the Shipping Board Bureau of this Department, the Division published a bulletin on Commercial and State-Aided Ship Scrapping, as well as a pamphlet containing statements of recent developments in State aid to shipping.

During the year this Division prepared a report entitled "Railway and Highway Transportation Abroad: A Study of Existing Relationships, Recent Competitive Measures, and Coordination Policies." This was undertaken at the request of the secretary of the President's Transportation Committee to determine what is being done in foreign countries in connection with problems similar to those existing in the United States. This very extensive handbook is now in process of publication. The Division is preparing two additional studies, one covering the development and operation of rail and highway rate structures in foreign countries, and the other pertaining to various forms of taxation of highway transport services and the taxes applying to the fuel used by these vehicles. In addition, the Division initiated action looking toward the disposal of surplus railway equipment to be used in the rehabilitation of Chinese railways.

One of the important functions of the Division for the next fiscal year will be in connection with the administration of the recently enacted law permitting the establishment of Foreign Trade Zones in ports of entry in the United States. The Director of the Bureau will serve as chairman of the interdepartmental committee which will act for the board in administering this law, and the acting chief of the Transportation Division will serve as executive secretary of the committee. All research and administrative work in connection with the preparation of informational data and the handling of publications will be performed in the Division.

PUBLICATIONS OF THE BUREAU

The drastic cut in the allotment of funds for printing necessitated a substantial curtailment during the past year in the number of special reports published by the Bureau, and the size of the periodical publications was reduced. Among the most important of the foreign-business reports handled by the Editorial Division were those on

Sources of Foreign Credit Information, World Chemical Developments, and Railway and Highway Transportation Abroad, while the publications in the field of domestic commerce included, among others, the monographs on Wholesale Druggists' Operations, Costs, Sales, and Profits in the Retail Drug Store (both these studies having been made in cooperation with the National Drug Store Survey Committee), and the Retail Credit Survey.

CONCLUSION

While the funds allotted to the Bureau for 1934–35 are approximately on the same reduced and economical basis as the appropriations for the previous fiscal year, every effort has been made to bring about the necessary readjustments and at the same time meet the increased demands that have been made upon the organization.

The Bureau is the clearing house of information on foreign trade, receiving reports from practically every part of the world, either from its own foreign service men or from consular officers. The reciprocal trade agreements now in process of study and negotiation with foreign countries should be a potent and practical factor in staying the trend toward commercial nationalism and isolation so evident in the recent past; they should provide a strong stimulus to American foreign trade and lead to a freer flow of merchandise between many countries of the world. The Bureau has devoted and will continue to devote its every effort to a successful consummation of these treaties in cooperation with other Government departments.

In the field of domestic commerce the Bureau has cooperated during the past year to the fullest possible extent with the various recovery units. Possessing data and information not available elsewhere, it has been in a position to assist effectively in many directions, and during the coming year it looks forward to continued participation in the national recovery program with all the resources at its command.

Fully conscious of its obligations to American business men, the Bureau will continue to put forth every effort to function effectively as a service unit in the interest of foreign and domestic business.

With our own country taking the lead in removing world-trade barriers, it is hoped that the efforts to render practical service along these lines will soon be converted into actual accomplishment.

NATIONAL BUREAU OF STANDARDS

GENERAL ACTIVITIES

Finances and personnel.—The appropriation for the Bureau for 1932 was $2,749,570; for 1933, $2,257,280. This reduction was met by drastic economies in operation and an 8-day furlough for all employees, without a forced reduction of the staff. The appropriation for the year just closed (1934) was $2,056,045, but of this sum $691,180 was impounded in conformance with the economy program, leaving $1,364,865 available for expenditure. With funds reduced to one-half of the 1932 appropriation, the only recourse was a far-reaching reduction of a trained staff. One-third of the staff was separated from the service in July 1933 and an 8-day furlough imposed on all remaining employees. The regular staff at the close of the fiscal year numbered 668 employees. In addition, 53 research associates supported by national engineering societies and trade associations were engaged on technical problems of mutual interest to the Government and to industry.

Testing.—The organic act of the Bureau provides that tests for the National and State Governments shall be made without charge. The great volume of this work, particularly the testing of supplies for the Federal Government, has taxed the Bureau's resources to the limit in recent years. With the limited appropriations now available, it has been necessary to abandon or curtail important investigations in order to conduct the Government testing. This important service would have broken down except for the provisions of the Economy Act permitting the transfer of funds from Government departments when available to cover the cost of certain tests.

Visiting committee.—The present members of this committee are Gano Dunn, Charles L. Reese, Morris E. Leeds, and Karl T. Compton. The members of the visiting committee have also served as members of the Business Advisory and Planning Council of the Department of Commerce, and have devoted much time to the study of the organization, functions, and needs of the Bureau.

International relations.—The International Committee on Weights and Measures held its regular biennial meeting in Paris, September 26 to October 11, 1933. The General Conference on Weights and Measures (convened only once in 6 years) met at the same time. Twenty-nine of the 32 member nations were represented. The delegates of the United States were Prof. A. E. Kennelly, of Harvard University, and Dr. Theodore Marriner, counselor of the American Embassy in Paris. The following matters were considered by the General Conference:

Thermal expansion of prototype meters: New determinations have shown the old values to be slightly in error. The old certificates were, therefore, canceled

and new ones issued. The findings are in accord with measurements made previously at the National Bureau of Standards.

Definition of the meter in wave lengths of light: The British delegate proposed that the unit of length be defined in terms of light waves, instead of the present prototype meter. Further study of the question was recommended by the conference.

International scale of temperature: The general conference accepted some corrections to the text defining the temperature scale, but decided to convoke an international conference on thermometry before adopting the temperature scale as definitive.

Advisory committee on photometry: The conference approved the organization of a new committee to advise the International Committee on Weights and Measures on such subjects as photometric standards and systems of measurement.

Establishment of a standard of light: The conference left the formulation of specifications for a black-body standard of light in the hands of the new advisory committee on photometry, the International Committee on Weights and Measures to fix the specifications at some suitable time after receiving the recommendations of the advisory committee.

Substitution of absolute electrical units for the present international units: The date for the provisional establishment of the ratio between each international unit and the corresponding absolute unit was postponed until 1935. The conference delegated to the International Committee on Weights and Measures the power to fix these ratios and to decide upon the exact date for the adoption of the new units.

Jurisdiction over electrical units: The conference adopted a resolution declaring itself the legal successor to the London Conference on Electrical Units (1908) and delegated to the International Committee on Weights and Measures full powers to change the specifications adopted by that conference when necessary.

As will be seen from the foregoing, the general conference dealt only with organization and general principles to be followed in establishing international standards. The detailed work is being done by the International Committee on Weights and Measures through its advisory committees and the International Bureau of Weights and Measures, in collaboration with the national standardizing laboratories.

Utility commission engineers.—The twelfth annual conference of State utility commission engineers was held at the Bureau on May 31 and June 1. The following papers and discussions were presented: Customer and consumption data—residential customers; load factor in relation to rates; use of indexes or cost translators in appraisals; cost of electrical distribution; the taxicab situation; economies and improvements in rural telephone service; public-utility accidents, causes and prevention; and butane and propane gases.

Federal Fire Council.—Fire-hazard surveys were made of municipal hospitals, and penal, correctional, and welfare institutions in the District of Columbia. The Manual of Fire Loss Prevention was prepared for publication.

American Standards Association.—Under arrangements with this association, the valuable work of the building and plumbing code committees, which was drastically curtailed through lack of funds, will be continued with the cooperation of the Bureau under the procedure of this association. Work relating to safety codes has been effectively carried on under American Standards Association procedure for many years. The rapidly growing interest in commercial standards, developed by mutual agreement of manufacturers, distributors, and consumers will be supported both by the association and this Bureau, using a similar procedure, with each organization

responsible for the projects assigned to it. To facilitate this work, three members of the American Standards Association staff are now located at the Bureau.

Federal Specifications Board.—This Board, of which the Director of the National Bureau of Standards is ex-officio chairman, has promulgated a total of 879 standard purchase specifications for the use of Federal departments and agencies.

ELECTRICITY

Measurement of electrical units.—Substantial progress has been made in determining the absolute values of the electrical units, and a paper on the determination of the ampere has been published. The measurements so far made give as the most probable value:

1 N. B. S. international ampere=0.999928 absolute ampere.

A large number of measurements have been made to determine the absolute value of the N. B. S. ohm; the data obtained have not yet been completely analyzed, but the result indicated is 1 N. B. S. ohm=1.00046 absolute ohms.

Standards of electrical resistance.—An investigation has been made of alloys of gold and chromium and of gold, chromium, and cobalt, which give exceptional promise for use in high-valued standards of resistance. The eighteen 1-ohm manganin coils of improved design constructed last year for international comparisons have apparently maintained their values well within one part in a million.

Standards of electromotive force.—The Bureau's Weston normal cells of improved construction have justified the expectation of better performance as regards constancy and portability A small group of cells representing the Bureau's primary standard of electromotive force was prepared for the International Bureau of Weights and Measures at Sevres. An analysis of records for the past 14 years having indicated a slight decrease in electromotive force of the Bureau's primary reference group, a correction amounting to five-millionths of a volt was made September 19, 1933.

Magnetic testing and research.—A method for precise comparison of mutual inductors used as standards in magnetic testing was developed. Two methods for testing at low inductions with alternating currents were investigated and the conditions necessary for obtaining reproducible results were determined. A thermomagnetic investigation on the effect of prolonged tempering at 100° C and of aging at room temperature of a quenched high-carbon steel was completed.

Various arrangements of coils for producing a uniform magnetic field throughout a long cylindrical volume, such as that traversed by the beam of a cathode-ray oscillograph, have been studied theoretically and the results confirmed by experiment.

Photometry and illumination.—More than 2,500,000 incandescent lamps were inspected and nearly 4,000 lamps were life-tested for Federal departments. Over 300 standardized lamps were supplied to State university laboratories and lamp makers. Special groups of standard lamps were calibrated for comparison with those of the National Physical Laboratory of Great Britian and the Electrotechnical Laboratory of Japan. An exhaustive investigation was made of colored glasses for airplane signal lights for the Navy Department;

and tests were carried out on airway beacons using different lamps, cover glasses, and auxiliary reflectors, for the Bureau of Air Commerce, Department of Commerce.

Battery research.—In cooperation with the Navy Department experimental batteries were constructed and operated to test (1) various alloys as materials for grids of positive plates; (2) theories of capacity in relation to plate thickness; (3) change in electromotive force with changing acid concentration and temperature. Measurements of the quantity of acid consumed per Faraday during discharge gave results agreeing with the theoretical value to within 0.1 percent. Determinations of the resistivity of sulphuric acid solutions between +30° and −40° C were completed. Operating characteristics of several types of batteries on flashing lights are being studied for the Bureau of Lighthouses.

Standards of radio frequency.—The reliability of the primary standard was increased by improving the voltage regulation and other elements of control. A number of different low frequencies of extreme accuracy were derived from this standard for use in various Bureau projects. A start was made on the transmission by radio of 10,000-kilocycle signals in addition to the 5,000-kilocycle transmissions now maintained. This standard frequency service is widely used throughout the United States to control broadcast frequencies. The service has also been reported as available at times in Alaska, the Canal Zone, and Hawaii.

Transmission of radio waves.—An experimental study was made of the transmission utility of the frequencies used for broadcasting. The laws were determined for the varying propagation of these waves from day to night, and summer to winter, for different distances and frequencies. The effects of ground waves and sky waves were determined. The sky waves were found to play a far more important role in distant daytime reception than previously supposed. Measurements were made throughout the year on the height and ionization of the conducting layers in the upper atmosphere which are responsible for long-distance radio transmission. The results constitute the most complete body of data in existence on this subject. From it were deduced the roles played by reflection and refraction, the relative effects of ultraviolet light, electrons, and heavy ions.

Telephone engineering service.—Numerous telephone service surveys were made for the Procurement Division of the Treasury Department to determine where economies could be effected in new and remodeled Federal buildings. At the request of the Bureau of Prisons, Department of Justice, detailed specifications were prepared for interior telephone systems, with superposed fire alarm, watch, and other special features.

Safety codes.—A 1934 edition of the electrical code combining accident-prevention and fire-prevention features was prepared for the State of Oregon. Assistance was given in revising the electrical codes of New Jersey and Wisconsin. Work has continued on revision of safety codes for elevators, for paper and pulp mills, for head, eye, and lung protection, and on accident statistics.

Corrosion of pipe lines.—Tentative formulas have been developed to represent the relation between maximum depth of pitting by corrosion and the length of exposure in different soils, as well as the

relation which depth of pits found in sample pipe have to the maximum penetration to be expected on pipe lines in similar soil. The role of soil acidity in underground corrosion has been determined. About 3,000 specimens of ferrous and nonferrous pipe materials and pipe coatings have been removed from 64 test sites for laboratory examination. Nine papers dealing with soil corrosion have been published in outside periodicals and one in the Bureau's Journal of Research.

WEIGHTS AND MEASURES

Theodolite circles.—Seventeen precision theodolite circles were successfully constructed and calibrated for the United States Coast and Geodetic Survey. These circles have no errors in excess of 2 seconds of arc, and the average error of graduation is less than 1 second of arc. They are reported to be more accurate than those formerly in use, which were graduated abroad.

Standardization of geodetic tapes and wires.—Four 24-meter invar wires belonging to the International Bureau of Weights and Measures were measured. These wires are being sent to national standardizing laboratories to enable the cooperating countries to arrive at a common basis for geodetic measurements, and have also been measured in France, England, Canada, and Germany. The results so far obtained in the various laboratories are in very satisfactory agreement.

Supplementary petroleum-oil tables.—During the past 10 years practically all calculations of temperature-volume corrections for petroleum oils sold in the United States have been based on the tables contained in Bureau of Standards Circular No. 154 and its supplement. To meet the need that has developed for a wider density range than that covered by the original tables, two new group coefficients have been added—one for very heavy and one for very light oils. The supplement has been revised and will be reissued after a review by the Bureau of Mines, American Petroleum Institute, and the American Society for Testing Materials.

Test of master tapes.—The many Civil Works Administration State surveying projects carried out under the direction of the United States Coast and Geodetic Survey required the testing of a large number of steel tapes to serve as masters. These were tested and certified by the Bureau.

Watches.—The investigation of the comparative performance of watches having the usual cut bimetallic balance wheels and steel hairsprings and those having uncut monometallic balance wheels and elinvar hairsprings was completed. The new assembly produces increased uniformity of rate over the temperature range to which a watch is ordinarily subjected, and practically eliminates the effects of magnetism. No marked difference was found in the susceptibility to position or isochronism adjustment.

Volumetric apparatus and hydrometers.—More than 10,000 pieces of glass volumetric apparatus and hydrometers were tested during the year. Nearly 95 percent of this apparatus met the test requirements fully. With the exception of dilution pipettes for haemacytometers, practically all of this apparatus was made in the United

States and is much superior to that received a few years ago when much of it was imported.

Thermal expansion.—Data have been obtained on the thermal expansion of single crystals of antimony, with various orientations, and an investigation of the thermal expansion of copper-beryllium alloys is now under way. Papers on the thermal expansion of columbium, thorium, and bearing bronzes were published, and a paper on graphite and carbon is now in press.

Cooperative dental research.—Good progress was made in determining the physical properties of dental materials and in the development of purchase specifications for such materials. In this work the Bureau has had the full cooperation of two research associates assigned to the Bureau by the American Dental Association, as well as a representative of the Bureau of Medicine and Surgery, United States Navy.

Special attention has been given to dental cements, vulcanites, and vulcanite substitutes, and to the development of an accelerated tarnish test for dental alloys of low precious-metal content; also to the development and standardization of testing equipment for dental materials. A group of about 150 practicing dentists, scattered throughout the country, are cooperating with the Bureau and the American Dental Association in this work.

Identification.—Work on questioned documents, bullets, and firearms, in cooperation with the Division of Investigation, Department of Justice, and with certain other Federal agencies has been continued. Assistance was given in cases involving extortion, kidnaping, theft of money orders, raised checks, forgeries, stolen securities, false contract, threatening letters, etc.

Certification of limit gages.—There was an increase of about 45 percent over the previous year in the number of gages, micrometers, polariscope tubes, and penetration needles submitted for test and certification.

Test methods.—An improved method of measuring the thread angle of small tapered ring gages by the use of copper amalgam was developed, and improvements were made in the interferometer used in the measurement of gage blocks by the use of krypton as a light source.

Cooperative orifice-meter tests.—The joint committee on orifice coefficients of the American Gas Association and the American Society of Mechanical Engineers will use equations proposed and developed by this Bureau as a basis for preparing new orifice-coefficient tables for use in commercial measurements of water, steam, and gases. The equations represent the results of extended tests and measurements in which the Bureau has participated.

Scales.—Each of the 19 master railway-track scales in the United States was tested during the year, 1 of these being tested twice. In the case of 8 scales, no adjustments or other modifications were necessary, the weighing performance being within the adjustment tolerances of approximately 0.01 percent. All scales were found to be within the maintenance tolerances of approximately 0.02 percent. The numerical mean of the maximum percent errors on final test is approximately 0.006 percent.

There were also tested 1,309 commercial-track scales located on 111 railroad lines in 36 States, and the District of Columbia, the

largest number ever tested by the Bureau in a year. The percentage of scales found correct was 77.9, this figure being 2.7 percent lower than last year. This is the first year since 1922 that this figure has failed to show an increase over the figure for the preceding year. The percentage of railroad-owned scales found correct increased, but the figure for industry-owned scales fell off sharply. The average error of all scales was 0.17 percent. Corrective adjustments were made on 83 scales, the average error on these scales being thus reduced from 0.28 to 0.08 percent.

Sixty railway-track-scale test-weight cars were standardized on the Bureau master track scale at Clearing, Ill. In addition, 45 test-weight cars were weighed in the field in connection with the operation of the Bureau's testing equipments.

On account of decreased appropriations mine scales were tested only on urgent request. Thirty out of forty-eight scales of this class tested, or 62.5 percent, were found to be correct within the prescribed tolerance of 0.4 percent. Also an inspector was assigned to the State of Kentucky for the training of State inspectors in charge of two mine-scale equipments which the State was putting into service.

HEAT AND POWER

Effects of aging on clinical thermometers.—Several gross of freshly manufactured clinical thermometers have been received through the courtesy of two of the larger manufacturers for use in tracing the changes which may occur in the properties of these instruments with time, starting from the day of manufacture.

Scale of color temperature.—An absolute scale of color temperature, based on the color of radiation from black bodies immersed in freezing platinum, rhodium, and iridium, has been established and is now in use.

Freezing point of rhodium.—The temperature of freezing rhodium, in vacuo, has been determined as 1,966° C. with an accuracy of ±3° C.

Photometric standards for tungsten lamps.—A method has been devised and applied to practice of deriving tungsten filament photometric standards from the basic carbon-filament standards.

Properties of steam.—The experimental part of the work on properties of saturated water and steam was virtually completed. This consisted of measurements of vapor pressure and calorimetric measurements which, together, suffice to determine all the quantities given in a steam table under the heading "Properties of saturated steam."

Saturated vapors.—An empirical formula of wide generality has been developed, which expresses specific volume in terms of the vapor pressure and the specific volume of the liquid. Two empirical constants are involved, one of which is the same for all substances examined, while the other varies but little for different substances.

Heats of combustion.—A complete redetermination of the heats of combustion of two lots of benzoic acid gave results in agreement within 0.01 percent and in agreement with the most reliable of other determinations within a few hundredths of 1 percent. Determinations of the heat of combustion of rubber and of rubber-sulphur

compounds were of sufficient accuracy to lead to reliable values for the heat of combination of rubber and sulphur.

Temperature control.—The method of temperature control used for radio-frequency standards has been adapted for use in two bridges for resistance thermometry and for controlling the temperature of standard cells. The results are better than previously obtained with oil baths, and the new equipment is much simpler and cleaner and has the additional advantage that the constant temperature is maintained continuously.

Thermal conductivities of metals.—Apparatus and methods have been devised for the rapid and moderately accurate determination of the thermal conductivity of metals.

Air cleaners.—Through the cooperation of several divisions of the Bureau, a satisfactory method of testing the efficiency of air-cleaning devices for buildings has been developed and applied to the rating of such devices for Federal purchases.

Low-temperature thermometry.—Progress was made in the setting up of a temperature scale for the range −259° to −190° C. The construction and assembling of the helium-gas thermometer, to be used as a primary standard, is nearly completed. Platinum-resistance thermometers and hydrogen-vapor-pressure thermometers, which are to be used as standards for the calibration of other thermometers, are being investigated for their reliability.

Vapor pressure of heavy hydrogen.—The vapor pressures of solid and liquid deuterium were measured. From these data its freezing and boiling points and its latent heats were deduced.

Fire resistance.—Structural steel columns encased in gypsum 2 to 3 inches thick supported working loads for 2½ to 7 hours in the standard furnace test, whereas failure occurred within ½ hour without fire protective coverings. A comprehensive series of tests with rolled shapes and round bars at temperatures up to 945° C. was completed, the slenderness ratio (l/r) for the bars being in the range 20 to 150.

Cigarettes as fire causes.—Tests made under carefully controlled conditions with lighted cigarettes on grass and forest floor materials show that the fire hazard is greatly decreased when a cigarette paper tip ¾ to 1 inch long is applied in course of manufacture over the end that is discarded.

Phenomena of combustion.—The spatial speed of flame in mixtures of carbon monoxide, oxygen, and water vapor was measured at constant volume over a wide range of concentrations. The bubble method has been satisfactorily refined and is now being used to measure flame speeds.

Psychrometric charts.—Charts for the rapid and precise evaluation of humidity from psychrometric observations were issued early in the year. This publication will be supplemented shortly by psychrometric charts for high and low pressures which cover the ranges of temperature, pressure, and humidity over which the psychrometer can be used to advantage.

Detonation rating of aviation fuels.—To ascertain whether the test method adopted for finding the octane numbers of motor fuels is directly applicable to aviation fuels, the Bureau and several cooperating engine manufacturers are comparing the performance of typical aviation fuels in full-scale aircraft engines.

Carburetor icing.—A study has been made of the influence of fuel volatility and atmospheric conditions on the formation of ice in aircraft engine carburetors. The results can be used to predict the danger zone for any particular engine and fuel.

Lubricants for use at extreme pressure.—A testing machine and test procedure devised during the previous year have both been revised and perfected to a point where reliable tests can be made to determine the limiting gear tooth pressure under which various lubricants will prevent abrasion and scoring of the metal surfaces.

Vapor lock.—A study was completed of conditions under which fuels vaporize in the automotive fuel feed system and interfere with engine operation. The results point the way to practical solutions of this difficulty.

OPTICS

Standard wave lengths.—Interference measurements in the first spectra of the noble gases have been repeated and extended. Most of the lines have been found reproducible to one part in 50 million and consequently can be recommended as standards for spectroscopic and metrological measurements.

End gages.—The Bureau has finished a number of fused quartz decimeter end gages with ends plane, parallel, and correct in length to within one part in 2 million. For purposes of international standardization of length measurements, these gages will be measured by means of standard wave lengths of light, then two each will be sent to the leading national standardizing laboratories for similar measurement.

Spectrum analysis.—To develop spectrographic methods of making quantitative chemical analyses, the partial spectra of various prepared mixtures have been studied. New descriptions of spectra have been completed for columbium and tantalum, and the ultraviolet spectra of iron and chromium have been remeasured. Analyses of spectral structures have been completed for the second spectrum of hafnium, and extended for the first two spectra of columbium and chromium.

Ultraviolet radiometry.—An instrument consisting of a balanced vacuum tube amplifier and a special ultraviolet sensitive photoelectric cell was developed for determining the solar spectral energy curve in the wave-length range below 3,200 angstroms.

Photometer for diffusing media.—Equipment has been developed by which the reflective and transmissive properties of diffusing media may be measured. It provides for measurement at any desired angle of view, with illumination unidirectional or completely diffused, and either homogeneous or heterogeneous in wave length.

Measurement of opacity.—Sources of error in the measurement of opacity of thin samples, such as paper, by the contrast-ratio method, have been investigated both theoretically and experimentally. Opal glass standards of opacity have been developed for checking meters for the opacity of paper.

Lens testing.—All lenses for airplane mapping used by the Army and Navy or on Government projects must be rigorously tested by the Bureau. More than 100 were tested for distortion and other properties on an apparatus especially designed and constructed for the purpose.

Photographic sensitometry.—Results of a study of the international standard sensitometric developer p-aminophenol (for negative materials) were published.

Radium and radioactive materials.—Nearly 1,700 radioactive preparations, having a radium content of about 16 grams and market value of $1,000,000, were tested during the year. An instrument consisting of a portable ionization chamber with vacuum tube amplifier was developed for locating lost radium preparations. A continuously visible indication as the chamber nears the preparation makes this instrument both more accurate and more rapid than equipment available heretofore.

X-rays.—A method was successfully developed for specifying the quality of radiation furnished by the various types of X-ray excitation potentials used in therapeutic work. This specification is based on the complete copper (or aluminum) absorption curve of the radiation and is expressed by the equivalent constant excitation potential and the equivalent initial filtration. Agreement was reached between the X-ray standardizing laboratories of England, France, Germany, and this country, establishing the same standardizing procedure in connection with X-ray measurements used by the medical profession.

Gaging equipment.—On request of the Secretary of the Treasury, a preliminary survey was made of the gaging equipment in use in the United States Customs Service for the determination of the volume of imported liquid products, such as molasses, sirups, distilled spirits, wines, etc.

Polarization of raw sugars.—A study of the errors in the testing of raw sugars and allied products due to clarification with basic lead acetate has been conducted. Tentative specifications have been devised for the dry basic lead acetate reagent. Several hundred comparative analyses were made on different raw sugars, using different basic lead acetates as clarifiers.

Sugar colorimetry.—A simple apparatus for the measurement of color in sugar solutions has been developed, which consists of a Duboscq colorimeter, a set of three glass plates calibrated in terms of transmission for definite wave lengths to serve as photometric standards, special color filters, and an ordinary incandescent source.

Preparation of xylose.—Several hundred pounds of xylose residues were purified in the levulose plant, by treatment with basic lead acetate, yielding nearly 200 pounds of an excellent grade of xylose.

Photochemical changes in window glasses.—Exposure of soda-lime-silica glasses to light was found to lower or raise, as the case may be, the transmission of the glass to an equilibrium value which varies with the wave length of the irradiating energy.

Standards for index of refraction.—Considering a period covered by the last 75 years, a statistical correlation has been found between published refractivities of dry air (under standard conditions) and solar activity as evidenced by sun-spot numbers. This indicates the existence of small periodic variations in the refractive index of air where previously a high degree of uniformity has been assumed in correcting standard wave lengths measured in air to vacuum values.

Expansivity of glass.—The expansivity of certain borosilicate glasses is found to depend on the temperature of the annealing treat-

ment. Similar tests on some other glasses in common use, but not belonging to the borosilicate group, have not disclosed comparable effects of heat treatment on the expansivity.

CHEMISTRY

Isotopic fractionation of water.—A preferential selection of the heavier isotope of hydrogen has been found to occur during the synthesis of organic compounds by a growing willow tree. Slight differences in isotopic composition of samples of water from the Dead Sea, Great Salt Lake, the ocean, and the water of crystallization of native borax have been detected by precise measurements of densities. Upon electrolysis of water, the isotopes of oxygen as well as hydrogen have been shown to fractionate.

Thermochemistry.—Accurate measurement has been made of the heats of combustion of ethane, propane, normal butane, and normal pentane. The new values are from 0.85 to 1.26 percent higher than what have been the usually accepted "best" values for these thermochemical constants. Tables of the heats of formation and of combustion of all the normal aliphatic hydrocarbons and alcohols have been compiled. A simple calorimeter for measuring heats of fusion was developed and used to obtain data on some liquid hydrocarbons. Contributions to the subject of the energies of the atomic linkages in the normal paraffin hydrocarbons and alcohols have been made.

Constituents of petroleum.—Additional hydrocarbons have been isolated from the naphtha fraction of petroleum and work has been started on the lubricating oil fraction.

Rubber hydrocarbon.—The investigation on rubber hydrocarbon was continued, and important results were obtained. Prof. George L. Clark, University of Illinois, collaborated by making X-ray studies of unvulcanized and vulcanized samples prepared here. The stress-strain relations of sol, gel, and total rubber, vulcanized, in different ways, were determined.

Gas cell materials.—Work was continued for the Navy Department on materials for making the gas cells of air-ships. One type of material that can be made in any desired quantity appears very promising.

Platinum metals.—The development of an accurate method for the separation of ruthenium from the remaining metals marked the completion of the group of analytical methods which permit the strictly quantitative separation of any two of the six metals of the platinum group.

Coatings on steel.—This Bureau cooperated with the American Electroplaters' Society and the American Society for Testing Materials in exposure tests and laboratory studies of chromium-plated steel. The results of 2 years' exposure show that the thickness of the nickel and copper base coatings is the most important factor. A base coat at least 0.001 inch thick is desirable for outdoor exposure. A layer of copper in the base coat is detrimental in thin coatings but not in thicker coatings. The final layer of chromium improves the appearance and resistance to tarnish, but does not add much to the protection against corrosion of the steel. Cadmium coatings are inferior to zinc in a severe industrial atmosphere.

Pure metals.—A method for the purification of crude gallium has been developed, and there has been prepared a quantity of gallium

containing as the only impurities spectrographic traces of calcium, magnesium, and iron.

Standards for gas service.—The preparation of the new circular on standards for gas service was completed. The circular is intended as a guide to good practice in the fuel-gas industry and as a source of technical information to public officials and others.

Gas appliance attachments.—A Bureau circular, entitled "Cautions Regarding Gas Appliance Attachments", was published in an abbreviated form in one of the household journals and has aroused unusual popular interest.

Gas analysis.—Research on methods of gas analysis has included a quantitative study of numerous sources of error which affect the usual methods of analysis, a comparison of several methods of combustion employed in analytical work, and the development of improved apparatus for the determination of dissolved gas.

Asphalt roofing materials.—A method of quantitative determination of entrapped air in bituminous products has been developed. The "degree of fineness factor" (ratio of bulking weight and specific gravity) indicates the bahavior of mineral fillers for asphalt. The oil absorption is proportional to the fineness factor. It has been discovered that asphalts on exposure to light develop water-soluble (hygroscopic) products.

Methods of analysis.—Rapid methods have been developed for the determination of aluminum, alkaline earths, and alkalies in feldspars that are graded under Commercial Standard CS 23–30. In the chemical requirements for certain nonferrous metals, Federal specifications state that the amount of aluminum shall be "none." For the testing of such materials there has been developed a method whereby as little as 0.0001 percent of aluminum can be detected or determined.

Testing.—The chemical testing of a great variety of materials for various branches of the Government has been unusually heavy. In connection with the testing of paints, investigations have been made to improve various paints, for example, international orange paint for airways and white traffic paint for highways. Work has been continued on accelerated weathering tests and physical tests of various types of paints. Whenever possible this type of testing has been substituted for composition requirements.

Analytical reagent chemicals.—The cooperative work with the American Chemical Society was continued. It involved, as usual, the critical study of many methods for estimating small amounts of impurities in analytical reagent chemicals. Outstanding projects were: Development of a method for determining small amounts of water in ether, revision in all published specifications of the test for nitrates, revision of the test for iron in phosphoric acid and phosphate salts.

MECHANICS AND SOUND

Testing instruments and appliances.—Approximately 850 engineering instruments were calibrated during the past year. Tests were made for the Treasury Department to develop beer-metering instruments of suitable accuracy for revenue-collection purposes. Performance tests were made of a number of types of thermostatic valves for use in heating installations in Government buildings. Ap-

proximately 100 items of fire-extinguishing equipment, ranging from hand extinguishers to complete systems, were investigated and tested for the Government departments, principally for the Bureau of Navigation and Steamboat Inspection as a basis for approval for use on vessels. The investigation of the accuracy and reliability of automatic postage metering devices for the Post Office Department was continued through the present fiscal year; 21 tests of this nature were made.

Acoustic properties of building materials.—The services of the Bureau are continually in requisition by other departments of the Government which have building work on hand, notably in the construction of new Federal courthouses. Public interest in the reduction of noise continues and advice and tests of material for this purpose are frequently requested.

Absolute measurement of sound intensity.—Work of this character is required as a basis for the measurement of the acoustic properties of building materials and in the calibration of microphones and loudspeakers for public-address systems and sound pictures. It is to be regretted that this work must be suspended for the ensuing year for financial reasons.

Absolute determination of gravity at Washington.—This project was undertaken at the request of the Coast and Geodetic Survey, but the result will be useful also to the Bureau in all problems involving absolute force measurements, such as the determination of the ampere in absolute measure. Reversible pendulums of fused silica, carrying parallel planes, are being used in these measurements.

Aircraft-instrument developments.—A vibrometer for measuring the amplitude of vibration of the instrument panel on aircraft, an oil-quantity gage of the pneumatic type, an angle-of-attack indicator for the U. S. S. *Macon*, a control-stick force indicator, a superheat meter of the resistance type, and five electrical-resistance thermometers were designed and constructed for the Bureau of Aeronautics of the Navy Department. Chapters on altimeters and air-speed indicators were prepared for the Navy Instrument Handbook. Considerable progress was made in investigations on the performance of directional gyroscopes, magnetic compasses, and lubricants for fine mechanisms. A report on the measurement of altitude in blind flying has been completed for the National Advisory Committee for Aeronautics.

Mercurial barometer.—A Fuess mercurial barometer has been modified so that the vacuum above the mercury column can be both controlled and measured. The barometer is for use as a standard in measuring atmospheric pressure.

Vibrations of aircraft propellers.—This investigation has been continued using new equipment for producing vibrations. Computed and measured stresses show good agreement. Failures produced in propellers on the apparatus check with these stresses. Preliminary ground tests of an instrument designed to detect dangerous vibrations of propellers during flight have been made in cooperation with the National Advisory Committee for Aeronautics. A description of the instrument was published in the Journal of Research.

Measurement of turbulence.—Work has been continued on the development of portable equipment. Two possibilities are being inves-

tigated: (1) Portable hot wire apparatus; and (2) pressure drop measurements on a sphere calibrated by means of the present apparatus.

Computation of air flow.—Two papers dealing with theoretical computation of boundary layer air flow have been prepared for publication as Technical Reports of the National Advisory Committee for Aeronautics.

Aerodynamical characteristics of automobiles.—Papers concerning this subject have been published in the Journal of Research and the Journal of the Society of Automotive Engineers.

Optical strain gage.—These gages mounted on vibrating airplane propellers are subjected to such large inertial forces that the elastic strain of the gages is not negligible, necessitating a double set of readings to determine the strain in the propeller. Special lightweight gages and rigid knife-edges have reduced this effect so that in most cases it is negligible and only one reading is now necessary.

Flat steel-plate floor.—In cooperation with the American Institute of Steel Construction, a flat steel-plate floor of 18 feet span was tested to determine its strength and whether it behaved as a unit under load. The floor was built of 4-inch steel I-beams and steel plates, 24 inches wide and ¼-inch thick, with continuous manual welds joining the plates to the I-beams. The measured stresses and the measured deflections were in substantial agreement with values computed by the ordinary theory of beams. The results have been published in the Journal of Research.

Miscellaneous testing.—Specimens of diverse structural parts submitted by the Bureau of Aeronautics of the Navy, for chemical, metallurgical, and mechanical tests during the past year have included: Engine mounts, cylinder heads, bomb racks, stabilizer spars, wire ropes for arresting gear, tie rods and tie-rod terminals, anchor bolts, welded joints, and numerous specimens of sheet and tube. Tests of construction materials were also made for the Treasury Department, Post Office Department, War Department, the Panama Canal, and the Highway Laboratory of the District of Columbia.

National Hydraulic Laboratory.—This laboratory is now in active operation, with seven problems under investigation. These are: Physics of plumbing systems, conducted for the subcommittee on plumbing of the United States Department of Commerce; pressure losses at pipe bends, for the United States Bureau of Reclamation; relative scouring effects of clear and muddy water on a river bed of fine sand, for the United States Bureau of Reclamation; two projects on the transportation of sediment by flowing water, for the United States Geological Survey and the United States Corps of Engineers; a study of divisors for measuring the run-off and eroded soil from agricultural test plots, for the Soil Erosion Service of the United States Department of the Interior. An investigation of the characteristics of deep-well current meters has been completed for the United States Geological Survey.

Three reports on current hydraulic research and a report describing the hydraulic laboratories in the United States have been prepared and have had wide distribution among the interested services of the Federal and State Governments and the hydraulic laboratories in the United States and abroad.

ORGANIC AND FIBROUS MATERIALS

Wool textiles.—Quantitative data on the system wool-sulphuric acid-water under conditions similar to those in the soaking, drying, and baking of wool in the carbonization process were obtained in cooperation with the American Association of Textile Chemists and Colorists and the Textile Foundation, Inc. These data provide the industry with a basis for the effective study of mill problems relating to this process. During this work a new method for determining the action of various chemicals upon wool was developed.

Woven fabric underwear.—The dimensions of woven fabric underwear were studied in cooperation with the Underwear Institute. Based on this work, the institute adopted standard minimum measurements for men's, boys', and children's woven fabric underwear which were then incorporated in the code for this industry.

Hosiery.—The Bureau has cooperated with the General Federation of Women's Clubs and with the National Association of Hosiery Manufacturers in the development of standards for hosiery. A specification based upon the use of a testing machine designed by the Bureau was adopted tentatively by the federation.

Carpets.—Wear of carpets of known constructions with and without underlays was studied with the aid of the carpet wear-testing machine developed at the Bureau. The durability of a carpet was found to be materially increased by increase in density or height of pile and by the use of underlays.

Standardization of papers.—In order to secure better register of successive color prints in lithographic printing, another series of commercial experimental printings was made. The papers printed were made by four different manufacturers according to specifications developed from previous printings and laboratory tests. Excellent register was obtained with the standardized papers.

Specifications were developed for Braille paper to be used in Library of Congress publications for the blind. The quality standards were established by laboratory tests of commercial papers, printing of experimental papers, and test readings of the prints by blind readers.

Tests of redeemed paper currency showed that bills containing an increased amount of cotton fiber had satisfactory wearing quality. This confirmed a previous finding based on experimental paper made in the Bureau's mill.

Paper-making materials.—A series of papers was made in the Bureau's mill in a study of the influence of sizing materials and paper-making operations on the stability of papers made from the various grades of rag fibers. As found with other fibers, the stability of the papers was proportional to the purity of the fibers and the amount of acid present. Study of the use of starch from sweet-potato culls, a waste product, for beater sizing paper indicated that for this purpose it is equal to the best commercial starches from other materials.

Measuring the pH of leather.—A method was developed for determining the pH of leathers by measuring the pH of water extracts. Effects of time of soaking, amount of sample used, temperature, grease content, method of preparing sample, and filtering the

extract were studied. Comparisons made with the hydrogen and glass electrodes showed the latter to be more satisfactory from the viewpoint of speed and reliability of results. A single pH measurement by this method is considered to give a satisfactory measure of the harmful acidity in sole leather.

Structure of collagen.—The equivalent weight of collagen, as determined in dilute acid solutions, is not a true equivalent weight. In hydrochloric-acid solutions above about 0.2 N concentration, a definite amount of acid reacts with the strongly basic nitrogen groups and a varying amount with the less basic groups.

Floor coverings.—During the past year a specification for asphalt tile has been prepared and put into use. A definite relation between time and depth of indentation where a load acts upon a sphere pressing into the test specimen was discovered. The two constants in the equation representing this relation give important information about the properties of plastic materials.

Kraft and soda pulp from cornstalks.—Considerable work has been done on this project on a semicommercial scale and fair grades of paper have been made in the Bureau's paper mill.

Sweetpotato-starch sizing for textiles.—An article has been published on this sizing and its properties. Its suitability for yarns and fabrics is under study in a semicommercial textile mill at Auburn, Ala.

Furfural derivatives.—Furfural and derivatives are made from farm wastes. They can be analyzed quantitatively and rapidly by a bromine method described in two published articles.

Uses for xylose sugar from farm wastes.—Samples of purified xylose have been sent to industrial and medical laboratories. Although incomplete, the work so far shows no injurious effects arising from xylose eaten by diabetics.

Measurement of ionization constants of organic acids from farm wastes.—An article has been prepared describing the methods, equipment, equations, and data for calculating the ionization constants of malonic acid. A special constant-temperature room with electric shielding has been built for accurate e. m. f. and conductivity measurements. A spectrophotometer has been suitably arranged for such pH measurements with indicators by a member of the Bureau of Plant Industry in cooperation with this Bureau.

Thermodynamics of rubber.—Measurements of change of volume with temperature indicate that unvulcanized rubber may exist in at least four forms, and vulcanized rubber in at least two forms. The results of the investigation have been correlated with measurements of the heat capacity and the electrical properties of rubber, and also with its behavior on stretching.

Rubber stretching.—Measurements of the change of volume of rubber on stretching indicate that this change is not instantaneous but that it is an exponential function of the time. Under some circumstances the volume of stretched rubber may decrease as much as 2 or 3 percent and may require several hours or days to become practically constant.

METALLURGY

Under-water corrosion of iron.—Factors affecting the reproducibility of laboratory tests—that is, velocity of flow, surface oxide films, etc.—have been studied and a preliminary report published. Large-scale tests are in progress on various ferrous materials in pipe form.

Weathering of light structural alloys.—Results of 5 years' atmospheric exposure of aluminum alloys, plain and coated, in tropical marine, northern marine, and inland locations have been published. Similar tests of magnesium alloys have been completed. Exposure tests of all recently developed aluminum alloys are under way.

Anodic treatment of aluminum.—Processes for protecting aluminum alloys by anodic oxidation have been studied and several new ones developed. Means for increasing the useful life of solutions now used in such processes have been studied.

Spring materials.—In cooperation with American Society of Mechanical Engineers and Engineering Foundation a comprehensive résumé of spring materials has been under way during the year. In addition to the intrinsic properties of the materials, factors which influence their usefulness as springs are considered.

Copper-base nonferrous ingot metals.—The cooperative study with the Non-Ferrous Ingot Metals Institute has continued with the ultimate aim of establishing a basic classification of these materials for specifications. Very comprehensive foundry studies were carried out on red brass (85 Cu, 5 Pb, 5 Zn, 5 Sn) to establish the effect of impurities, remelting, and other foundry variables which influence the metal.

Wear-resistance of metals.—Study of the wear-resistance of steel has continued and a report was issued on the influence of surface oxide films. In an atmosphere free from oxygen, the rate of wearing, in metal-to-metal contact, was often very high. The presence of a surface oxide film often decreased the rate of wear decidedly although this was related to the character of the steel as determined by heat-treatment received.

Quality of carbon tool steels.—These steels of the same nominal composition often differ decidedly in quality, "body", or "timbre." A study of the underlying reasons has been concerned chiefly with the correlation of critical quenching rates, depth of hardening, and grain size at the instant of quenching to the critical rate.

Creep of metals.—Observation has been continued on pure silver single-crystal bars maintained at 400° C. for the greater part of the year. The data clearly show the influence of crystalline orientation and loading method on creep rate. Some study of the effect of low temperatures has been carried out.

Engineering uses for silver.—With the cooperation and financial support of American silver producers, a survey has been started of potential industrial applications of silver in addition to well-established ones.

Phosphorus and sulphur in steel.—Cooperative work with a joint research committee of technical organizations has continued and two

reports have been published: Effect of Phosphorus on Low Carbon Steel and Effect of Sulphur on Forging Steels.

Rail steel.—Tensile tests covering the range 20° to 600° C. have corroborated previous indications that "secondary brittleness" in rail steel appears at somewhat lower temperatures with very slow loading rates. Study has been made of the difference in residual internal stresses in rails according to the rate of cooling.

Wire for bridge cables.—Static tensile loading of heat-treated wire and of cold-drawn wire looped over a curved support has shown that cold-drawn wire assumes the curvature of the support more quickly and more closely than heat-treated wire, a fact in agreement with previous laboratory tests. Fluctuating tensile loading of similar specimens has shown cold-drawn wire to have distinctly higher endurance. The smoother unpitted surface of cold-drawn wire, demonstrated metallographically, evidently is closely related to this difference.

Welding of steel.—In connection with the wide use of welding in naval construction, extended metallographic studies have been made of structural changes resulting from welding various kinds of steels.

Gases in metals.—The increasing industrial importance of this subject prompted cooperative study with the American Institute of Mining and Metallurgical Engineers to determine the accuracy of oxygen determinations on steel. About 30 laboratories, domestic and foreign, are cooperating in the analysis of eight chosen heats of steel. Agreement on methods of oxygen determination is essential before progress can be made as to its real significance in steel.

Pure iron.—Small ingots of iron of unusually high purity have been prepared by a method developed at the Bureau. A treatise on the properties of *pure* iron based on existing technical literature (over 1,000 technical articles) is nearly complete.

Foundry molding sands.—On the basis of testing methods for evaluating molding sands developed at the Bureau, purchase specifications for 13 molding sands were prepared for the Washington Naval Gun Factory. Much study was devoted to developing a suitable method for determining the clay substance, or bond, in molding sands.

Castability of aluminum.—The factors affecting the castability or the running properties in a sand mold of molten aluminum were the subject of much study. Under proper foundry conditions, temperature appears the most potent factor, although some difference between grades of aluminum was observed.

High-strength cast iron.—A report is now available showing the magnitude of the beneficial effect of superheating prior to casting of certain grades of iron. At the request of American Foundrymen's Association and American Society for Testing Materials, study is being devoted to the casting of a more satisfactory arbitration bar, for cast iron.

Preece test for zinc coatings.—A study was completed on this widely misused test for galvanized steel. Conditions responsible for misleading results have been clarified and the necessary precautions in testing set forth in the published report.

CLAY AND SILICATE PRODUCTS

Effect of particle size in whiteware.—A completed study of variations in particle size of flint and feldspar points to the possibility of vitrifying commercial ceramic ware without the use of auxiliary fluxes at temperatures significantly lower than are now required in the industry.

Physical properties of some commercial American china clays.—American kaolins were found to contain smaller amounts of fluxing constituents than the English clays, but by proper selection of domestic materials almost complete substitution was possible in the average whiteware body. Some red-burning Ohio clays were studied and found to be mixtures of clay, quartz, mica, and other minerals containing iron, lime, and magnesia. The iron compounds are responsible for the red colors when heated, and together with the lime and magnesia cause the clays to vitrify at relatively low temperatures.

Glassy phase in ceramic materials.—In the burning of clay ware glasses are produced which determine, to a large extent, the properties of the ware. Various glasses have been made at the Bureau and certain of their physical properties have been determined, so that clay ware having the characteristics desirable for any given service can be produced more readily.

Physical properties of glass.—In continuing its work on the physical properties of finished glasses, the Bureau has measured the thermal expansion of 50 experimental glasses of the soda-lime-silica series in the range from room temperature to their softening points. Equations were derived for computing the critical temperatures and softening points of these glasses.

Analysis of glass.—A new method for determining the amount of boric acid in glass was developed. It depends on the relative solubility of boric oxide in ether and in water. The method is much simpler than those in common use and is equally accurate.

Relative solubility of glass.—A method for determining the relative solubility of glass in alkaline or acid solutions is being developed. The interference of light is used to measure the amount of glass dissolved, instead of the usual loss-in-weight method. The chief advantage of the new method is that the results are independent of the area of the sample used.

Production of optical glass.—Fifty-three pots of optical glass, embracing five different kinds, were made. From a part of these 23,821 molded and annealed blanks for optical elements weighing 5,552 pounds were made for the Navy Department. An improvement in the quality of the light barium crown was made by stirring it with a water-cooled iron rod instead of the ordinary clay thimble.

Fundamental properties of cement.—The studies of the fundamental properties of cement have been continued with particular reference to the cement-water systems. The reaction of water on the anhydrous calcium silicates has been determined and work is in progress on the effect of boric oxide on the formation of portland-cement clinker.

The Calcium Chloride Association fellowship continued its studies along two lines: The effect of calcium chloride on the calcium alumi-

nates, and the effect of calcium chloride on cements and concretes during the period immediately after pouring. A paper has been published on part of this work. Special calorimeters, designed at the Bureau, have been used in testing low-heat cements for Boulder Dam and for determining the effect of both partial hydration and curing temperature on the resulting heat of hydration of cement.

A study of commercial masonry cements was undertaken because of the dearth of information on these important materials. The composition and properties of the cements were found to vary between wide limits. For example, the weight of the dry cements varied from 39.7 to 89.7 pounds per cubic foot; the strength of 28-day mortar from 5 to 3,650 pounds per square inch. It was found that absorption criteria of the mortars and the compressive strength furnished a good estimate of their durability when subjected to freezing and thawing cycles.

A study of commercial high early strength cements furnished data on: The heat generated during isothermal hardening and the effect of such hardening on compressive strength; the effect of storing during early ages at higher than room temperature on strength and volume changes; the effect of freezing and thawing cycles, and freezing, thawing, and drying cycles upon strength and volume; and the relation between physical properties and chemical composition, and physical properties and fineness of grinding.

The Bureau is trying to find if it is possible to produce by prehydration a cement having a low heat of hardening and high sulphate resistance that will be as satisfactory as the special cements now being used. The results so far indicate that this can be accomplished. It appears that any cement, regardless of its composition, can, by the introduction of 1 to 5 percent of water during grinding, be given the sought-for properties.

Studies of the Portland Cement Association Fellowship have included investigations on: (1) The heats of hydration of cements and cement compounds, (2) the chemical reactions of hydration of the cement compounds, (3) the effect of composition on the volume changes and resistance to attack of alkali waters, and (4) some effects of active silica as an admixture in portland cement. Data obtained by the Fellowship have been submitted to the committee on cement of the American Society for Testing Materials for use in preparing specifications for cements of low heats of hydration and high resistance to sulphate attack.

The cement-testing laboratory, together with the branch laboratories at Northampton, Pa., Denver, Colo., San Francisco and Riverdale, Calif., have tested approximately 5,500,000 barrels of cement for the Government, an increase of 50 percent over the previous year, the increase representing very largely cement for the Boulder Dam.

The Cement Reference Laboratory, a cooperative project of the National Bureau of Standards and the American Society for Testing Materials, completed the third tour of inspection among cement laboratories throughout the country and made substantial progress on the fourth tour. The Bureau of Public Roads continues to require the Reference Laboratory inspection of laboratories which make acceptance tests of cement for Federal aid projects. Progress has been made in the problem of standardizing the turbidimeter for

subsieve fineness tests of cement and a standard sample was prepared for use with this instrument. The laboratory cooperated with the American Society for Testing Materials cement committee in tests and studies of a proposed method for plastic mortar compression strength tests of portland cement.

Vibrated concrete.—A machine has been specially designed to aid in studying the effect of vibrating concrete into the form. It has been found that, for dry mixes, the extent of vibration that produces optimum density will in general produce the greatest strength. It has also been noted that mixes in which the mortar is approximately 1.05 times the voids in the coarse aggregate have a minimum segregation due to vibration.

Aggregates for cinder concrete building units.—The strengths of cinder concretes were found to decrease and the volume changes to increase with an increase in the amount of finely divided combustible matter in the cinders. Specimens cured for 8 hours in steam under a pressure of 125 pounds per square inch were as strong at 2 days as those aged 28 days in moist air at 70° F. unless the cinders contained large amounts of unsound particles. Volume changes of specimens steam cured were about one-half as large as those cured at normal air temperature.

Hinges.—Seven reinforced-concrete hinges of the Mesnager type, tested for the Bureau of Yards and Docks of the Navy Department, showed satisfactory strength for the intended use and resistance to flexure which could be considered as negligible. The results indicate that these hinges may be used advantageously in some types of reinforced-concrete structures, such as arches.

Brick masonry.—Mortar joints in brick masonry were found to be strongest if bricks of low absorption were set dry and those of moderate or high rates of absorption were wetted before setting. The leakage through brick masonry of water under a low head was least when the masonry was built with impermeable bricks set dry or with absorptive bricks set wet. The bond of mortar to brick usually was most complete and the leakage through the masonry usually was least with mortars of good troweling properties.

Design of brick and hollow-tile extrusion machines.—Results of the completed investigation showed that a single wing auger and 10-inch spacer in combination with a die of 3° taper resulted in maximum output of hollow tile per unit of power consumed. The maximum and minimum die lengths for production of a satisfactory tile were 6 and 4 inches, respectively.

Wear of dies for extruding plastic clay.—Determinations of the wear resistances of 21 materials used for dies gave wear-resistance coefficients varying from 3.22 for soft brass to 1.673 for a cobalt-chromium-tungsten alloy. The wear resistance of nitrided steel decreased irregularly with depth while that of porcelain decreased asymtotically.

Study of refractories.—In manufacturing fire brick the clay is extruded through a die, one result of which is that the properties of the brick are not the same in the longitudinal and transverse directions, and may differ even at two points in the same cross section. This variation in physical properties is undesirable and frequently results in failures in service. As a first step in the development of

a brick having more uniform properties, the Bureau is determining just what these differences amount to in brick now on the market. Tension tests for elasticity and strength at room temperature show variations as high as 65 percent in elasticity and 60 percent in strength, depending upon whether the test specimens are cut lengthwise or crosswise. The change in dimensions of fire brick under load for long periods at slightly elevated temperatures is also being studied.

Thermal expansion is an important property in relation to service life of refractories, and this is being studied over a wide range of temperature. The total linear thermal expansion has been found to bear a direct relation to the percentage increase in modulus of elasticity in bending. A similar relation holds true with respect to silica content, but in both cases the relation is true only when the material has not been heated to excessively high temperatures which would tend to convert the silica into a glass.

Vitreous enamels.—In the case of enameled metalware, the difference between the thermal expansion of the enamel and that of the base metal sometimes causes difficulties, so that the Bureau has devoted considerable time to a study of the subject, in the interest of a more uniformly satisfactory product.

A study of the stresses developed in vitreous enamel coatings indicated that (1) stresses set up at temperatures above the critical temperature of an enamel are largely removed by yielding of the enamel in normal cooling and may be completely removed by following a predetermined cooling schedule; (2) stresses set up below the critical temperature are proportional to the differential contraction between the enamel and the metal base; (3) the stresses produced in any given enamel may be increased or decreased by causing the enamel coating to cool somewhat more slowly or more quickly than the metal; and (4) increased severity of the firing treatment for a given enamel affects stress in a way which indicates that the expansivity of the enamel is lowered.

Lime.—An investigation is being made of the effect of particle-size distribution of hydrated lime upon the other properties of this material. An investigation was completed of the reaction between lime solutions and diatomaceous silica, silica gel, and other forms of silica.

Building stones.—The study of wear resistance of 215 samples of natural-stone flooring has been completed. In the study of domestic granites 82 samples have been collected from the more important producing districts of 14 States. Determinations of compressive strength, absorption, density, and porosity have been completed on 65 samples. The Bureau has cooperated with the National Park Service in studies of methods and materials for repairing the Washington Monument. The investigation of test methods for durability of stone has been continued.

SIMPLIFIED PRACTICE

Simplified Practice Recommendations.—A total of 153 Simplified Practice Recommendations have been formally approved, of which 149 are available in printed form. Four simplification projects were completed and prepared for publication.

Revisions and reaffirmations.—Twelve existing Simplified Practice Recommendations were reviewed by their respective standing committees. Of these, 6 were reaffirmed without change and 6 were revised. The work of reviewing 14 other simplification programs was started.

New projects.—Fifteen proposals for new Simplified Practice Recommendations were brought before the Bureau. Some of these are quite new, others are earlier proposals which have been renewed, while still others await further action by the proponent groups. In a number of the approved National Recovery Administration codes, industry has indicated its intention to develop Simplified Practice Recommendations for their products. Other approved National Recovery Administration codes contain specific references to the active Simplified Practice Recommendations, and, in a few cases, the recommendations are incorporated in the codes verbatim.

Use of simplified invoice form.—The railroads commenced a survey of their business practices to determine the degree of conformance with active Simplified Practice Recommendations, with a view to increasing adherence. Also, the railroads are requesting that invoices covering all materials purchased by them be made on the simplified invoice form, which is included in Simplified Practice Recommendation R37–28.

Approval of simplified lines in trade literature.—Current editions of catalogs and trade literature show that industry continues to advocate adherence to these programs. College and university faculties and students alike continue to seek current data relative to simplified practice as an element of industrial management. Several textbooks and handbooks, and one encyclopedia, issued during the year, contain specific references to the Bureau's cooperation with industry in developing Simplified Practice Recommendations.

BUILDING AND HOUSING

On June 30, 1933, as part of the economy program, the staff of the Division of Building and Housing, which had consisted of 36 persons, was reduced to 2 members. For a limited time additional personnel was assigned from the Civil Works Administration. Assistance was given to the National Planning Board on problems of city and regional planning and zoning; to the Housing Division of the Public Works Administration, the Division of Subsistence Homesteads, and the Tennessee Valley Authority in the solution of building and housing problems; to the Home Loan Bank Board, the Public Works Administration, and the National Emergency Council in their home-modernizing programs; to the Real Property Unit of the Bureau of Foreign and Domestic Commerce, the Federal Emergency Relief Administration, the Public Works Administration, the Committee on Government Statistics and Information Services, and the Central Statistical Board in supplying statistics relating to real estate and housing; to the Executive Council in its program of coordination of Government agencies and activities relating to housing; and to the National Emergency Council in the preparation of the national housing bill and the initiation of the work of the Federal Housing Administration.

SPECIFICATIONS

Facilitating the use of specifications.—The lists of sources of supply of commodities have been augmented by 3,338 separate requests for listing from manufacturers willing to certify to compliance with 32 Federal specifications, thereby increasing the total number of lists and requests to more than 400 and 20,000, respectively. Several of the early Federal specifications, and the lists relating thereto, have been consolidated. All of the completed lists have been brought up to date, so that they may be utilized most effectively in connection with the index of Federal specifications issued as part of the Federal Standard Stock Catalog.

Services to consumers, governmental and nongovernmental.—The information service relating to the identification of commodities complying with the requirements of nationally recognized specifications has been expanded to care for the greatly increased interest being shown by producers, distributors, and consumers in the quality of goods purchased and sold. The quality guaranteeing labeling plan, which serves to identify both the firm or association issuing the guaranty and the nationally recognized specification which the commodity is guaranteed to meet, is now widely recognized as the best solution to the problem of marketing staple products—not specialties.

The city of New York reports that effective use is being made of the detailed comparison carried out by the Bureau of 1,800 commodity specifications used by the city with the corresponding specifications of the Federal Specifications Board and other national agencies. Directly traceable to the services rendered to New York City is the request from the State purchasing agent of New Hampshire for aid in solving the State's purchasing problems. The Governor of New Hampshire has placed a representative at the Bureau to make a study of nationally recognized specifications.

Effective service has been rendered to the Consumers' Advisory Board in reviewing all proposed codes of fair competition to insure the insertion therein of proper references to quality standards to safeguard the consumer's interest. For 499 of the 831 codes and supplements reviewed for the Consumers' Advisory Board, there were located specifications formulated or sponsored by 186 separate agencies. To these specifications 3,112 individual references were suggested. References to the requirements of existing standards or to the creation of committees to formulate standards were included in 129 of the 543 codes and supplements that had received official approval up to and including June 30, 1934. Of the 76 references in the approved codes and supplements to definite existing standards or to designated agencies to cooperate in the preparation of standards, 35 were to the National Bureau of Standards.

Coordination of sizes of building materials.—As the result of a request transferred from the Bureau of Foreign and Domestic Commerce, a preliminary survey has been made of sizes of manufactured and stocked building materials. The object is to coordinate the sizes of the separate materials so as to involve the minimum of alteration when utilized in structures where economy in materials and labor are deciding factors. The project has received the endorsement of the executive committee of the American Institute of Architects and the officers of various building materials trade associations.

For the convenience of agencies of the Federal Government and other consuming organizations it is planned to compile lists of manufacturers desirous of supplying materials suitably dimensioned in accordance with the coordination plan. Promises of cooperation have been received from the following Federal agencies: Division of Subsistence Homesteads, Department of the Interior; Federal Emergency Administration of Public Works; Construction Division, Quartermaster Corps, War Department; Construction Service, Veterans' Administration; Bureau of Yards and Docks, Navy Department; Bureau of Agricultural Engineering, Department of Agriculture; Land Planning and Housing Division, Tennessee Valley Authority.

TRADE STANDARDS

Commercial standards.—At the close of the year there were 95 active projects for the establishment of commercial standards. Cooperation with the respective industries at their request resulted in the acceptance of commercial standards for wood shingles; wool blankets (supplement); gage blanks; marking of gold-filled and rolled-gold plate articles other than watchcases; interchangeable ground-glass joints, stopcocks, and stoppers; domestic burners for Pennsylvania anthracite; and binder's board. Twenty-five preliminary and six general conferences were held to pave the way for the establishment of standards of quality for marking gold-filled and rolled-gold plate articles other than watchcases; hospital and institutional mattresses; domestic burners for Pennsylvania anthracite; bathing suits; sweaters; interchangeable ground-glass joints, stopcocks, and stoppers; asphalt floor tile; binder's board; berets, knitted cuffs, and bottoms; women's full-fashioned hosiery; wool blankets; ophthalmic lenses; fuel oils; and cotton garments. Six printed editions of established commercial standards were made available, and one supplement was issued.

GENERAL FINANCIAL STATEMENT

During the fiscal year 1934 the Bureau expended and accounted for funds aggregating $1,364,865, exclusive of $363,653.99 received by transfer and reimbursement from other Departments for special researches, and $100,000 received under the National Industrial Recovery Act for renovation of buildings. 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., 1934, 1933, and 1932 appropriations

Appropriations	Total appropriation [1]	Disbursements	Liabilities	Balance
1934				
Salaries	$600,000.00	$568,118.27		$31,881.73
Equipment	80,000.00	51,529.11	$4,223.02	24,247.87
General expenses	[2] 65,068.96	42,840.72	1,157.13	21,071.11
Improvement and care of grounds	11,220.00	6,592.78	335.79	4,291.43
Testing structural materials	[3] 325,984.45	198,079.00	9,883.94	118,021.51
Testing machines	[4] 42,127.37	25,867.77	703.81	15,555.79
Metallurgical research	[5] 46,170.00	28,269.86	431.41	17,468.73
Investigation of optical glass	21,500.00	13,124.44	58.82	8,316.74
Standard materials	8,900.00	5,066.39	368.31	3,465.30
Investigation of textiles	[6] 49,683.25	32,326.45	14.00	17,342.80
Sugar standardization	[7] 71,630.00	46,707.65	1,282.66	23,639.69
Gage standardization	37,000.00	23,184.06		13,815.94
High temperature investigation	7,000.00	4,147.31	174.13	2,678.56
Testing railroad-track, mine, and other scales	50,000.00	29,653.63	150.09	20,196.28
Investigation of fire-resisting properties	[8] 23,857.55	14,912.69	152.80	8,791.86
Testing miscellaneous materials	[9] 51,163.75	34,810.08	900.42	15,453.25
Investigation of public-utility standards	[10] 85,123.11	40,348.83	2,122.82	42,651.46
Radio research	69,000.00	42,683.88	91.65	26,224.47
Industrial research	[11] 128,875.00	48,860.49	3,879.54	76,134.97
Sound investigation	[12] 8,497.29	5,250.99	500.03	2,746.27
Investigation of clay products	37,000.00	22,455.10	358.24	14,186.66
Color standardization	11,100.00	6,587.38	367.64	4,144.98
Investigation of radioactive substances and X-ray	21,500.00	12,874.19	667.30	7,985.51
Standardization mechanical appliances	[13] 37,966.32	23,824.57	1,335.04	12,806.71
Standardization of equipment	[14] 149,442.88	41,652.53	375.74	107,414.61
Investigation of automotive engines	[15] 41,109.00	26,204.76	1,346.03	12,958.21
Utilization of waste products from the land	38,700.00	23,983.97	2.75	14,713.28
Investigation of dental materials	6,500.00	3,974.53	81.80	2,443.67
Hydraulic laboratory research	40,000.00	25,329.63	7.17	14,663.20
Appropriations transferred from other departments which are available for the current year:				
Aircraft in commerce	5,000.00	4,767.42	200.00	32.58
Air navigation facilities	29,600.00	28,619.52	745.73	234.75
National Industrial Recovery Act 1933-35	100,000.00	73,200.84	14,489.42	12,309.74
Appropriations transferred from other departments under the provisions of the legislative act approved June 30, 1932: Working fund	214,855.26	198,099.08	5,773.83	10,982.35
Total 1934	[16] 2,515,573.99	1,754,547.92	52,181.06	[17] 708,845.01
Total 1933	2,710,739.23	2,412,400.29	33.51	298,305.43
Total 1932	3,298,551.63	3,124,857.09		173,694.54

[1] Includes reimbursements and transfers received from other departments as shown under the following footnotes:

[2] $1,068.96.
[3] $70,984.45.
[4] $672.37.
[5] $180.
[6] $3,183.25.
[7] $2,500.
[8] $517.35
[9] $14,163.75.
[10] $2,313.11.
[11] $8,875.
[12] $597.20.
[13] $966.32.
[14] $1,067.88.
[15] $7,109.

[14] Also a transfer was made to the Procurement Division of $4,125.

[15] Approximately $20,000 of reimbursements pending not included in these figures.

[17] Includes, in addition to unobligated balances, impounded amounts and administrative savings totaled $691,180.

BUREAU OF FISHERIES

The fishing industry, in common with most other industries, has suffered severely during the past few years. The fiscal year 1934 has shown, at least in many of the important producing centers, a tendency toward recovery. Better prices have prevailed during most of the months of the year, and these better prices have been accompanied by increased catches. While still far below normal, the upward trend is very encouraging.

The fisheries of the United States and Alaska, which are prosecuted on the high seas and in the territorial waters of the Atlantic and Pacific Oceans and in the Gulf of Mexico and their adjacent waters, as well as in the Great Lakes and in interior waters in 1932, the latest calendar year for which complete data are available, gave employment to about 116,000 persons as commercial fishermen, and their catch in the same year aggregated 2,614,000,000 pounds, valued at $54,800,000 to the fishermen, representing a decrease of 1 percent in quantity and 29 percent in value as compared with the catch and its value in the preceding year.

There were decreases in most of the groups of prepared products; thus the output of canned fishery products which amounted to 416,062,000 pounds, valued at $43,749,000, showed a decrease of 18 percent in quantity and 31 percent in value as compared with the previous year. Byproducts valued at $12,466,000 decreased 25 percent in value, and frozen products, which amounted to 92,472,000 pounds and estimated to be valued at $7,000,000, decreased 18 percent in volume. The production of fresh and frozen packaged fish (not including shellfish) in the calendar year 1932 amounted to 51,976,000 pounds, valued at $5,741,000. Data on the output of cured fishery products were not collected for the year 1932, but in 1931 the production amounted to 98,969,000 pounds, valued at $12,364,000.

Imports of fishery products for consumption in the calendar year 1932 were valued at $29,566,000, which is 31 percent less than in the previous year, while exports of domestic fishery products were valued at $7,808,000, or 33 percent less than in 1931.

NATIONAL PLANNING COUNCIL (OF COMMERCIAL AND GAME FISH COMMISSIONERS)

For many years, in fact ever since the inception of fishery work, there has been a lack of coordination between the various organizations engaged in this service. The Federal Government and the various States have all pursued their respective ways. They have cooperated it is true, but in a sort of haphazard way, uniting on projects that concerned them both for the time being.

This haphazard method was especially noticeable in the fish planting efforts of the various agencies and resulted in considerable wastage of fish, effort, and money. Requests for fish were received by both the State and Federal departments and were filled by the agency receiving the request, without regard to what had been done or was going to be done by the other agency concerned. The results were that often the two agencies planted different species of fish in the same waters and these different species might be antagonistic to each other. In the actual planting of these fish more time and money have been spent than necessary. The Federal Government has sent its trucks to waters that could have been better and more cheaply served by the State and vice versa.

With the advent of pollution problems, stream-survey work, and stream-improvement programs, the need for coordination of effort became even more apparent. Rivers know no State lines, nor do the fish in them. The work to be successful must embrace river systems regardless of State boundaries. This, then, would require careful planning and direction.

Commissioner Bell, therefore, called a meeting of State game and fish officials in St. Louis on April 23, 1934, and laid before them a plan to coordinate the activities of the various States and the Federal Government in all their activities concerning fish. This led to the formation of the National Planning Council of Commercial and Game Fish Commissioners. Through this council it is expected to establish unified programs that will bring about a saving in money and yet actually accomplish more for the fisheries than under the old system.

The council divided the country into five zones, grouping together those States with similar problems and conditions. Each zone will hold meetings every 3 months or oftener to consider the problems of that zone, and the whole council will meet once a year for general consideration of the whole situation.

COOPERATION WITH STATES

Many of the cooperative relationships for fish culture are a continuation of those existing in previous years. Among the newer developments is an arrangement whereby the Bureau's Northville (Mich.) station incubated trout for assignment to the States of Indiana and Ohio in conformity with the program of those States to develop trout fishing. Upon the closure of the Federal hatchery at Grand Lake Stream, Maine, the State Fish and Game Department was prevailed upon to take over its operation and allot the Bureau a limited number of land-locked salmon eggs. The resources of the State and Federal hatcheries, located at Put in Bay, Ohio, were pooled, with the result that the operations with whitefish and with pike perch were conducted at a material saving to both agencies. The State of Georgia undertook to distribute fish from the Bureau's Lake Park station, filling both State and Federal applications. At Rochester, N. Y., the cooperative arrangement with the city and the Monroe County Park Board was continued, and there was placed in operation a first-class trout hatchery, the activities of which were supervised by the Bureau, while the costs of construction were met by

the local community. At Walhalla, S. C., the unified efforts of the Bureau, local sportsmen, and the authorities in charge of the Civilian Conservation Corps activities resulted in the establishment of splendid rearing ponds, in which a considerable number of trout for local waters are being grown.

The maintenance of cooperative rearing ponds by private sportsmen's organizations to be stocked with fish furnished from Federal hatcheries has been conducted on a somewhat restricted scale. The Bureau will continue to cooperate with such groups who are desirous of accepting part of the responsibility for the production of larger fish for stocking their local waters. More careful scrutiny must be given, however, to the locations available, the resources of the organization, and other pertinent details in view of the more limited scope of the Bureau's activities.

Cooperative investigations of the nutritional requirements of trout carried on jointly by the New York Conservation Department, Cornell University, and the Bureau of Fisheries at Cortland, N. Y., have been continued during the past year, and a series of monthly articles concerning modern hatchery practices has been issued for the use of fish culturists.

Cooperative trout investigations in the State of California, because of the liberal support afforded by that State, have been conducted without curtailment. Ecological studies of both coastal and high Sierran streams have been undertaken on a large scale to determine the capacity of various waters in sustaining fish life in relation to the food supply. Three stream-survey parties were maintained in the field during the past summer on Public Works Administration funds, and great progress has been made in obtaining the necessary facts upon which to base more adequate stocking policies for the waters of this State.

In the technological work of the Bureau many State agencies have cooperated in extending their facilities for the prosecution of these studies. State universities, hospitals, agricultural experiment stations, and other State institutions of research have contributed personnel and laboratories in various projects. Especially has this been true in the nutrition studies. Among the State institutions cooperating in this work are the South Carolina Food Research Commission and State Medical College, Charleston, S. C.; the Massachusetts State Agricultural College, Amherst, Mass.; the Ohio State Agricultural Experiment Station, Wooster, Ohio; the New York State College of Agriculture, Cornell University, Ithaca, N. Y.; Washington State College and Agricultural Experiment Station, Pullman, Wash.; the University of Washington, Seattle, Wash.; and the University of Maryland, College Park, Md. In addition to cooperation in nutrition investigations, the members of the staff of the Massachusetts State College rendered valuable aid to the technological staff of the Bureau's laboratory at Gloucester, Mass. In tests of fishing gear with respect to measurement of mesh size of nets, cooperation has been received from the States bordering on the Great Lakes.

In certain marketing investigations, including the studies of the grading of fish, the States of Virginia, North Carolina, Massachusetts, Maryland, and New Jersey either cooperated actively or gave valuable aid in some form.

In the annual surveys of the fisheries of the Great Lakes and Pacific Coast States such exceptional cooperation has been obtained from State fishery agencies in recent years that it has been only necessary for agents of the Bureau to conduct fragmentary surveys to supplement the data available. Recently the States of Maryland and Virginia have adopted very complete statistical programs which not only alleviate the work of our agents but also produce more accurate data.

COOPERATION WITH OTHER FEDERAL AGENCIES

The coordinating bill, passed during the last session of Congress, calls upon Government Bureaus whose activities affect wildlife, including the Bureau of Reclamation and the Bureau of Indian Affairs, to consult with the Bureau of Fisheries and/or the Bureau of Biological Survey whenever wildlife may be affected by activities of the two former organizations.

In response to this legislation, the Bureau of Reclamation of the Department of Interior has just issued general instructions to its field officers which provide that storage areas for irrigation or power shall be administered as far as possible to avoid detriment to fish and birds, and that when ponded waters are to be lowered to a point adversely affecting fish and game, officials in charge shall notify State and Federal authorities in charge of the protection of fish and game in advance.

The Bureau of Biological Survey has administered its land-purchasing program in the Upper Mississippi Refuge so as to afford assistance to the Bureau's activities. In this purchasing program the Biological Survey has endeavored to meet the wishes of the Bureau by acquiring tracts within the refuge which can be used for fish-cultural purposes. In the case of the National Park Service, aside from strictly fish-cultural work in stocking park waters, the Bureau has been requested to give further assistance by conducting a survey of the waters of the Great Smoky Mountain National Park, to develop information as to food conditions, suitability of different species, stocking policies, etc., in that area similar to the data being worked out in the western parks.

With funds received from the War Department, Corps of Engineers, to carry on the cooperative investigation at Bonneville on the Columbia River, studies are being made as to how the fish should be passed over the dam, both as mature upstream migrants and young downstream migrants. The problem is the most difficult one of its kind yet encountered since the use of devices used successfully at other dams has not been found entirely applicable at Bonneville because of the much greater height of the dam.

The Bureau also receives extremely valuable cooperation from the Engineer Corps in its studies of pollution in the Mississippi River system. In this work a floating laboratory is used, set up in a former Engineers' quarterboat. During the summer working season for several years past this boat has been moved from place to place by the Engineers' river tugs.

The Bureau of Agricultural Economics collects information on cold-storage holdings of fish in the United States. The Bureau of

Fisheries supplies that Bureau with vital economic information. In the collection of statistical data, the cooperation of the Bureau of the Census, the Bureau of Foreign and Domestic Commerce, the United States Tariff Commission, and others is of considerable value to this Bureau.

In the technological field the Bureau has worked from time to time in cooperation with practically every scientific or technical agency of the Federal Government. One example of this is the cooperation with the Navy Department in developing chemical preservatives for marine rope and cordage. Other examples are the cooperation with the Bureaus of Animal Industry, Dairy Industry, Biological Survey, Plant Industry, Food and Drug Administration, and Chemistry and Soils in extending the uses of fishery products in human, animal, and plant nutrition.

During 1933, various new and emergency agencies of the Federal Government made considerable use of the facilities of the Division of Fishery Industries, including its technical, marketing, and statistical reports and the knowledge and experience of its personnel. Such cooperation was rendered to the National Recovery Administration, the Agricultural Adjustment Administration, the Federal Emergency Relief Administration, the Federal Surplus Relief Corporation, the Reconstruction Finance Corporation, and others. Members of the Bureau's staff were detailed first to the Agricultural Adjustment Administration and later to the National Recovery Administration to supervise and assist in the formulation of fishery codes of fair competition under the National Industrial Recovery Act.

CONSERVATION OF WHALES

The Multilateral Convention for the Regulation of Whaling agreed to by the economic committee of the Council of the League of Nations on September 24, 1931, yet awaits the signature of the United Kingdom of Great Britain and Northern Ireland to make the convention effective. The convention has been ratified by the following nations: United States, July 7, 1932; Norway, July 18, 1932; Union of South Africa, January 11, 1933; Switzerland, February 16, 1933; and Mexico, March 13, 1933. In addition to these ratifications, the following have signified adherence to the convention: Nicaragua on April 30, 1932; Sudan, April 13, 1932; Monaco, June 17, 1932; Brazil, November 21, 1932; and Egypt, January 25, 1933.

LEGISLATION

Several pieces of legislation affecting fishery matters and the Bureau of Fisheries were enacted during the last session of the Seventy-third Congress. A brief statement with respect to the more important legislation enacted follows:

Public, No. 166, approved April 16, 1934, amends sections 3 and 4 of an act of Congress entitled "An act for the protection and regulation of the fisheries of Alaska", approved June 26, 1906, as amended by the act of Congress approved June 6, 1924. The effect of these amendments is to permit commercial fishing for king salmon in the

Yukon and Kuskokwim Rivers by native Indians and bona fide white inhabitants under such restrictions as may be prescribed by the Secretary of Commerce. Heretofore all commercial fishing has been prohibited in these rivers and within 500 yards of their mouths.

Public, No. 372, approved June 16, 1934, repeals all acts and parts of acts making it unlawful to kill sea lions in the waters of the Territory of Alaska, and in substance provides that sea lions may be killed in the waters of Alaska only in accordance with rules and regulations prescribed by the Secretary of Commerce. The regulations which have been promulgated pursuant to the provisions of this act provide that sea lions may be killed by natives for food or clothing, by miners or explorers when in need of food, or by anyone in the necessary protection of property, or while such animals are destroying salmon and other food fish.

Public, No. 447, approved June 21, 1934, authorizes an appropriation of $500,000 for the preparation of plans, specifications, and for the construction and equipment of a fisheries research vessel to be maintained and operated under the supervision of the Secretary of Commerce. No appropriation, however, has as yet been made.

Public, No. 464, approved June 25, 1934, authorizes the formation of associations of producers of aquatic products. This act extends to the producers of aquatic products the same privileges which have been extended to producers of agricultural products by the act of February 18, 1922 (42 Stat. 388). In other words, it permits the producers of aquatic products to form associations for the purpose of collectively producing, marketing, and harvesting aquatic products.

Public Resolution No. 19, approved April 16, 1934, extends to the whaling and fishing industries the same benefits granted under section 11 of the Merchant Marine Act of 1920, as amended. This act provides for loans for the construction, outfitting, equipment, reconditioning, remodeling, and improvement of vessels engaged in the whaling and fishing industries and is administered by the United States Shipping Board Bureau.

Public, No. 120, approved March 10, 1934, provides for the establishment of fish and game sanctuaries, subject to certain restrictions and limitations, and provides that the Secretaries of Agriculture and Commerce shall execute the provisions of the act, and authorizes them to make all needful rules and regulations for the administration of such fish and game sanctuaries or refuges as may be established pursuant to the provisions of the act.

Public, No. 121, approved March 10, 1934, commonly known as the "Federal Coordination Act", has for its purpose the conservation of wildlife—fish and game.

Public, No. 417, approved June 19, 1934, provides for loans for the purpose of financing the production, storage, handling, packing, processing, carrying, and/or orderly marketing of fish of American fisheries and/or products thereof. This act is being administered by the Reconstruction Finance Corporation.

Public, No. 381, approved June 18, 1934, authorizes production credit associations to make loans to oyster planters. This act is being administered by the Farm Credit Administration.

CONSTRUCTION ACTIVITIES

Construction and improvements at the Federal hatcheries were conducted through the medium of allotments received from the Public Works Administration and through participation in the Civil Works program during the winter. During the year there became available outright allotments totaling $281,500. These grants from the Emergency Public Works funds provided $150,000 for additional construction at five hatcheries which were only partially completed. These hatcheries, authorized by the act of May 21, 1930 (46 Stat. 371), are located in Alabama, Indiana, Pennsylvania, Texas, and West Virginia. At the close of the year all of these hatcheries had been placed on a producing basis, although several of them were not fully completed. The balance of the allotments, amounting to $131,500 was apportioned among 29 different hatcheries for the purpose of reconditioning and repairs. On the inception of the Civil Works program in November, there was approved a grant of a maximum of 2,440 men with an allotment of $85,175 for materials and expenses other than labor. These forces were assigned to projects of improvement, enlargement, and reconditioning at 40 different hatcheries, and rearing units. The maximum number of men employed at any one time was 2,269. By virtue of the outright cash allotments, and the allocation of labor, the hatchery system as regards buildings, water supply, and all physical features was brought to a higher state of repair and efficiency than has existed for a great many years.

STATISTICAL INVESTIGATIONS

FISHERIES OF THE UNITED STATES, 1932

New England States.—During the calendar year 1932 the commercial fisheries of Maine, New Hampshire, Massachusetts, Rhode Island, and Connecticut employed 16,580 fishermen. Their catch amounted to 480 521,000 pounds, valued at $14,001,000—a decrease of 10 percent in volume and 28 percent in value as compared with the catch in 1931. In addition there was a production of 229,000 bushels of seed oysters, valued at $120.000. Landings of fish by American fishing vessels at Boston and Gloucester, Mass., and Portland, Maine, amounted to 252,334,000 pounds as landed, valued at $6,084,000—a decrease of 4 percent in quantity and 34 percent in value as compared with the preceding year.

Middle Atlantic States.—The commercial fisheries of New York, New Jersey, Pennsylvania, and Delaware in 1932 gave employment to 9,155 fishermen. Their catch amounted to 141,221,000 pounds, valued at $4,654,000—a decrease of 7 percent in volume and 36 percent in value as compared with 1931. In addition, there was a production of 1,332,000 bushels of seed oysters, valued at $481,000. Landings of fish at New York City and Groton, Conn., amounted to 35,602,000 pounds or 31 percent less than in 1931. On the Hudson River the shad fishery was conducted by 274 fishermen who caught 530,000 pounds of shad valued at $51,000—an increase of 28 percent in volume and 2 percent in value over 1931.

Chesapeake Bay States.—In the calendar year 1932 the commercial fisheries of Maryland and Virginia employed 21,084 fishermen. Their catch amounted to 359,007.000 pounds, valued at $5,905,000—an increase of 26 percent in volume, but a decrease of 18 percent in value as compared with the previous year. In addition there was a production of 1,475,000 bushels of seed oysters, valued at $159,000. The shad and alewife fisheries of the Potomac River were prosecuted by 703 fishermen who caught 2,264,000 pounds of shad, valued at $173,000 and 6,845,000 pounds of alewives, valued at $24,000, representing an increase of 10 percent in the catch of shad, but a decrease of 7 percent in the catch of alewives.

South Atlantic and Gulf States.—During the calendar year 1932 the commercial fisheries of North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas employed 21,560 fishermen. Their catch amounted to 299,917,000 pounds, valued at $6,428,000—an increase of 4 percent in volume, but a decrease of 20 percent in value as compared with the previous year. In addition, there was a production of 40,000 bushels of seed oysters valued at $8,000.

Pacific Coast States.—The commercial fisheries of Washington, Oregon, and California in the calendar year 1932 employed 17,900 fishermen. Their catch amounted to 560,828,000 pounds, valued at $9,484,000—a decrease of 6 percent in quantity and 30 percent in value as compared with 1931. The total catch of halibut by the United States and Canadian vessels amounted to 43,458,000 pounds, valued at $1,740,000—an increase of 1 percent in quantity, but a decrease of 39 percent in value as compared with the preceding year.

Lake States.—During the calendar year 1932 the Lake fisheries (Lakes Ontario, Erie, Huron, Michigan, and Superior, and Namakan and Rainy Lakes, and Lake of the Woods of the United States and Canada) produced 110,675,000 pounds of fishery products. Of the total, the United States accounted for 83,744,000 pounds, valued at $4,332,000—a decrease of 9 percent in quantity and 28 percent in value as compared with the United States catch in the previous year. The Lake fisheries in the United States gave employment to 6,900 fishermen in 1932.

Mississippi River and tributaries.—No survey was made of the fisheries of the Mississippi River and tributaries for the year 1932. In 1931 these fisheries gave employment to 15,900 fishermen, and their catch amounted to 82,382,000 pounds, valued at $2,897,000.

MANUFACTURED PRODUCTS IN THE UNITED STATES AND ALASKA, 1932

Fresh and frozen packaged fish.—The production of fresh and frozen packaged fish in the calendar year 1932 amounted to 51,976,000 pounds, valued at $5,741,000. The most important species packaged was haddock, which alone amounted to 33.401,000 pounds, valued at $3,357,000. Statistics of production of fresh and frozen packaged shellfish were not obtained for 1932.

Frozen products.—The production of frozen fishery products in 1932 amounted to 92,472,000 pounds, estimated to be valued at about $7,000,000. The volume of the production was 18 percent less than in 1931. The more important products frozen with respect to volume were mackerel, ground fish, salmon, whiting, and shellfish.

Cured products.—Statistics of the production of cured fishery products were not obtained for the year 1932, but in 1931 the output amounted to 98,969,000 pounds, valued at $12,364,000.

Canned products.—Canned fishery products produced in 1932 amounted to 416,062,000 pounds, valued at $43,749,000—a decrease of 18 percent in quantity and 31 percent in value as compared with 1931. Canned salmon amounted to 283,631,000 pounds, valued at $26,460,000; other important products were tuna and tunalike fishes, sardines, shrimp, clam products, and oysters.

Byproducts.—During the calendar year 1931 the value of production of fishery byproducts amounted to $12,466,000—a decrease of 25 percent as compared with the preceding year. Important products in this group were marine animal oils and meals and aquatic shell products.

MARKETING INVESTIGATIONS

The shrimp industry.—A survey of the shrimp industry of the South Atlantic and Gulf States, which in 1932 produced 96,000,000 pounds, valued at $2,700,000 to the fishermen, points out the advisability of study of conservation measures, technological development, and improved business methods, and includes much data on the economic aspects of this industry.

Standardization or grading fish and fishery products.—At the request of various States, members of the industry, and others interested in the fisheries, the Bureau has continued its study of the possibilities for establishing and applying voluntary marketing grades or standards for fishery products.

TECHNOLOGICAL INVESTIGATIONS

Technological investigations include studies of methods of manufacture, preservation, storage, and marketing of both the primary products of the fisheries for food and the byproducts for animal nutrition; biochemical tests to determine the food value of these products; the development of fishing gear; and experiments in preparing chemical treatments to fishing nets to lengthen their usefulness. These investigations have involved the application of the sciences of chemistry, engineering, bacteriology, and general technology to the solution of the problems arising. The accomplishments of the Bureau's technological staff, during recent years, have resulted in notable contributions of outstanding value to both American fisheries and American agriculture. Among these achievements is the discovery of ample domestic sources of vitamin-bearing fish oils for both human and animal nutrition. These fish oils, rich in vitamins, such as halibut liver, cod liver, swordfish liver, sardine, salmon, and many others, are absolutely essential to the maintenance of a high standard of nutrition among our people and are of economic necessity to the American farmer in raising further food for our national dietary. Other accomplishments during the past year by the technological staff of direct economic value to the fishery industries are the development of chemical preservatives for lengthening the useful life of fishing nets and gear, the discovery of important facts concerning the peculiarly valuable food properties of fishery products as one of our great

basic food industries, the development of better methods for manufacturing fish meal for use by the agricultural industry, and the discovery of better methods for the preservation and handling of various products of the fisheries.

Preservation of fishery products for food.—These studies have consisted of the development of improved methods for handling fresh and frozen fish, improvements in the smoking of fish, methods of canning fish in the home, and the bacteriology of fish preservation and storage. Technologists of the Bureau have developed an electrometric method for the determination of the relative freshness of fish flesh. They have found that, in order to produce smoked fish of uniformly high quality, the factors affecting the quality of smoked fish, such as temperature, humidity, volume of smoke, etc., must be controlled. Finnan haddie of uniformly high quality were produced experimentally. Methods of home canning fish are being worked out. The changes caused by the action of bacteria are closely related to the chemical changes which accompany enzyme action in the fish flesh. Attempts are being made to correlate the various stages of spoilage with the bacteria count in each of these stages. This has included studies of the bacteriology of the various experimental methods of fish preservation described above.

Preservation of fishery byproducts.—Studies on the improved manufacture of fishmeal from nonoily fish waste demonstrated that by careful control of drier operation this type of material can be converted into a very high-grade meal by a single drying operation, without experiencing appreciable difficulty from glue formation. Material so produced has a particular advantage as a feedstuff in that it possesses considerable vitamin G potency. The effect of drying time and temperature of drying on various factors influencing the nutritive value of fishmeal was determined and additional information was obtained on the relative importance of such factors.

Data obtained from the examination of a large number of haddock-liver oil samples indicated that oil prepared from livers taken from fish caught during the summer months, especially on Georges Bank, will occasionally have an iodine number which will exceed the maximum upper limit prescribed for cod-liver oil in the United States Pharmacopoeia.

At the present time, large quantities of salmon waste are not being utilized. This material is capable of yielding an oil comparable to cod-liver oil in vitamins A and D, and a fishmeal of high feeding value. In order to assist in increasing the utilization of salmon waste and to improve the product now manufactured, technologists were assigned to the Pacific coast to conduct research on this problem. The results to date, while only of a preliminary nature, indicate the possibility of considerable improvement in the waste-utilization problem of the salmon fishery.

Studies on the oil extractable from the livers of swordfish taken off the New England coast show that this oil is an even richer source of vitamins A and D than halibut-liver oil. This is an extremely important discovery.

One method of increasing the usefulness of fish oils is to increase their keeping qualities. Studies are being carried on with the use of antioxidants or inhibitors for the purpose of preventing excessive oxidation and rancidity.

Nutritive value of fishery products.—It has been found that a diet of oysters and milk not only permits normal blood formation but also good growth, reproduction, and lactation in laboratory animals. Experiments in which white rats have received diets for a period of 12 months which are many times richer in copper than any oysters found on the market reveal that when the element is fed in conjunction with oysters a smaller quantity of the metal is stored in the liver than when fed with the stock diet alone. The toxicity of the copper contained in market oysters should, therefore, give very little concern.

Other nutrition studies have revealed the relatively high vitamin content of various fish oils, such as swordfish-liver oil, oils from salmon cannery trimmings, salmon eggs, salmon livers, and other miscellaneous fish oils.

Development and improvements of fishing gear.—The mesh size of nets determines the kinds and numbers of undersized and immature fish which will be permitted to escape from the commercial fishermen in the interests of conservation. Technologists of this Bureau and of the Bureau of Standards have made a study of devices to enable the conservation authorities of the States to establish and apply uniform enforcement of regulations pertaining to the mesh sizes of nets.

For many years methods have been studied for chemically treating nets in order to prolong their useful life. In addition to recommendations for treating these nets with toxic dyes as suggested in previous annual reports, it has been found, during the past year, that chrome tanning of the cotton netting gives excellent results and that, where bacterial action on nets is not serious, an improved method of cutching twine produces good service. In all cases, better results are obtained by covering the treated nets, in addition to one of the above treatments, with a good grade of tar, properly applied. Mercury compounds are valuable in checking weed and other marine growths on nets exposed in waters for varying lengths of time.

BIOLOGICAL FISHERY INVESTIGATIONS

Reduced appropriations made it necessary to curtail drastically scientific investigations on the main problems of the national fisheries. In spite of a smaller staff, diminished laboratory facilities, and lowered operating funds, a reorganization made it possible to carry on the most essential lines of research. Funds furnished by the Public Works Administration enabled the undertaking of important lines of investigation which had previously received little attention.

Investigations of the commercial fisheries are concerned with the changes in abundance of the food fishes of the North and Middle Atlantic areas and with the correction of abuses in the commercial fisheries of the Great Lakes. The shrimp fishery of the South Atlantic and Gulf has also been studied with the aim of discovering and preventing depletion of the supply; and the salmon and herring fisheries of Alaska are undergoing scientific analysis as a basis for their regulation. Aquicultural investigations include studies on the improvement of hatchery technique for both cold- and warm-water fishes and the planning of rational stocking policies in interior

waters. Shellfishery investigations have been directed toward improving the quality of the oysters in the North and Middle Atlantic section and toward increasing the production by cultural methods in the South and on the Pacific coast.

With funds received from the Public Works and Civil Works Administrations studies were made on fresh- and salt-water pollution; the formation of a rational stocking policy for our national parks and forests was undertaken, as well as studies of fish protective devices to be used in connection with certain physical developments along the important fishing rivers.

FISHERY INVESTIGATIONS OF THE ATLANTIC AND GULF STATES

The haddock catch, which has been declining steadily since the peak year of 1929, showed signs of recovery in 1933 when the total landings at major fishing ports reached 138,000,000 pounds. This was about equal to the catch in 1932 but far short of the 243,000,000 pounds landed in 1929. The termination of the downward trend came largely as the result of the improved fishery on the banks off the Nova Scotian coast, which approximately counterbalanced a moderate decline on Georges Bank and South Channel. On the latter banks, which normally supply the major part of our haddock catch, the abundance of marketable haddock during the spring and summer of 1933 was considerably less than during the corresponding part of the previous year, but in the fall and winter was raised by the influx into the commercial catch of fish of the 1931 class which then were reaching marketable size. However, the average level for the entire year was considerably less than in 1932 and was primarily responsible for the decline in the catch from this area. On the banks off the Nova Scotian coast haddock of the relatively numerous 1929-year class reached marketable size in the summer and fall of 1933 and caused a great increase in the catch. This was the same year group which caused the improved catch on Georges Bank in 1932, but due to the difference in growth rate the haddock of this class did not reach commercial size on the Nova Scotian banks until more than a year later.

The prospects are good for a somewhat improved yield in 1934. The average abundance on Georges Bank should be about the same or possibly somewhat less than in 1933, depending on the 1931 class. The extent of this class cannot be determined at present owing to the lack of facilities for work at sea which makes it impossible to obtain any good measure of the magnitude of a year class until it has been in the fishery for about a year. The yield (catch per trawler day) on the banks off the Nova Scotian coast will be much greater during the spring and summer of 1934 than during the pervious year, but should be somewhat less in the late fall and winter.

At the present time the study of the haddock fishery has revealed the major causes of the fluctuations in the abundance of haddock on the banks. In addition, the experiments with savings gear have demonstrated that the use of the correct mesh in the otter trawls will reduce the present destruction of millions of undersized haddock to about one-fifth the present amount, a saving that will contribute directly to the success of the commercial catch in later years. How-

ever, the major objectives still lie ahead; the accurate evaluation of the factors causing good or poor fishing seasons which will enable us to forecast any important increases or decreases in the haddock catch; and the accurate determination of growth rates, mortality rates, and migration, which will enable us to determine the minimum size below which it is economically wasteful to capture haddock. This information is vital for the intelligent exploitation of this resource. Its attainment depends on the availability of facilities for work at sea involving the study of abundance and mortality of haddock below commercial size and the study of migrations.

The regular spring prediction of abundance of mackerel for the 1934 season was issued by the Bureau near the beginning of the season. At that time it appeared that the abundance would be nearly the same as in the previous season and would have provided a catch approximating 54,000,000 pounds if exploitation had been normal. This amount being in excess of the probable market demand, the industry, under authority provided by its Code of Fair Competition, curtailed its mackerel seining activities. In this manner the results of scientific research have been useful to the industry. The trend toward planned exploitation renders more urgent the need for advances in scientific knowledge of this fishery. Badly needed investigations of the reasons for variations in the rate of annual decline of the several year classes and variations in their seasonal appearance in different areas have had to be deferred because of the lack of means for their pursuit.

Investigations of the shore fisheries of the Middle Atlantic States were continued on a greatly reduced scale. It was necessary to abandon several series of field observations before conclusive results were secured, thereby diminishing the value of the results obtained through funds expended on these observations in previous years.

Results of tagging experiments have demonstrated that certain of the more important species migrate extensively over the entire continental shelf between Massachusetts and North Carolina, hence cannot be protected effectively by uncoordinated regulations of individual States. Since the winter trawl fishery is conducted outside the jurisdiction of the States, the continued growth of this fishery adds greatly to the difficulties of protection under the present system of independent legislation by the several States.

Because of the interstate and extraterritorial nature of the fishery, the responsibility for securing knowledge essential for the conservation of this important natural resource is clearly Federal. There is a widespread demand on the part of commercial fishermen and anglers in the Middle Atlantic States for resumption and extension of the scientific studies necessary to provide a sound basis for formulation of a wise conservation policy.

The shrimp investigations conducted by the Bureau in cooperation with the States of Louisiana, Texas, and Georgia have continued the field work throughout the entire range of the commercial shrimp fishery with various modifications to meet the special needs of the problem. Definite evidences have been gathered which show that the shrimp migrate. The nature and extent of their migrations are now being studied by means of population and racial analyses, and preliminary marking experiments are under way.

Ichthyological studies of the South Atlantic and Gulf coasts have included a continuation of taxonomical examinations and revisions of the flounders, gobies, cyprinodonts, and other species. The fresh-water fishes of the State of Mississippi also were studied and a report was submitted to the recently established State game and fish commission as an aid in formulating more effective laws of conservation. The ichthyological studies included, also, a survey of the fresh-water streams and lakes of Puerto Rico, carried on in cooperation with the Insular Department of Agriculture and Commerce, the object of the investigation being the determination of the present status of the fisheries and the possibilities of future cultural operations either of indigenous or introduced species.

FISHERY INVESTIGATIONS IN INTERIOR WATERS

Owing to the severe curtailment of funds all field work has been discontinued on the Great Lakes, and the staff has devoted its full time to the analysis of the many fisheries data that have been collected during the past years but which have not yet been compiled in final form for publication. One important phase of the work that is showing promising results is the detailed study of the statistics of the commercial fisheries of Lake Huron for the 5-year period 1929–33. This study has made available not only complete data on fluctuations in the total fishing intensity and in the yield of each commercial species for each of the 6 statistical districts into which Lake Huron has been divided but includes also a precise tabulation of the fishing effort actually exerted for the capture of each of the 8 most important species of the commercial catch. This tabulation of fishing effort for each individual species (necessary since identical types of gear are employed in completely distinct fisheries), together with the elimination of the effect of the different fishing times (nights out) of the same types of gear in different geographical regions, has made possible an accurate determination of fluctuations in abundance, as measured in terms of yield per unit effort, not attainable through less refined methods of procedure. The practical value of the methods employed has been demonstrated clearly in the study of the rapid depletion of the stock that has resulted from the use of the deep trap net for the capture of whitefish.

Another important phase of the Great Lakes work involves the study of the life histories of the more important species of commercial fishes. These studies on the three species of pike perches (sauger, and yellow and blue pike perch) and the yellow perch are rapidly nearing completion and preliminary reports have already been published. On the basis of this work, recommendations are made to the various State conservation departments on proper size limits, closed season, size of mesh in nets, and other regulatory measures. As a result of these studies it was also possible to submit to the National Recovery Administration many basic data to show the need of the inclusion of certain uniform conservation measures in the Great Lakes Fisheries Code.

A manuscript was recently completed for publication on the age and growth of the cisco of certain inland lakes of northeastern Wisconsin, a study made possible by the cooperation of the Wisconsin Geological and Natural History Survey.

FISHERY INVESTIGATION OF THE PACIFIC COAST AND ALASKA

The staff of the Bureau's Seattle (Wash.) laboratory has continued its investigations of the salmon and herring populations of Alaska and the Pacific coast. These investigations, although confined to definite localities, have as their goal the determination of the causes responsible for the fluctuations in the abundance of the salmon and herring so that provisions may be made for permanent and productive fisheries throughout the entire region.

The red-salmon runs in Bristol Bay and the Karluk, Chignik, and Copper Rivers were observed and information concerning them collected. The results from the studies of the red-salmon runs in the past indicate that the mortality of the young in the streams and lakes is to a great extent responsible for the wide fluctuations in the abundance of these salmon. In view of these findings an attempt is being made to determine some of the causes responsible for this mortality in the Karluk River system.

The studies dealing with the homing instinct and age at maturity of the pink salmon have been submitted in a report which is being published by the Bureau. Observations of the pink-salmon runs in southeastern Alaska were continued for the purpose of determining the causal factors responsible for the fluctuations in the time of appearance and abundance of these runs.

A report has been submitted showing areas inhabited by each of the principal herring races in southeastern Alaska. This information will be of great value in segregating the catch statistics so that the abundance of each race may be determined separately and the intensity of the fishing regulated accordingly.

The statistical study of the sockeye-salmon fishery in Puget Sound has been continued and is demonstrating that severe overfishing eventually will destroy the sockeye-salmon runs in the Fraser River which virtually support this fishery. An attempt is being made to compile a formal report of this study within the next year so as to provide a basis for the regulation of this fishery in order to restore it to its former abundance.

The coho salmon that frequent the waters of the Pacific Coast States and Puget Sound provide the basis for a large sport fishery as well as the commercial fishery in this region. During the past year the Bureau has undertaken a study of the fluctuations in the abundance of these fish for the purpose of recommending measures that will provide for a permanent supply of the coho salmon, both for commercial and recreational purposes.

AQUICULTURAL INVESTIGATIONS

The investigations in the interest of improved fish-cultural practices have recently been expanded to include field studies dealing with problems which are of vital concern to any program of fisheries management. Under an allotment from the Public Works Administration, stream survey and improvement work has been carried on in the national forests and parks in 15 States. The purpose of the survey is to supply information on the streams and lakes of the public domain for the development of a scientific stocking program.

Under such a program fish will be planted where they will do the most good and the mistakes inherent in the old haphazard system of planting avoided.

The stream-improvement work has been undertaken in cooperation with the Forest Service. Under this arrangement the Bureau has planned and supervised the work which has been done with labor furnished by the Civilian Conservation Corps.

Investigations of means of improving hatchery practices and providing better control of fish diseases have been continued. Breeding experiments with brook trout have been so successful in developing superior strains of fish that the work has been extended to include rainbow and brown trout.

SHELLFISHERIES INVESTIGATION

The various problems of the oyster industry were studied in Massachusetts, Connecticut, North Carolina, Florida, Louisiana, and Washington. In cooperation with the Connecticut Shellfisheries Commission, the Bureau continued observations on the growth, fattening, and seasonal changes in the nutritive value of oysters from the experimental farm near Milford, Conn. In New Haven Harbor, where dredging operations in the channel threatened the oyster bottoms, a series of analyses of the water was made for the State authorities and the amount of silt in the water and its rate of settling were determined.

In North Carolina the Bureau's experts worked out the plans of restocking the depleted oyster bottoms and supervised planting operations carried out by the State.

The development of new oil fields in the inshore waters of the Gulf of Mexico creates a new difficulty to the oyster industry. A question has arisen as to what extent the oil in the sea water may affect the oyster bottoms in the vicinity of the oil wells. This difficult problem has been studied in the field and experimentally under controlled laboratory conditions at Beaufort, N. C., Woods Hole, Mass., and Washington, D. C. It has been found that the presence of crude oil in the water decreases the rate of feeding of the oyster and adversely affects the propagation of diatoms which are used by the oyster as food.

A disease of oysters caused by a protozoan parasite, which may have been responsible for the mortality of oysters observed in previous years in certain sections of the coast, was studied at Beaufort. The investigation has not been completed, but several phases of the life history of the microorganism have been revealed.

On the Pacific coast studies of the cycles of setting of the oyster larvae proved of great value to the oystermen who arranged their planting operations in accordance with the information and advice supplied by the Bureau's laboratory at Olympia, Wash.

POLLUTION STUDIES

New methods for the biological assay of polluted waters have been developed and put into practical operation at the field stations at Columbia, Mo., Fort Worth, Tex., and aboard the floating laboratory,

quarterboat *348*. These methods permit more detailed and more rapid determinations of the effects of the various stream pollutants not only on fish but on the basic fish-food organisms as well under conditions existing in the polluted waters. A systematic study of the effects of effluents of various industrial operations and of municipal sewage is being made with a view to supplying standardized data concerning both the actual and relative toxicity of these effluents to fish and fish food. As a part of this work, a comprehensive study of the toxicity of ammonia, which is one of the chief break-down products of municipal sewage and one of the principal effluents from gas factories, to fish and fish-food organisms under stream conditions, has been completed.

It has been shown by some of the work now completed that certain types of industrial and municipal wastes can be utilized to increase the plankton content of natural waters when these wastes are properly diluted and separated from noxious and toxic wastes. As a basis for plans to conserve these substances, which can be utilized in the production of fish food in inland waters, biological assays of the fish-food values of various wastes are in progress.

Long-time experiments dealing with the effects of erosion silt on fresh-water mussels have been completed at the Fort Worth substation. These experiments have definitely established the fact that even very small quantities of erosion silt are highly detrimental or fatal to the principal commercial species of fresh-water mussels. Other long-time experiments on the survival and growth of fresh-water mussels under conditions of stream pollution are in progress at Fort Worth.

ALASKA FISHERIES SERVICE

ADMINISTRATION OF FISHERY LAWS AND REGULATIONS

In general, the Bureau continued the program followed in previous years for the conservation of the fisheries of Alaska, although reduced funds made it necessary to curtail some phases of the work. The Commissioner of Fisheries visited all important fishing districts in the summer and held hearings at about 20 places, giving all interested persons full opportunity to express their views.

Restrictions on commercial fishing were modified during the season as changing conditions warranted, and revised regulations were issued on December 21, 1933, to be effective in 1934. Except for the closure of additional trap sites, most of the changes relaxed existing prohibitions, the purpose being to spread employment wherever possible without impairing the future supply of fish.

A patrol of the fishing grounds was maintained to assure enforcement of the laws and regulations. One hundred and thirty-one stream guards and special employees were engaged for varying periods in this protective work, under the direction of 12 regular employees of the Bureau. Many of these guards furnished their own launches and were stationed at the mouths of salmon streams to prevent poaching in closed areas. Fourteen Bureau vessels, manned by 53 persons, and 2 chartered vessels with 2 men patrolled the larger bodies of water.

Five weirs for counting the escapement of spawning salmon were operated in 1933, chiefly in localities where important biological studies of the salmon have been in progress for several years. Through an allotment of $6,000 by the Public Works Administration for the purpose, arrangements were made for the operation of 11 salmon-counting weirs in Alaska in 1934. An allotment of $20,000 of Public Works Administration funds was used in reconditioning and repairing the Bureau's Alaska vessels.

Considerable work was accomplished in the Civil Works Administration project of improving natural propagation conditions in southeast Alaska by the removal of log jams and other obstructions that blocked the passage of salmon to the spawning beds. Three regular employees of the Bureau supervised the work, which gave employment to approximately 200 persons for varying periods. Notwithstanding severe weather during part of the winter, the work was carried forward throughout the first 4 months of 1934. In that time 468 salmon streams were cleared for a distance of 621 miles, and more than 100 miles of trail were cut to assist stream guards in making surveys of the spawning beds.

The destruction of predatory trout in important red-salmon rivers tributary to Bristol Bay was carried on under an appropriation of $15,000 by the Territorial legislature in 1933, to be expended the next biennium for bounty on these enemies of salmon.

ALASKA SALMON HATCHERIES

After the liberation of salmon fry and fingerlings that were reared at McDonald Lake and Afognak from eggs collected in 1932, the operation of the Government's hatcheries at those places was discontinued. One privately owned hatchery, operated under the provisions of the Alaska fisheries act of June 26, 1906, collected 20,650,000 red-salmon eggs in 1933, from which 20,030,000 fry were produced and liberated in Alaska waters.

PRODUCTS OF THE FISHERIES

Although the quantity of fishery products in Alaska in 1933 was slightly less than in the preceding year, there was a marked improvement in value, which was of material benefit to the fishermen, Several plants were reopened and employment was given to a larger number of people than in 1932.

Salmon products comprised about 76 percent in quantity and 92 percent in value of the total output of the Alaska fisheries in 1933. Ninety-five percent of the salmon production consisted of canned salmon, the pack amounting to 5,226,000 cases, or 250,829,000 pounds, valued at $28,376,000. As compared with the pack for 1932, the output of canned salmon showed a decrease of one-half of 1 percent in quantity but an increase of nearly 31 percent in value. The number of canneries operated increased from 87 in 1932 to 91 in 1933.

The total output of Alaska fishery products in 1933 was 346,480,000 pounds, valued at $32,127,000, as compared with an average of 373,624,000 pounds, valued at $40,329,000, for the 5-year period from 1928 to 1932, inclusive. The value of the 1933 catch to the

fishermen was approximately $9,089,000, or about $2,118,000 more than in the preceding year. There were 21,695 persons employed in the various branches of the industry, as against 20,122 in 1932.

ALASKA FUR-SEAL SERVICE

GENERAL ACTIVITIES

The Pribilof Islands fur-seal herd has increased steadily under Government management, and in 1933 the killing of surplus males was the largest for any year since 1889. About 80 percent of the skins obtained on St. Paul Island were taken by the stripping process, which necessitates removal of the blubber before curing.

Sealing operations were under the direction of a staff of regular employees and were performed by Pribilof Islands natives and by approximately 60 natives brought from the Aleutian Islands for the active sealing season. The work of blubbering the sealskins was done by employees of the Fouke Fur Co., in accordance with the provisions of the fur-seal contract.

In addition to the general repairs and upkeep of buildings and equipment, three new houses for natives were erected on St. Paul Island, and the boat ways at East Landing were completed. There was also some extension of improved roads to facilitate the hauling of sealskins from the killing grounds to the curing plant.

Cooperative assistance was rendered by the Navy Department in detailing the U. S. S. *Vega* to transport the annual supplies to the Pribilof Islands and to bring out the season's take of sealskins, and by the United States Coast Guard in maintaining a patrol for the protection of the fur seals.

For the first time since the fur-seal treaty of 1911 became effective, the Government of the Dominion of Canada in 1933 elected to take delivery of its share of the sealskins taken at the Pribilof Islands, instead of 15 percent of the net proceeds of sale. The skins accordingly were delivered to a representative of that Government at Seattle in August 1933.

SEAL HERD

The computed number of animals in the Pribilof Islands fur-seal herd on August 10, 1933, was 1,313,568, an increase of 98,607, or 8.08 percent over the corresponding figure for the previous year.

TAKE OF SEALSKINS

In the calendar year 1933 there were taken on the Pribilof Islands 54,550 fur-seal skins, of which 44,448 were from St. Paul Island and 10,102 from St. George Island. This was an increase of 5,214 over the total take in 1932.

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 1934. On August 28, 1933, there were sold 18,047 black, dyed, 6,192 logwood-

brown dyed, and 237 miscellaneous skins for a gross sum of $469,761.50.

At the second sale, held on April 30, 1934, 17,617 black dyed, 10,039 logwood-brown dyed, and 445 miscellaneous skins were sold for $575,041.25. At the same time 170 raw-salted Japanese fur-seal skins that had been allotted to the United States as its share of skins taken on Robben Island in 1933 were sold for $467.50.

Special sales of Pribilof Islands sealskins authorized by the Secretary of Commerce in the fiscal year 1934 consisted of 432 black dyed, 25 logwood-brown dyed, 120 safari-brown dyed, and 13 exhibition skins, at a total of $13,590.44.

FOXES

Blue-fox herds are maintained on St. Paul and St. George Islands, where they roam at large and ordinarily find an abundance of natural food. Prepared rations are fed them during the winter, at which time the animals are trapped for their pelts and for marking and releasing for breeding stock.

The 1933–34 season's take of fox skins consisted of 214 blue and 23 white skins from St. Paul Island and 700 blue and 2 white skins from St. George Island, a total of 939. Thirty-five foxes on St. Paul Island and 192 on St. George Island were marked and released for breeding.

In the fiscal year 1934 there were sold at public auction 1,119 blue and 22 white fox skins that had been taken on the Pribilof Islands in the 1932–33 season. The blue pelts brought $36,297, and the white pelts $496, a total of $36,793.

FUR-SEAL SKINS TAKEN BY NATIVES

Under the provisions of the North Pacific Sealing Convention of 1911, Indians of the United States and Canada in 1933 took 2,076 fur-seal skins, which were duly authenticated by officials of the respective Governments. Of these skins, 63 were taken by Indians of southeast Alaska, 29 by Indians of Washington, and 1,984 by Indians of British Columbia.

FUR-SEAL PATROL

A patrol for the protection of the fur seals during their northward migration and while at the Pribilof Islands was maintained by the United States Coast Guard, which detailed six vessels to this work. Two vessels of the Bureau also participated in the patrol—one at Neah Bay, Wash., and one in southeast Alaska.

PROPAGATION AND DISTRIBUTION OF FOOD AND GAME FISHES

The requirements for economy were met by the complete closure of nine fish-cultural stations, and by operating practically all the remaining establishments on a sharply restricted basis. As a consequence, the output of fish and eggs decreased almost 4,000,000,000 in comparison with the production of the previous year. The 1934 output comprised 3,258,131,200, in comparison with the 7,202,155,000 of the previous year, or a reduction of more than one-half. The com-

mercial fisheries are to a large extent supported by natural reproduction, hence emphasis was placed upon the propagation and distribution of those forms which are required to maintain good fishing in the public domain, and in all public waters of the interior sections. Consequently, there was an actual increase in the production of 10 varieties of game fish, which included all the game trout and the largemouth and smallmouth bass, as well as grayling. The increases ranged from less than 25 to over 70 percent.

A further modification required by curtailment of appropriations involved a change in the system of distribution. The delivery of fish gratis to applicants was strictly limited, and the bulk of the output destined for interior waters was received directly by the applicants at the hatcheries at no expense to the Government. It is gratifying to report that there was in general a favorable response to this change, and the whole-hearted cooperation of sportsmen's clubs and individuals was very evident.

The yield of fingerlings, consisting of fish several inches in length up to adult size, was considerably reduced, dropping to 126,368,200, a reduction of over 50,000,000 under the 1933 figures. This was largely owing to the fact that the salvage operations on the upper Mississippi River, from which a large number of fingerling fish are secured, were greatly restricted. It may be further pointed out that while there was of necessity a tremendous drop in the production of the Federal hatcheries, there was no indication of a slackening in the demand for fish, particularly for game varieties. Several forms such as the cisco and pollock, which have been handled in previous years, were not propagated in 1934.

PROPAGATION OF COMMERCIAL SPECIES

Marine species, Atlantic coast.—Only two hatcheries propagated these forms during the year, the establishment at Gloucester being one of those which was closed on account of the shortage of funds. As a consequence the production of these varieties was considerably reduced. The percentage of marine commercial forms in the total output was 66.5 percent as compared with the normal proportion of approximately 85 percent. The activities of the stations at Woods Hole, Mass., and Boothbay Harbor, Maine, were greatly circumscribed, the former being responsible for the greater share of the output of cod, haddock, and flounder.

Pacific salmon.—Both salmon hatcheries in Alaska were on an inactive basis; consequently, there was a reduction in all species of Pacific salmon except the steelhead variety. The number of sockeye salmon produced was less than 50 percent of that in previous years. Approximately normal conditions prevailed at the other Pacific coast hatcheries at which these forms are propagated.

Anadromous species, Atlantic coast.—Here, too, there was a noticeable reduction in the output of shad, Atlantic salmon, and yellow perch. It was impossible to obtain any Atlantic salmon eggs whatever in exchange with the Canadian Government, and the limited distribution of this species consisted of fingerlings held over from the previous year.

The Edenton (N. C.) station was successful in securing an increased number of shad, but this gain was offset by a sharp reduction of operations on the Potomac River. The run of shad was greatly reduced for reasons which have not been fully determined, but are ascribed to the severe winter. No effort was made to propagate yellow perch on the Potomac River, but scattered production was obtained from other hatcheries. No glut herring were handled at all.

Commercial species, interior waters.—The closure of all the commercial hatcheries on Lake Michigan was responsible for a negligible production of whitefish and lake trout. No attempt was made to secure eggs of the cisco or lake herring. While the Duluth (Minn.) station was in operation it was possible to secure only a limited number of eggs. The Cape Vincent (N. Y.) station, as has been the case for the last several years, was unable to secure any worthwhile number of eggs of the commercial species, and therefore concentrated its activities on game forms. With the pike perch, however, cooperative activities with the State of Ohio at Put in Bay yielded a record collection of eggs, yielding an output of 836,000,000 fry. The eggs were incubated at both the State and Bureau's hatcheries.

RESCUE OPERATIONS

Reduction of the appropriation for fisheries work in the Upper Mississippi Wild Life Refuge to negligible proportions made it impossible to carry on the rescue or salvage of fish to the extent followed under normal conditions. Fish become trapped in landlocked sloughs upon recession of the water throughout a large part of this refuge. Seining crews are sent out to salvage them and return them to open waters. Lack of financial resources for the support of a normal number of crews reduced the number of rescued fish in 1934 to 22,643,000, in comparison with a normal collection of over 50,000,000. Controlled semiartificial ponds within the refuge were operated, however, to produce a satisfactory yield of bass. Some rescue work was carried on in the vicinity of the Fairport (Va.) station.

AQUARIUM

The aquarium located under the main lobby in the Department of Commerce Building is becoming increasingly popular. It has been visited by many organizations such as Boy Scout troops and biology classes, as well as miscellaneous students and the general public.

At the close of the year there were on display 1,533 fish, comprising 62 varieties, and 107 aquatic animals of 6 varieties. During the year a stock of chinook salmon, hatched in the aquarium, has been reared; and there is now on hand a very creditable display of this species, comparatively little known in the East. Over one-half million trout, salmon, whitefish, perch, and shad eggs were displayed and hatched in the model hatching apparatus maintained for demonstration purposes. This activity, together with a model fishway, has been a source of great interest.

The staff of the aquarium has been called on frequently for expert advice in problems relating to the maintenance of home aquaria,

ornamental fish pools, etc. The reserve tanks in the aquarium have been utilized for the temporary holding of game fish destined for distribution and planting in nearby waters.

BLACK BASS AND ANGLERS DIVISION

In cooperation with State fish and game authorities the black-bass law has been reasonably well enforced in most of the States where black bass are found in numbers. Through the united efforts of all interested, including the anglers, commercial fishermen, shippers and conservation organizations, a great deal has been accomplished. The work of the Division has been materially enlarged to include a service for the angler in connection with matters pertaining to fish and fishing, such as information in regard to laws, kinds of tackle and baits to use, where certain species are to be found, etc.

There are 3 persons regularly employed in the Division, assisted by from 90 to 103 deputy black-bass law inspectors, who are State officials receiving no salary from the Federal Government but who function under the supervision and direction of the Chief of the Division.

But 5 State legislatures met in regular session in 1934, in which needed black-bass legislation could be obtained, and progress was made in 3 of these. A large amount of educational work was done in the States where further legal protection is needed and where legislatures will be in session in 1935.

There have been illegal shipments of black bass made in various sections of the country. A number of seizures of bass have been made and turned over to charitable institutions. Illegal shipments between Mississippi and Arkansas, Illinois and Missouri, and Maryland and Pennsylvania were formerly of frequent occurrence but have been reduced to a minimum by the activities of the State officials in cooperation with the field officers of the Division, principally through warnings and a large number of seizures under State laws. Considerable difficulty has been had in reference to shipments from Tennessee to Mississippi and Missouri, which have not yet been entirely controlled. Shipments from Florida, and shipments into Indiana, have caused some trouble but have been taken care of, but amendments to the laws of these two States must be made before this situation can be considered satisfactory.

The educational part of the work, impressing upon those interested, the provisions of the Federal law and the necessity of further protecting our valuable black bass, has been successfully continued through publication in the daily press, sporting magazines, and by radio talks.

Fishery Circular No. 9, containing the game-fish laws, the black-bass law in full, the progress in black-bass legislation, and the aims and recommendations of the Bureau in connection with the administration of the law, was revised and republished as Fishery Circular No. 16. (Copies of this circular may be procured from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 5 cents each.) A tabulation of the fishing licenses issued by the States and the revenue therefrom was assembled and published for the first time. Various other leaflets were prepared and released,

covering such subjects as part-time licenses, sales of black bass, list of books on angling, necessity of returning small fish to water, etc., for all of which there is a constant demand.

Markets in the principal large cities in Central and Eastern States have been regularly inspected by the field officers for illegal black-bass shipments, and investigations of reports of violations have been made when required. In connection with investigations, the field officers have attended and addressed a great number of gatherings of anglers, sportsmen, conservationists, and others, on the subject of the Federal black-bass law and the necessity for giving these valuable game fish more adequate legal protection.

VESSELS

The *Albatross II* formerly used by the Bureau in its offshore fishery investigations was returned to the Navy Department during the fiscal year. This was done for two reasons: First, the vessel was very old and not well adapted for the Bureau's work and, second because of reduced funds the Bureau was unable to continue it in operation.

The steamer *Shearwater* was engaged in the usual fish-cultural work at the Put in Bay (Ohio) station during the fall and spring months.

The motor vessel *Fulmar* was turned over to the Division of Conservation of the State of Ohio for its use in fish-cultural operations under a revocable license providing for its maintenance and operation by the licensee and also providing that the licensee would furnish the Bureau with such vessel service as required in connection with its operations at the Put in Bay (Ohio) station.

The *Pelican* was used in connection with fishery investigations off the coast of Maine, and also in fish-cultural work at the Boothbay Harbor (Maine) station.

Fifteen vessels of the Alaska service cruised about 123,000 nautical miles in the fiscal year 1934, as compared with 132,700 nautical miles in the previous year. The *Penguin* covered approximately 28,000 miles, the *Crane* 15,900 miles, and the *Brant* and *Teal* each 11,400 miles.

The *Penguin* served as tender for the Pribilof Islands, with base at Unalaska. Five round trips were made to Seattle during the year to transport personnel and perishable and emergency supplies.

Of the vessels that engaged in fisheries protective work, the *Auklet*, *Murre*, *Petrol*, and *Widgeon*, were employed in southeast Alaska. The *Crane* and *Teal* were in the Alaska Peninsula region and on Cook Inlet, respectively, until about the middle of August, and later assisted with the patrol and stream inspection in southeast Alaska. The *Blue Wing* and *Red Wing* were in the Kodiak-Afognak area, the *Kittiwake* on Prince William Sound, the *Ibis* at Chignik, the *Eider* in the Alaska Peninsula district, the *Scoter* on Bristol Bay, and the *Coot* on the Yukon River.

The *Brant* was used in general supervisory work, chiefly in southeast Alaska, although one trip was made to the westward as far as Bristol Bay. It was engaged also for a short time in the fur-seal patrol off Neah Bay, Wash., relieving the *Eider* in that duty toward the end of April. The *Teal* patrolled waters in the vicinity of Sitka,

Alaska, for the protection of the fur-seal herd during its northward migration. The *Auklet* and *Scoter* participated in the Civil Works Administration project of clearing salmon streams in southeast Alaska of log jams and other obstructions that blocked the passage of salmon to the spawning grounds.

Through an allotment by the Public Works Administration, the *Penguin*, *Eider*, *Crane*, *Brant*, *Murre*, *Kittiwake*, *Teal*, and *Scoter* were reconditioned at Seattle during the winter.

APPROPRIATIONS

Appropriations for the Bureau for the fiscal year aggregated $1,778,850, as follows:

Salaries	$160,400
Miscellaneous expenses:	
Administration	3,000
Propagation of food fishes	801,755
Maintenance of vessels	200,000
Inquiry respecting food fishes	173,000
Fishery industries	78,000
Protecting sponge fisheries	2,750
Protecting seal and salmon fisheries of Alaska	340,000
Upper Mississippi Wild Life and Fish Refuge	6,835
Enforcement of black-bass law	13,110
Total	1,778,850

LIGHTHOUSE SERVICE

Various items of special works were actively in progress during the year, including new aids necessary for the safety of navigation, the preservation of existing stations, and the equipment of the Service. These works were made possible by allotments of funds by the Public Works Administration, amounting to $5,620,334, and strenuous efforts were employed to push the projects to completion as rapidly as possible. The major projects, including about 150 separate items, are covered in more detail under the heading "Progress of special works under construction or completed."

During the last winter, the Lighthouse Service contributed its share in the alleviation of economic distress by providing work for the unemployed, improving lighthouse property in various locations through the Civil Works Administration, that organization furnishing the funds for the labor and some of the funds for materials. In general, the work comprised improvements which, though desirable, would not have been practicable to carry out under normal conditions from Lighthouse Service funds at this time, and included such projects as paving, grading, and repairing roadways, cutting and burning underbrush, clearing trees from ranges, painting, repairing, etc. Eighty-seven projects of this nature scattered throughout 14 States were submitted to the Federal Administrator, of which 62 were approved. As the work reached its maximum, 565 men were under employment, and much work of definite value to the Service was accomplished.

No appropriations for special works for the Lighthouse Service were made by Congress in connection with maintenance appropriations for the fiscal year 1934, but various projects were prosecuted and expenditures were made during the year from balances remaining from special appropriations for public works in the Lighthouse Service made by Congress in prior years.

In the operation of the Service, 23,597 aids to navigation were maintained as of June 30, 1934, this number being a net increase of 1,088 over the previous year. There were 1,984 aids discontinued during the year as being no longer necessary or as having been replaced by more suitable aids.

Improvements in aids were continued during the year; 92 lights were changed from fixed to flashing or occulting, and the illuminant was changed to electric for 119 lights and to acetylene for 41 lights. Two new radiobeacons were established, increasing the total number to 105.

IMPROVEMENTS IN APPARATUS AND EQUIPMENT

The use of electricity has been greatly extended. These uses include illumination for major and minor lights, power supply for fog signals and radiobeacons, lighting for quarters, timing apparatus for signal controls, etc. Many major coast lights have been changed to electric, in all cases accompanied by savings in operating costs. Minor oil lights are being rapidly replaced by minor electric lights of much greater adaptability, higher power, and requiring less maintenance. For major lights the use of 36-inch lens revolving beacons has been extended to several new stations. For minor lights improvements have been made to flashing mechanisms, lamp changers, and lanterns. A new type of 200 mm type of lantern adaptable to varied needs and to any flashing mechanisms has been developed. Improvements in lamps include precise focusing arrangements, bases adaptable to two kinds of socket support, and filaments adapted to lenses specially designed for the units. Considerable progress has been made in the way of standardization of voltages and lamps which will reflect economy in operation. The use of photo cell control has been greatly extended and improvements in relays effected so as to insure continued functioning of the light in event of failure of the device. Two well-developed control units of this type are now commercially available.

Radiobeacon transmitters of a new design embodying many improvements and of a unit type adaptable to three or more power ratings have been developed and a considerable number are now under construction. These will replace units of obsolete design and poor frequency stability. There has been continued improvement in control equipment for synchronization of radiobeacons. Methods of carefully monitoring radiobeacon operation have been extended to all districts and standard design of equipment for such purposes made available.

Investigation of possibilities in utilizing remote control by radio has continued. An extended test of engine reliability under such control was made and actual operation of a remote station continued. A lightship has been equipped for remote control of all facilities, including light, fog signal, and radiobeacon, and is about ready to be placed in service as an unwatched aid. A station is to be similarly equipped.

Telephones are now installed at 322 attended light stations, including installations by the Lighthouse Service, the Coast Guard, and private installations by the keepers. Radiotelephone communication has been installed at 19 light stations as a means of rapid communication in emergencies, including the remotest two stations in Alaska, Cape Sarichef and Scotch Cap. One tender has also been equipped with radiotelephone communication, and similar installations are being made on three other tenders.

The radiobeacon system has been rendered more effective through elimination of some interference from airways stations, secured through cooperation between the Air Commerce Bureau and the Lighthouse Service. A further test has been made on the Atlantic coast of the use of mobile radiobeacons to avoid collision between vessels.

Investigations are being made of problems of the service in radio and electrical matters and to establish approved practice and adequate specifications for the purchase and use of such material.

The design of a completely automatic light- and fog-signal station with attendance contemplated only at considerable intervals has been completed, and a trial will be made soon. In addition to the automatic function of the light and the battery-charging units in accord with need, a device will be included for operating the air compressors and fog signal automatically as the need may be indicated by the condition of the atmosphere over a testing range. The results will be of much importance to the Service.

New structures being erected under the Public Works program are receiving adequate architectural study with a view to obtaining dignified and simple buildings but adapted to actual use and enduring as to style and construction. The cooperation of the Commission of Fine Arts has been secured in passing on designs which will be carried out at eight different locations.

Studies are in progress in cooperation with the Bureau of Standards of various types of batteries for use with minor electric lights. The results will be of great importance in the extended use of this equipment. Service tests are being made in many districts.

Extended observation and record of buoy performance under various conditions is under way, the results of which will be used as the basis of improvement in design where shown to be needed. A new type of steel winter marker for buoy stations is being tried out. Conversion of Pintsch gas buoys to acetylene has been practically completed throughout the Service.

An electric-siren buoy has been tested with promising results. Further test to find a suitable horn is being made.

The test of distinctive buoy characteristics has been continued with satisfactory results. A river channel of great importance has been equipped with distinctive quick-flashing buoy lights to mark all turns, and the improvement has been favorably reported on by mariners.

An installation has been made of synchronized range lights permitting the use of flashing characteristics with positive synchronism of the two for greatest value to the user.

The use of automatic lights of reduced candlepower at stations closed for the winter has been extended. The station characteristic is shown for such extended time as necessary to serve all navigation.

Much equipment at depots to facilitate the work of the Service has been provided, including trucks and portable hoisting equipment, also welding equipment.

Following the acquisition of rights to manufacture the diaphone fog signal, its use has been widely extended. The cost is only about 30 percent of that formerly paid. In many districts the old steam fog signals have been almost wholly replaced by high power compressed air signals of the quick starting type. A testing station where accurate comparison can be made of the relative value of various types of signals under varying conditions is in process of erection.

With the advent of good roads in most sections, there has been extended the use of light trucks in conducting the work of the

Service at considerable saving in cost and time of tenders. Further use is indicated, since the economical grouping of unwatched lights for periodic attendance is thereby greatly facilitated.

ADMINISTRATION

Appropriations for the maintenance of the Lighthouse Service totaled $9,122,100 for the fiscal year 1934. There was allotted by the Public Works Administration $5,620,334 for special works. There were also allotted from the Department appropriations for printing and binding, $23,200, and for contingent expenses, $4,000.

There was received and deposited in the Treasury the following: From sale of Government property, $18,060.16; rent of buildings, etc., $3,983.67; forfeitures by contractors, $291.44; reimbursement for property destroyed or damaged $8,219.54; work done for private interests, $13,688.89; commissions received on telephones, $21.08; total, $42,264.78.

Modification was made in the organization of the technical staff of the Bureau, with a view to more effective conduct of the engineering work of the Lighthouse Service. All branches of the engineering work of the Service have been coordinated under a Chief Engineer, Lighthouse Service, in the Bureau in Washington.

The suboffice of the Lighthouse Service at Cincinnati, Ohio, was discontinued on September 1, 1933, and the work transferred to the office of the superintendent of lighthouses, fifteenth district, at St. Louis, Mo.

Items of special legislation affecting the Lighthouse Service made by the Seventy-third Congress, second session, included the transfer of Black Rock, Conn., lighthouse reservation to the city of Bridgeport, Conn., for use as a public park; the transfer of the unused lighthouse reservation and buildings at Erie, Pa., to the city of Erie for public-park purposes; the transfer of a portion of the Amelia Island, Fla., lighthouse reservation, for a consideration, to the city of Fernandina, Fla.; and the transfer of a portion of the Yaquina Bay, Oreg., lighthouse reservation to the State of Oregon for public highway and park purposes. The same session of Congress also provided for the acquisition of a site for a lighthouse depot under a 99-year lease from the board of commissioners of the port of New Orleans, and the erection of wharves, docks, and other structures thereon.

A storm, of hurricane force, accompanied by high tides and heavy seas, which occurred August 22 to 24, 1933, did considerable damage to lighthouse property along the middle Atlantic coast and Chesapeake Bay. Eight attended lighthouses and several unattended minor lights suffered damages—some serious. Valuable stores and equipment at the Portsmouth Lighthouse Depot were damaged. Diamond Shoal Lightship was dragged off station but did not suffer any serious damage. The small boats and superstructure of the Winter Quarter Shoal Lightship, Va., were badly damaged, but the vessel was able to maintain its station. During a hurricane, September 15 and 16, 1933, the Diamond Shoal Lightship, which occupies one of the most exposed stations in the world, was dragged from her station. The vessel survived the storm, and the captain and

crew of the lightship were commended by President Roosevelt for bravery and a high order of seamanship in bringing their vessel through the hurricane.

During the week of December 17 to 24, 1933, the entire Pacific Northwest was visited by a succession of gales accompanied by extreme high tides along the coast, but actual damage to lighthouse property was remarkably light, except at New Dungeness Light Station where the tramway to the wharf was partially destroyed, and serious erosion to the sand spit and the wrecking of the station launch occurred.

Lightship *No. 117*, occupying the Nantucket Shoals Station, was collided with by the steamship *Olympic* on May 15, 1934, in a dense fog, and sank on station with the loss of seven members of its crew. Boats from the *Olympic* were immediately put over, and 7 of the 11 officers and crew who were aboard the lightship were picked up; 3 of those picked up died the same day of injuries. The vessel was a first-class lightship, built in 1930. It had Diesel electric propulsion and modern types of signaling equipment which were duly operating.

Severe ice conditions during February 1934, along the entire North Atlantic coast from Maine to Virginia, caused considerable difficulties in the maintenance of the buoyage system and also resulted in damage to a number of minor lights.

Five Finger Light Station, Alaska, was destroyed by fire December 8, 1933. The crew of the tender *Cedar*, which was off the light station landing supplies, and the station keepers were able to save the boathouse and the carpenter shop, but the tower and dwelling and the radiobeacon building were destroyed.

PERSONNEL

During the fiscal year there was a net decrease of 279 in the personnel of the Service. The number of positions of lightkeeper was reduced by 75; the personnel on vessels was reduced by 120; and the number of light attendants and part-time lamplighters was reduced by 175, the latter decrease being due to assigning larger groups of aids to the care of individual employees. There was an increase of 116 in the technical, clerical, and field construction forces, but most of this increase is temporary and is due to the various public works in progress. The total number of persons employed as of June 30, 1934, was 5,167, including 1,175 lightkeepers and assistants; 1,815 officers and crews of lightships and tenders; 109 Bureau officers, engineers and draftsmen, district superintendents, and technical assistants; 174 clerks, messengers, janitors, and office laborers; 103 depot keepers and assistants, including laborers; 1,200 lamplighters, laborers, etc., mostly part-time employees; and 591 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 85 instances of saving life and property or rendering other valuable aid were reported, many of these acts having been performed at great personal risk, and in some cases, being considered especially meritorious, the employees were commended by the Secretary of Commerce.

LIGHTHOUSE DEPOTS

Many depots are in process of improvement at the present time under the Public Works program and some new depots are to be established.

At Portland, Maine, slips have been dredged, retaining walls constructed and filled, shop building completed, concrete paving well under way, and a combined depot and office building placed under contract. Steps are being taken to establish another depot in the first district in lieu of that at Bear Island.

The depots at Chelsea and Woods Hole, Mass., and Bristol, R. I., in the second district, have been improved by dredging of slips, construction of sheet pile revetments, paving of surfaces, and added buildings.

At Staten Island, N. Y., a material extension has been made to the wharf facilities by the construction of a concrete and timber section 75 by 324 feet in size.

At Charleston, S. C., an office building to be erected on the depot grounds has been designed and placed under contract, and at Key West, and Egmont Key, Fla., extensive improvements have been made. The old navy buildings at Key West, taken over by the Lighthouse Service, have been adapted to its needs.

In the eighth district new buildings have been erected at Mobile, Ala., and Galveston, Tex., and a site has been acquired for a new depot at New Orleans, La. Work at the latter point in the construction of wharf and buildings will be started soon.

A new depot, including wharf, dwelling, and storage building is under construction at Los Angeles, Calif., and improvements to the wharf at the Yerba Buena Lighthouse Depot, San Francisco, Calif., are under way. The depots at Tongue Point, Oreg., and Seattle, Wash., are undergoing improvements to retaining walls, etc.

At Honolulu, Territory of Hawaii, the present Lighthouse depot falls in the way of dredging improvements by the United States Engineers and new structures are to be erected at another point which will be satisfactory. Minor improvements have been made at the depot in San Juan, Puerto Rico.

The depot at Buffalo, N. Y., has been improved by completion of the shop building and an extension to wall of mooring basin has been authorized. Improvements at Detroit, Mich., consist essentially of added equipment, and at Milwaukee, Wis., a new building has been erected. The St. Marys River Lighthouse depot on Sugar Island has been moved to a leased site at Sault Ste. Marie pending acquisition of a suitable site where it can more adequately serve lighthouse vessels.

A considerable amount of new equipment for depots has been provided and the efficiency of this important item in the work of the Service will be much increased by the improvements now completed or under way.

LIGHTHOUSE TENDERS

At the end of the year, 58 tenders were in commission, including 2 laid up in reserve. Twenty-nine of the tenders in commission are fitted with direction finders and 33 have radio communication.

The following tenders have been extensively overhauled during the year: *Camellia*, *Willow*, *Cedar*, *Manzanita*, and *Hibiscus*.

The following were the number of tenders on June 30 of the years specified, omitting vessels not having regular crews: 1910, 51; 1920, 55; 1930, 55; 1934, 58.

One new tender, the *Dahlia*, was completed and placed in commission, replacing the small tender *Thistle*. The tender *Hemlock* was practically completed at the end of the fiscal year to replace the tender *Fern*.

One tender, the *Tamarack*, to replace the *Clover*, is being constructed under contract. Plans and specifications have been completed for the *Jasmine* to replace the *Cosmos* in the eighth district.

Arrangements have been practically completed for changing the tenders *Oak*, *Hawthorn*, *Anemone*, and *Hibiscus* from coal to oil burning; converting the tender *Camellia* from steam to Diesel drive; installing oil-burning boilers on the *Crocus;* and the electrification of the auxiliary machinery on the tender *Palmetto*.

Plans and specifications were prepared and bids invited for the construction of the new tender *Rhododendron*, a small tender for duty on the Columbia River, seventeenth district, to replace the *Larch*.

The following tenders were sold on the dates named: *Azalea*, December 13, 1933; *Woodbine*, October 20, 1933; *Maple*, October 29, 1933; *Iris*, June 21, 1934; *Thistle*, April 4, 1934; *Yerba Buena*, December 1933; *Birch*, September 8, 1932. These vessels were beyond economical repair.

LIGHTSHIPS

At the close of the year lightships were maintained on 35 stations, and 49 lightships were in commission, of which 9 were regular relief ships and 5 were in reserve.

Lightships *No. 86* and *No. 87* have been reconditioned. The reconditioning of lightships *No. 78*, *No. 84*, *No. 90*, *No. 88*, *No. 83*, and *No. 102* is now underway. Lightship *No. 95* is to be transferred to the Atlantic coast and reconditioned. It is expected that lightships *No. 16*, *No. 47*, *No. 69*, *No. 41*, and *No. 39* will be condemned and sold during the next year, being beyond economical repair.

Nantucket lightship *No. 117* was lost through collision on May 15, 1934.

OPERATION AND CONSTRUCTION, LIGHTHOUSE SERVICE, FISCAL YEAR 1934

PROGRESS OF VESSELS UNDER CONSTRUCTION OR COMPLETED

Tender "Dahlia."—See annual report, 1933. This tender was completed during the fiscal year and was placed in commission in the eleventh district for service on the Detroit and St. Clair Rivers and Lake St. Clair.

Tender "Lilac."—See annual report, 1933. This tender was completed during the year and was placed in commission in the fourth district for service on the Delaware River and Bay.

Tender "Hemlock."—See annual report, 1933. This tender was practically completed at the end of the fiscal year.

Tender "Tamarack."—This tender, for service on the St. Marys River, eleventh district, to replace the tender *Clover*, is being built under contract

of December 11, 1933, by the Manitowoc Shipbuilding Corporation, Manitowoc, Wis., at a cost of $233,917. The tender is a single-screw Diesel electric-propelled vessel. On June 30, 1934, the vessel was 26 percent completed.

PROGRESS OF SPECIAL WORKS UNDER CONSTRUCTION OR COMPLETED

Portland Lighthouse Depot, Maine.—See annual report, 1933, page 102, and previous reports. The following work was completed during the fiscal year 1934: The remainder of the material from site of service building has been excavated and placed in main wharf inclosure. Four-inch stone was placed over entire wharf and piers. Total cost, $10,175. A 40- by 100-foot 2-story brick and concrete shop building was constructed. Total cost, $32,697. The sheet piling of wharf was painted. Total cost, $923. Light and power lines were extended to piers. Total cost, $1,256. A steel shed 30 by 180 by 16 feet was built. Total cost, $10,013. The following work is under construction: Reinforced concrete deck on two piers, chain platform, and roadways; wrought iron and chain link fence around depot property; five dolphins at junction of 100-foot channel; contract being prepared for building a two-story-and-basement service building. Cost to June 30, 1934, $297,667.

Whitehead, Maine.—See annual report, 1933, page 102. This project completed. Total cost, $11,353. Additional allotments made for installation of electric lights in tower and dwellings. Project completed. Total cost, $6,855.

Tenants Harbor, Maine.—Establish lighted bell buoy and discontinue light station. Project completed. Total cost, $5,986.

Winter Harbor, Maine.—Establish lighted bell buoy off station and discontinue light station. Project completed. Total cost, $5,986.

Spring Point Ledge, Maine.—Place approximately 1,262 tons of riprap around tower. Project completed. Total cost, $5,869.

Whaleback, Maine.—Deposit riprap. Contract in Bureau for approval. Cost to June 30, 1934, $4.

Spring Point Ledge and Portland Breakwater, Maine.—Electrify stations, Portland Breakwater to be operated by remote control from Spring Point Ledge. Project practically completed. Cost to June 30, 1934, $6,123.

West Quoddy Head, Maine.—Change fog signal from steam whistle to air diaphone. Work under way. Cost to June 30, 1934, $5,576.

Southwest Harbor, Maine.—Construct new depot to replace the present isolated depot on Bear Island. Negotiations for an acceptable site are in progress and nearing completion.

Chelsea Lighthouse Depot, Mass.—See annual report, 1933, page 102. The bulkhead, dredging, and backfill in connection with the west slip have now been completed. Total cost, $45,687. Contract has been awarded for the construction of a steel sheet pile bulkhead along the side of the east slip and across the inner end of the slip. The anchor system is in place, and driving of the steel sheet piling has been started. Cost to June 30, 1934, $8,510. The entire area purchased in 1932 was graded and covered with a reinforced concrete pavement for buoy storage. Project completed. Total cost, $12,100. A blacksmith shop, 48 by 72 feet, was erected on the depot area recently acquired. A 15-ton traveling crane was also provided. Project completed. Total cost, $9,521. A wood frame storehouse, 50 by 80 feet, two stories high, was erected on the new area to be used for the storage of boats. Project completed. Total cost, $6,222.

Woods Hole Depot, Mass.—Remove boulders and ease the curve at the entrance to Little Harbor. Project completed. Total cost, $19,245. A large part of the old wooden wharf along the east face of the depot property was rebuilt. Project completed. Total cost, $12,789.

Bristol Lighthouse Depot, R. I.—See annual report, 1933, page 102, and previous reports. Erect brick veneer keeper's dwelling. Project completed. Total cost, $6,530. An area 36 feet in width on the sides and 50 feet in width along the face of the wharf was dredged to a depth of 16 feet below mean low water. Project completed. Total cost, $5,111.

Cohasset Harbor and Winthrop Minor Lights, Mass.—Rebuild structures at four sites in this harbor. The four-pile wooden structures were removed and replaced by interlocking steel sheet piling cylinders approximately 12 feet in diameter. These cylinders were filled with gravel except a concrete deck 2 feet thick providing a base for an 18-foot tower. Project completed. Total cost, $8,200.

Cape Cod Canal, Mass.—Revise aids at approaches. Orders placed for lighting equipment. Actual construction awaiting progress of War Department improvements in channels.

Hudson River, N. Y.—Place riprap at Peekskill, Duck Island, Stockport Middle Ground, and Lampman Hill Lights. Project completed. Total cost, $10,022.

Greens Ledge, N. Y.—Place riprap to strengthen and protect foundation and construct breakwater to protect boat landing. Project completed. Total cost, $12,237.

Hudson River Lights, N. Y.—Place riprap around foundations at Tarrytown, Rockland Lake, Esopus Meadows, and Hudson City Light Stations, N. Y. Project completed. Total cost, $9,082.

Staten Island Lighthouse Depot, N. Y.—Extend south wharf at General Lighthouse Depot 324 feet. Project completed. Total cost, $43,884.

Raritan Bay Lights, N. Y.—Place additional riprap around foundations at Raritan Bay Lights 1, 3, 4, 5, 5A, Raritan River 1, and Arthur Kills 6. Project completed. Total cost, $11,583.

West Bank, N. Y.—Place riprap around this station and construct breakwater for the protection of boat landing. Project completed. Total cost, $8,873.

Sag Harbor, N. Y.—Place riprap for Cedar Island and Sag Harbor Light 3. Erect two towers, with necessary acetylene apparatus. Will be completed August 30, 1934. Cost to June 30, 1934, $10,747.

New London, Conn.—Place riprap to protect foundations and boat landings at Race Rock, Little Gull Island, Orient Point, and Latimer Reef Light Stations. It is expected that this project will be completed by August 13, 1934. Cost to June 30, 1934, $4,531.

Southwest Ledge and Faulkner Island, Conn.—Place riprap protection to foundations and boat landings. Cost to June 30, 1934, $11.

Raritan River to Arthur Kill, N. J.—Establish cut-off channel lights 1 and 2, install riprap for foundations, and establish four buoys. Bids have been invited for riprap. Cost to June 30, 1934, $10.

Brandywine Shoal, Del.—See annual report, 1933, page 103. Project completed. Total cost, $5,298.

Delaware River and Bay, N. J.—Mark points in Delaware River and Bay between Trenton, N. J., and the sea, and establish White Hill Range on Newbold Island, N. J. Project completed. Total cost, $41,064.

Elbow of Cross Ledge Light, Delaware Bay, N. J.—Repair caisson. Install steel belt around caisson. Work practically completed. Cost to June 30, 1934, $14,758

Fisher Point, Delaware River, etc.—Establish five range lights. Preliminary work on project completed; two contracts negotiated and one approved. Cost to June 30, 1934, $6,166.

Hoboken Light station, N. C.—Construct wharf, storehouse, bulkheads, buoy skids, and dredge boat slip. Project completed. Contract awarded for new dwelling. Motor boat for station nearing completion. Cost to June 30, 1934, $21,194.

Cape Hatteras, N. C.—Move light to new location. Fabricated steel tower 150 feet high and illuminating apparatus have been purchased. New site being acquired. Cost to June 30, 1934, $4,659.

Fog signal testing station, Virginia.—A suitable site has been selected on the Cape Henry Lighthouse reservation and plans are in course of preparation.

Portsmouth Lighthouse Depot, Va.—Enlarge and improve depot. Site has been purchased, piling and lumber delivered, and work started. Cost to June 30, 1934, $44,564. Rebuild bulkheads and dredge. All work completed except dredging. Cost to June 30, 1934, $16,803.

York River, Va.—Establish aids. Steel structure established and light in commission. Buoys have been ordered. Project substantially completed. Cost to June 30, 1934, $9,392.

Hog Island and Cape Charles, Va.—Contract has been awarded for heating and plumbing systems in four dwellings. Cost to June 30, 1934, $11,750.

Croatan Sound, N. C.—Improve illuminating apparatus. The apparatus has been ordered. Project 20 percent completed. Cost to June 30, 1934, $2,793.

Chesapeake Bay, Md.—Improve lights and fog signals. The illuminating apparatus has been ordered. Cost to June 30, 1934, $6,530.

Chesapeake Bay, Va.—Improve lights and fog signals. The illuminating apparatus has been ordered. Cost to June 30, 1934, $4,336.

Portsmouth Lighthouse Depot, Va.—Install machinery and modernize shops. Bids are being invited. Cost to June 30, 1934, $3,025.

Fifth district storm damages.—Rebuild and repair 59 minor lights and make extensive repairs to 9 light stations. Project substantially completed. Cost to June 30, 1934, $74,708.

Charleston Harbor and Cooper River Lights, S. C.—See annual report, 1933, page 103. Project completed. Total cost, $10,949.

Intracoastal waterway, Florida.—Establish automatic primary battery electric lights. Illuminating apparatus, low discharge type storage batteries, and materials of construction have been purchased and delivered. Cost to June 30, 1934, $4,067.

Charleston depot office building, South Carolina.—Plans and specifications for a 2-story brick building, 46 by 74 feet, have been completed and bids were opened on June 22, 1934. Cost to June 30, 1934, $556.

Lighted buoys, sixth lighthouse district.—See annual report, 1933, page 103. The majority of the buoys were delivered during the year and have been established. Cost to June 30, 1934, $34,730.

Smith Shoal, Fla.—See annual report, 1933, page 103. Project completed. Total cost, $18,372.

Punta Rasa Range Lights, Fla.—See annual report, 1933, page 103. Project completed. Total cost, $8,308.

Tennessee Reef Light, Fla.—See annual report, 1933, page 103. Project completed. Total cost, $15,691.

Tampa Bay (Mullet Key Shoal Lights), Fla.—See annual report, 1933, page 103. Project completed. Total cost, $8,695.

Cosgrove Shoal Light, Fla.—Establish light on skeleton iron tower. Metal work under contract. Cost to June 30, 1934, $5,388.

Pulaski Shoal Light, Fla.—Establish light on skeleton iron tower. Metal work under contract. Cost to June 30, 1934, $5,292.

Miami Harbor Lighthouse, Fla.—Contract let for nine galvanized iron pipe towers for lights. Cost to June 30, 1934, $55.

Key West Depot, Fla.—Make repairs and improvements to newly acquired quarters. Concrete and iron fence, floor in workshop, steel window sashes in workshop, work of resurfacing grounds, removal of gantry crane, and repairs to buildings completed. Cost to June 30, 1934, $18,247.

Miami to Cape Sable, Fla.—Establish 34 minor electric primary cell lights. All materials on hand and work under way. Cost to June 30, 1934, $2,924.

Hillsboro Bay and Tampa Bay, Fla.—Improve and change aids in channels. Ironwork for six structures under contract. Lighted buoy and illuminating apparatus have been requisitioned from General Depot. Work contingent on necessary dredging. Cost to June 30, 1934, $15.

Egmont Key Light Station, Fla.—Reconstruct wharf and repair buildings. Plans have been completed and approved in readiness for bids.

Mobile Lighthouse Depot, Ala.—See annual report, 1933, page 103. Additional fill was placed within the bulkhead. Project completed. Total cost, $1,066.61.

Improvements to light stations, eighth district (Timbalier Bay and South Pass West Jetty).—Requisition made on third district for buoyage for Timbalier Bay. Order placed for riprap. Cost to June 30, 1934, $10,458.

Mobile Lighthouse Depot, Ala.—Reconstruct buildings. Three buildings erected. Awaiting settlement of fill placed inside and outside buildings. Other improvements under way. Cost to June 30, 1934, $49,270.

Intracoastal waterway, New Orleans to Sabine, Tex.—Reconstruct lights. Establish single-pile and three-pile structures to mark dredged channel. Materials assembled. Cost to June 30, 1934, $7,125.

Minor lights, eighth district.—Revise system of minor lights, as follows: Sabine to Galveston, Brazos-Santiago, Galveston to Corpus Christi, and Aransas Pass. Practically all materials on hand. Requisition made on General Depot for illuminating apparatus. Erection of lights practically completed except where necessary to await completion of dredging operations of United States Engineers. Cost to June 30, 1934, $16,925.

Houston Channel, Tex.—Move eight lights. Materials assembled. Work 50 percent completed. Remainder will be accomplished when United States Engineers complete dredging. Cost to June 30, 1934, $8,532.

Galveston Depot Storehouse, Tex.—Construct brick storehouse. Building erected and steps taken to complete other improvements. Project 80 percent completed. Cost to June 30, 1934, $17,734.

New Orleans Lighthouse Depot, La.—Congressional authority for the lease of a suitable site was enacted late in the session, and the execution of lease is now in progress preliminary to the erection of wharf and depot buildings. Tentative plans of structure have been compiled.

St. Andrews Bay, Fla.—Establish lights. All materials on hand except illuminating apparatus requisitioned from third district. Structure for main light erected. Other light will be erected when United States Engineers complete dredging. Cost to June 30, 1934, $6,185.

Cubits Gap, La.—Lay willow mattress, stone protection, etc., and move building. Work completed. Total cost, $3,500.

Galveston Jetty, Tex.—Deposit riprap and construct boat landing. Bids solicited. Cost to June 30, 1934, $31.

Gulfport, Miss.—Erect channel range lights. Work practically completed. Cost to June 30, 1934, $4,907.

Sabine-Neches Canal, Tex.—Revise aids. Materials assembled and bids solicited for construction. Cost to June 30, 1934, $3,821.

Eighth district storm damages.—Repair Brazos-Santiago station, Tex., Matagorda station, Tex., Turtle Cove Channel Range Rear Light, and Aransas Pass Spur Dike Light 2. Repairs completed at Brazos-Santiago and Aransas Pass and under way at other stations. Lighted whistle buoy requisitioned from General Depot. Cost to June 30, 1934, $9,243.

Sabine Pass Outer Range Lights, La.—Establish lights. Practically all materials assembled. Bids solicited for driving piles. Cost to June 30, 1934, $4,067.

San Juan Lighthouse Depot, P. R.—Construct office and storehouse. See annual report, 1933, page 103. Project completed. Total cost, $17,092.

Cape San Juan, P. R.—Restore and improve light station. Woodwork and plastering renewed. Electric lighting provided. A four-panel revolving lens has been installed in place of lens destroyed by hurricane. Project completed. Total cost, $16,399.

East Charity Shoal, N. Y.—Establish unattended light on submarine site. Contract awarded for timber crib and concrete superstructure foundation, and riprap protection. Site surveyed; preparatory work in progress. Cost to June 30, 1934, $391.

Buffalo Lighthouse Depot, N. Y.—An addition to the machine shop was constructed of tile walls and steel-frame construction. The shop has also been completely modernized. Project completed. Total cost, $15,000. Construct protection pier at entrance to slip and complete yard grading, etc. Plans and specifications approved for protection pier. Yard grading, etc., completed. Cost to June 30, 1934, $7,004.

Oswego, N. Y.—See annual report, 1933, page 104. Erect steel lighthouse superstructure. Work under way. Light on east breakwater completed. Foundation for keeper's dwelling completed. Site secured for boathouse. Cost to June 30, 1934, $35,222.

Cape Vincent, N. Y.—Construct steel sheet-pile wharf and boatslip, backfill wharf, place concrete top, dredging as required. Move and remodel boathouse. Additional land purchased. Plans and specifications approved. Bids invited. Cost to June 30, 1934, $6,561.

Light-station quarters, tenth district.—Construct two-family keepers' dwelling, boathouse, and slip at Fairport, Ohio, and provide boathouses and slips at Ashtabula and Lorain, Ohio. Contract awarded for boatslip at Fairport and Lorain. Site secured for Fairport dwelling; plans and specifications approved, awaiting approval title. Site secured for Ashtabula boathouse and slip; title being examined. Cost to June 30, 1934, $623.

Maumee Bay Ranges, Ohio.—Rebuild about 55 lineal feet concrete pier. Contract awarded. Cost to June 30, 1934, $2.

Thirty Mile Point, N. Y.—Establish fog signal. Contract awarded for brick fog-signal house and addition to keepers' dwelling. Type F diaphone and machinery purchased. Shore protection also to be provided. Cost to June 30, 1934, $5,598.

Sodus Harbor and St. Lawrence River, N. Y.—Revise aids. Contracts awarded for concrete-block foundations for two minor lights in St. Lawrence River. Steel towers purchased and other apparatus being assembled. Sodus changes contingent on United States Engineer work, not yet accomplished. Cost to June 30, 1934, $576.

Revision of aids, tenth district.—Relocate breakwater lights, necessitated by United States Engineer harbor improvements. At Conneaut and Huron, power houses and control stations have been completed. Towers, diaphones, and other equipment. Completion of work contingent on work being done by United States Engineers. Cost to June 30, 1934, $15,141.

Monroe, Mich.—Establish range lights and four lighted buoys. Range light towers and buoy bodies purchased and delivered. Balance material being assembled. Establishment of buoy contingent on dredging operations by United States Engineers. Cost to June 30, 1934, $2,701.

Maumee Bay, Ohio.—Provide lighted and unlighted buoys for lakeward extension of Maumee Straight Channel. All buoys delivered. Balance equipment ordered. Establishment contingent upon completion channel. Cost to June 30, 1934, $6,758.

South Buffalo, N. Y.—Electrify station and improve fog signal. Type F two-tone diaphone, motor-driven compressors, and submarine cable connecting with commercial power lines on shore have been installed. Work nearly completed. Cost to June 30, 1934, $10,425.

Cleveland and Toledo, Ohio.—Provide radiobeacon at Cleveland, and replace obsolete fog-signal equipment at Toledo, radiophone installation to Maumee Ranges and Manhattan Ranges to be provided. Most of the equipment has been delivered at station, awaiting installation. Cost to June 30, 1934, $7,709.

Wyandotte, Mich.—See annual report, 1933, page 104. The keepers' dwelling and boathouse have been built. Project completed. Total cost, $20,960.

Port Austin Reef, Mich.—Replace brick and timber facing with concrete. Facing has been stripped from five sides of the octagonal pier, and flash plating and back-up concrete placed on four sides. Cost to June 30, 1934, $12,429.

Duluth-Superior Harbor, Minn. and Wis.—Rearrange aids. Work comprises the establishment of range lights on permanent structures and provides lighted buoys to replace temporary pile structures. Work begun on 7 circular steel sheet piling pier structures. Fabrication of 32 gas buoys and rebuilding buoy dock at Superior Entry, Wis., practically completed. Erection of 3 rear range towers on land sites completed. Cost to June 30, 1934, $82,234.

Spectacle Reef, Mich.—Repair foundation pier. Work on repairs to the concrete pier started during the month of June. The repairs are to consist of driving a protection wall of interlocking sheet-steel piling close up against the portion of the pier to be repaired and filling in the undermined portions with tremie concrete and grout. The work is 10 percent complete. Cost to June 30, 1934, $16,062.

St. Clair Flats Range, Mich.—Rearrange aids. Plans and surveys are under preparation. Cost to June 30, 1934, $86.

St. Marys River Beacons, Mich.—Replace Pintsch lighting equipment with acetylene. All equipment is under purchase, much of which has not been received. Electrification of Winter Point Range under way. Cost to June 30, 1934, $27,265.

Ashland Harbor, Wis.—Rearrange aids. Six gas buoys and 20 special steel unlighted buoys purchased. Two additional gas buoys under purchase. Project substantially completed. Cost to June 30, 1934, $5,690.

Harbor Beach, Mich.—Electrify station and install radiobeacon. All materials delivered. Cost to June 30, 1934, $12,098.

Replace steam fog signals, eleventh district.—See annual report, 1933, page 104. At Crisp Point, Mich., a 6-inch siren was installed. At Port Austin Reef, Mich., a type F diaphone, and at Fort Gratiot, Mich., an electric oscillator. Project completed. Total cost, $18,850.

Point Iroquois, Mich.—See annual report, 1933, page 104. Project completed. Total cost, $8,368.

North Manitou Shoal, Mich.—Construct fixed structure to replace North Manitou Lightship. Contracts have been let and the entire project is 50 percent completed. Cost to June 30, 1934, $75,399.

Peshtigo Reef, Wis.—Construct fixed structure to replace Peshtigo Lightship. Plans and specifications are in preparation. Steel piling has been purchased. The modification of lightship *No. 75* to serve as a radio remote controlled and automatic lightship to mark this station temporarily, pending the completion of the pier station, is well advanced. Cost to June 30, 1934, $2,502.

Minneapolis Shoal, Mich.—Construct fixed structure to replace Eleven-Foot Shoal Lightship. Plans and specifications completed and some materials furnished by Government, purchased. Cost to June 30, 1934, $15,251.

Grays Reef, Mich.—Construct fixed structure to replace Grays Reef Lightship. Various materials furnished by Government under purchase. Cost to June 30, 1934, $15,245.

Calumet Harbor, Ill.—Construct dwellings for four keepers at new site. The entire project is 75 percent completed. Cost to June 30, 1934, $14,771.

Calumet Harbor Breakwater Lights, Ill.—Prepare plans and specifications for two new lights to be erected on the extension to the breakwater. Cost to June 30, 1934, $1.

Manitowoc, Wis.—Construct keepers' dwellings. Dwelling for three keepers under way. Cost to June 30, 1934, $14,343.

Green Bay Channel, Wis.—Establish new aids. Plans and specifications are in preparation for light and fog signal structure on submarine site to mark the entrance to Green Bay, Wis. Cost to June 30, 1934, $119.

Electrify and improve light stations, twelfth district.—Plans and specifications in preparation for equipment at South Haven and Big Sable, Mich. Cost to June 30, 1934, $2,650.

Milwaukee Lighthouse Depot, Wis.—Construct storehouse. Contracts have been let and project 95 percent complete for construction of a storehouse 48 by 90 feet, of steel and masonry. Cost to June 30, 1934, $13,440.

Grossepoint, Ill.—Electrify station, discontinue fog signal and make station automatic. Work practically complete. Cost to June 30, 1934, $2,091.97.

South Fox Island, Mich.—Construct new tower to replace old brick tower. Plans and specifications in preparation. Tower from an abandoned coast station being dismantled for use. Cost to June 30, 1934, $584.

Indiana Harbor, Ind.—Establish new light and fog signal on breakwater extension. Plans and specifications are in preparation for providing a light and fog signal at the outer end of the east breakwater which it is proposed shall be extended northerly 2,300 feet. Tower under contract. Cost to June 30, 1934, $4.

Port Washington, Wis.—Establish light and fog signal. Plans and specifications are in preparation for constructing a light and fog signal on the end of the proposed new breakwater. Tower under contract. Cost to June 30, 1934, $1,341.

Establish Mississippi River buoys.—About 990 buoys with mooring equipment have been purchased for the Mississippi River and tributaries. Cost to June 30, 1934, $11,293.

Establish Ohio River lights and provide buoy replacements.—120 lighted buoys with lanterns and dry-cell packs have been purchased. Also 132 marine beacon lanterns have been ordered. Cost to June 30, 1934, $17,232.

Tree Point, Alaska.—Rebuild light and fog signal building. Excavation for a reinforced concrete structure was made during November 1933. Actual construction started in April 1934; basement, first floor, and roof have been poured. Cost to June 30, 1934, $25,208.

Sentinel Island, Alaska.—Rebuild light and fog-signal building. Excavation for a new reinforced-concrete structure was made during 1933. Materials purchased. Cost to June 30, 1934, $2,314.

Cape Hinchinbrook, Alaska.—See Annual Report, 1933, page 105. This project completed. Total cost, $91,793.

Establish minor automatic aids, Alaska.—Materials have been purchased for 8 of the 9 authorized aids. Cost to June 30, 1934, $11,527.

Establish Wrangell Narrows aids, Alaska.—Materials have been purchased for minor aids, including buoys in Wrangell Narrows. Cost to June 30, 1934, $2,860.

Reconstruct Five Finger Island Light Station, Alaska.—Plans for the replacement of structures at this station which were destroyed by fire in December 1933 are under way. Some equipment has been ordered.

Desdemona Sands, Oreg.—See Annual Report, 1933, page 105. Construct power shed for housing transformers and stand-by generator. Submarine cable for transmitting power to the light station delivered on site and power shed constructed. Cost to June 30, 1934, $5,623.

New Dungeness, Wash.—See Annual Report, 1933, page 104. Electrification of station completed, covering construction of transformer house and installation of equipment. Wood pile bulkhead and groin also installed to stop erosion. Project completed. Total cost, $13,100.

Browns Point, Wash.—See annual report, 1933, page 104. Project completed. Total cost, $5,868.

Lighted buoys, Oregon and Washington.—Seven lighted buoys requisitioned from third district. Buoys to be installed along coast of Oregon and Washington. Cost to June 30, 1934, $245.

Puget Sound, Wash.—Establish automatic lights and signals. Construction of new light structures for minor lights at Davidson Rock, Puffin Island Shoal, Waterman Point, and Leo Reef completed. Aids to navigation improved in approach to Bremerton, Wash., including establishment of lighted buoy at Bainbridge Reef; additional horn at Orchard Point; echo board at Orchard Rocks; improved signal at Waterman Point; and fog signal and improved electric light at Point Herron. Plans completed and early construction of light- and fog-signal station to be undertaken at Waadah Island and Cattle Point. Bids invited for construction of light structure at Point Defiance, Wash. Cost to June 30, 1934, $18,518.

Cape Arago, Oreg.—Reconstruct tower, etc. Construction of reinforced concrete tower and fog-signal building completed and equipment installed. Project completed. Total cost, $9,213.

Cape Flattery, Wash.—Construct keepers' dwelling. Contract awarded for construction of new double dwelling. Practically all materials have been delivered and building is about 60 percent completed. Cost to June 30, 1934, $6,693.

Electrify light stations, seventeenth district.—At Dofflemyer Point new reinforced concrete light- and fog-signal buildings constructed. Foghorn and stand-by equipment installed and placed in operation. At Yaquina Head electrification of light station completed, including stand-by equipment. At Willamette River battery-operated light established. CO_2 fog bell has been requisitioned. Cost to June 30, 1934, $7,808.

North Head, Wash.—The new road connecting the light station with county highway now under construction. Cost to June 30, 1934, $2,598.

Coast lights, Oregon.—Electrify stations. Work of electrifying Heceta Head, Umpqua River, and Cape Meares Light Stations is well under way. Concrete power sheds have been constructed at Heceta Head and Umpqua River. Equipment ordered for all three stations. Installation of equipment and wiring of towers and buildings under way at Heceta Head and Umpqua River. Cost to June 30, 1934, $2,104.

Convert oil lights to semiautomatic, Oregon Sounds, Oreg.—During the year, twenty-one 90- and eight 120-millimeter electric lanterns were installed in Coos Bay, Umpqua River, Yaquina Bay, Tillamook Bay, and Columbia River, Oreg. Three range reflector lanterns were installed in Coos Bay and Yaquina Bay, Oreg. Three 90-millimeter lanterns were installed on the Willamette River, Oreg. One 150-millimeter lantern was installed on the Columbia River. Cost to June 30, 1934, $6,311.

Tongue Point Lighthouse Depot, Oreg.—Construct wharf. Construction of new wood-pile wharf was started April 1, 1934, and is now nearing completion. Electric service, water, and air lines are now being installed. Cost to June 30, 1934, $8,908.

Humboldt Bay Fog Signal Station, Calif.—See annual report, 1933, page 106. Project completed. Total cost, $5,995.

Improve light stations, eighteenth district.—At San Luis Obispo, Calif., new timber wharf constructed, extending 120 feet beyond end of old wharf; old steam hoist replaced by gasoline-engine-driven hoist. Total cost, $7,008. At Yerba Buena, Calif., the fog signal changed from steam whistle to double type C diaphone signal with electric siren stand-by. Wiring of quarters remodeled and light changed from fixed white to flashing white. Total cost, $5,552.

Yerba Buena Lighthouse Depot, Calif.—Extend wharf. Wharf extended 90 feet to provide additional berthing space for tenders and buoy storage. Crane track extended to outer end of wharf for handling and storage of buoys. Project completed. Total cost, $13,019.

Los Angeles Depot, Calif.—Construct wharf, warehouse, etc. Timber pile wharf was constructed. All timbers creosoted except deck joists and planking. Project completed. Total cost, $23,171. A warehouse was constructed for storage of miscellaneous equipment and supplies. Warehouse is of one-story, reinforced-concrete construction with provision for offices, blacksmith shop, etc. Project completed. Total cost, $18,900. Contracts let for construction of fence and roadways. Contract for keepers' dwelling in preparation. Cost to June 30, 1934, $58,751.

Southern California Islands.—Establish additional aids. Seven 375-millimeter acetylene lights established. Each light is mounted on small timber

structure, housing a double bank of accumulators to reduce maintenance. Project completed. Total cost, $9,376.

Punta Gorda, Calif.—Construct roads. Field survey completed; plans and specifications completed. Project advertised for bids. Cost to June 30, 1934, $3,035.

Additional buoys, eighteenth district.—Requisition submitted to third district for buoys and fittings. Cost to June 30, 1934, $9,305.

San Joaquin River, Calif.—Establish aids. Structures erected and five lights established. Temporary buoys established pending receipt of material requisitioned from third district. Cost to June 30, 1934, $12,426.

East Brother Island, Calif.—Improve fog signal, etc. Work practically completed; new signal and electric light in lens in commission; stand-by fog signal oscillator and generator installed. Cost to June 30, 1934, $10,620.

San Diego, Long Beach, and Los Angeles Harbors, Calif.—Additional aids rendered necessary by War Department improvements. Materials and equipment ordered. Cost to June 30, 1934, $1,595.67.

Improve fog signals, eighteenth district (including electrification of Table Bluff and San Luis Obispo Light Stations).—Plans and specifications prepared for work at Table Bluff Light Station; proposals for purchase of equipment being issued. Cost to June 30, 1934, $3,000.

California Harbors aids.—Establish aids to mark new river and harbor improvements. Lights established in upper San Francisco Bay; temporary buoys established in Los Angeles Harbor. Plans prepared for light and fog signal on Los Angeles-Long Beach Breakwater. Cost to June 30, 1934, $13,289.

Cape Kumukahi, Hawaii.—See annual report, 1933, page 106. A galvanized structural steel tower, 110 feet high, and a corrugated asbestos power house were erected. The project included the installation of two 36-inch airways beacons, three engine-generator units, and electrical work connected therewith. Project completed. Total cost, $10,135.

Barbers Point, Hawaii.—See annual report, 1933, page 106. The grounds were improved. Gasoline driven engine-generator units were installed and station electrified throughout. Project completed. Total cost, $19.304.

Repair depots and stations, Hawaii.—At Kalae, old structural steel tower and power house renewed; telephone pole line is also to be constructed. At Makapuu a telephone pole line was completed. Two automatic 5-kilowatt engine generators and necessary equipment for improving the radiobeacon were purchased and the work of installing is in progress. At Molokai three fully automatic 2-kilowatt engine generators and equipment were purchased for electrifying the lights. Plans and specifications covering the installation are completed. At Sand Island Buoy Depot, work of moving stores to new site has been completed. Plans and specifications for marine railway, boat car, shed, etc., completed. At Nawiliwili, new water pipe line has been completed. A telephone pole line will be completed during current year. At Nakalele erection of new wooden tower has been completed. Cost to June 30, 1934, $9.956.

Hawaii, minor aids and buoys.—Establish three lighted buoys to replace smaller buoys unsuitable for locations in the open sea. Buoys and appendages were ordered by requisition on the third district. Re-mark improved entrance channel to Honolulu Harbor. Plans and specifications have been completed for new range structures and for 1 electric and 1 acetylene light. Lighted buoy to replace present can buoy at Blonde Reef Buoy has been ordered. Establish acetylene light on a 30-foot wooden tower at Kauna Point. Site has been acquired and order placed for illuminating apparatus. Establish acetylene light on a 40-foot wooden tower at Palaoa Point, install derrick, and improve the site Establish 2 range lights, a breakwater light, and 5 wooden buoys, made necessary by harbor improvements to be accomplished by the United States Engineers in Port Allen Harbor. Illuminating apparatus, buoys, and appendages have been ordered by requisition upon the third district. Cost to June 30, 1934, $3,000.

GENERAL SERVICE PROJECTS

Buoys to replace stations and vessels.—Work under this project is being carried out at 6 districts, including the replacement of 2 lightships. Cost to June 30, 1934, $3,019.64.

Automatic apparatus for major lights.—Improvement of major lights through introduction of automatic equipment chiefly electrical is under way in seven districts. Cost to June 30, 1934, $6,900.38.

Automatic apparatus for minor lights.—Minor lights of types requiring manual attendance are being eliminated and automatic apparatus substituted in six districts under this project. Total cost to June 30, 1934, $6,070.46.

Improvement of fog signals at stations.—This work includes the substitution of more powerful compressed air signals, improved compressing machinery, control apparatus at stations in five districts. Cost to June 30, 1934, $5,341.79.

Improving radiobeacons at stations.—This project which includes the modernization of radio transmitting equipment at some 11 stations, together with improved control equipment at various stations, is well under way and delivery of transmitters is about to be started. All work has been placed under contract or is covered by bids pending.

COAST AND GEODETIC SURVEY

REVIEW OF THE YEAR

The fiscal year 1934 has been one of unprecedented activity for the Coast and Geodetic Survey. The uniform, moderate programs of work, which are the ideal for an agency charged with the gradual performance of large tasks, were drastically disturbed by the depression. Curtailments of normal activities were accompanied by assignments of large special projects under the Government's emergency programs, with the net result that the volume of Bureau activity has far exceeded that of any previous year of its history.

The Bureau's regular appropriation for 1932, which may be regarded as normal, was $3,075,933. That for 1934 was $2,205,090, a reduction of 28 percent. At various times during the year the Bureau received Public Works allotments totaling $6,503,120 for a series of projects of field work, the first of which began in the fall of 1933 and all of which will terminate in the spring or early summer of 1935; in other words, substantially a 1½-year program of field work divided about equally between the 2 fiscal years. In addition, during the winter the Survey carried on a Civil Works Administration program of local control surveys on which, at the peak, 10,288 persons were employed, being paid directly by that Administration.

In short, when the program was at its height last winter, the Survey, which normally spends about $3,000,000 a year and employs some 1,300 persons, was spending at the rate of over $20,000,000 a year and employing some 12,000 temporary persons additional to its regular permanent force.

These concurrent reductions and expansions of the work necessarily overlapped. To illustrate, in the function of providing adequate charts for the mariner, some operations were largely curtailed, while others were even more largely expanded. These apparent contradictions would mislead anyone who did not realize the principle on which they were based. Since a major purpose of the Public Works money allotted to the Bureau was to relieve unemployment, its application was limited to projects which would afford a maximum of such relief. The goal which was voluntarily set for the Bureau was that approximately 70 percent of the money spent should be paid out directly as wages.

Operations which could not make this contribution to the relief of unemployment were curtailed. Of these, the principal ones were those carried on by the Bureau's sea-going ships. One ship was laid up throughout the year, and the working seasons of others were shortened. During the periods of operation, the personnel of all ships was supplemented by employment of men paid from Public Works funds.

THE PUBLIC WORKS PROGRAM

Detailed report on the Public Works projects must await their completion, but a brief preliminary report at this time is appropriate.

The sum of $3,210,148 of Public Works money was spent during 1934. This expenditure contributed to the following extent in relieving the depression:

1. Jobs were given to 3,125 different persons in need of relief. This number includes some turn-over, of which, however, there has been very little. Full-time employment has been running at the rate of 2,300 to 2,500 persons per month.

2. The men employed were largely of the white-collar class, for whom the problem of relief has been a particularly difficult one. Twenty-nine percent of the total were graduate engineers, and 59 percent were men of college training. Only a small percentage of these men were employed on professional work. A great majority of them were used in the various subprofessional capacities of surveying work, such as rodmen, chainmen, and truck drivers. Thus the personnel of the surveying parties has been of exceptionally high caliber. In addition, they were grateful for the relief and enthusiastic about the work. The practical result of these factors is that in spite of the emergency character of the program, worth-while projects are being carried on at substantially the same unit costs as those which prevail in our similar normal operations.

3. The pay is moderate, ranging from $85 a month for hands to $150 a month for an engineer operating an instrument and in charge of a unit of the work under direct supervision. The basis on which the pay scale was fixed was to give the men a decent wage, yet one sufficiently modest so that each man always would have an incentive to get off the Federal pay roll as quickly as possible.

4. The work was widely distributed over the rural districts of each State. The operating expenses of the parties, which constituted about 12 percent of their total cost, and the subsistence expenses which the men paid out of their own salaries, were spent locally in the small communities and contributed materially to relieving local stagnation.

In return for these expenditures, the public will receive the following permanent benefits:

1. A survey of the intracoastal waterway, extending along the Atlantic and Gulf coasts and of all commercially important tributaries thereto. The Federal Government is spending many millions of dollars to improve the natural waterways of these regions; and when the project, which is now approaching completion, is finished, small craft will be able to go all the way from New York to Key West, and from Apalachicola, Fla., to Corpus Christi, Tex., without having to enter unsheltered ocean waters. Charts to guide mariners through these waterways are essential to their effective use, and slightly less than half of the Public Works money is being devoted to field surveys required for the production of such charts.

2. A little less than half the money is being used to expedite progress on the program of control surveys (triangulation and leveling), which the Bureau has been carrying on at an inadequate rate for many years. These surveys are essential to the mapping of the coun-

try and to every extension of engineering projects requiring accurate knowledge of the horizontal and vertical relationships between points on the earth's surface. They are to such engineering operations what the steel framework is to a large building—they give form and strength and rigidity to the whole structure. The national demand for work of this character recently has been unusually large, and it is in response to such demand that the work is being expedited.

3. A small sum is being devoted to studies of earth movements at the central regions of an earthquake and to the response of buildings, bridges, dams, and similar structures to such movements. This undertaking is a part of a larger non-Federal effort to safeguard life and property by learning how to design such structures so that they will resist the earthquake stresses.

4. Tidal and current surveys were made in a number of important waterways where the resulting data were urgently needed by mariners and engineers.

5. Survey ships and observatories have been reconditioned.

6. The Survey is a firm believer in the principle of constantly striving to develop new instruments and equipment whereby better results can be obtained at reduced costs. Its goal has been to maintain close and constant contact with progress in science and its applications, and to appropriate for its own use any detail which can be utilized to advantage for this purpose. The unemployment situation enabled it to secure the services of half a dozen men, each a specialist along some particular line, and through those services to develop certain instruments and equipment whose subsequent use will save the Government hundreds of thousands of dollars. The need for brevity denies to these achievements the space which their importance merits. There may be mentioned, however, the shoal-water fathometer, the precision photolithographic camera, the 9-lens aerial camera and accompanying rectifying and other equipment, and a machine for drawing projections.

Finally, it is important to note that all field work was devoted to projects with which the Bureau is charged by law and has been carrying on under the regular annual appropriations. Use of the Public Works money for such purposes means that equivalent amounts need not be included in the regular appropriations hereafter made.

CIVIL WORKS PROJECT

Late in the fall, the Civil Works Administration asked the Coast and Geodetic Survey to undertake a program of local control surveys, supplemental to the regular Federal project. It asked that 15,000 men be taken on for this project, as a part of its program to provide winter work for 4,000,000 persons.

The Bureau was reluctant to undertake such a project, because it had a lively appreciation of the impossibility of getting results at low unit costs. Finally persuaded, however, that the emergency justified inefficiencies which it would not normally have sanctioned, it undertook the project.

Within little more than a month after the final word came to go ahead, some 10,000 men had been recruited, organized into units of 7 to 10 men each, equipped with borrowed or rented instruments,

supplied with transportation procured on the same basis, trained, and set to work.

This was no small achievement. The principal credit for it belongs to the 48 men whom the Survey carefully selected, one for each State, and asked, as a contribution to the welfare of less fortunate members of their professions, to organize and direct the work in his State. While lack of space precludes a detailed report on the project, no report on the Bureau's work for the year would be complete without a tribute of appreciation to these men who, faced with unusual difficulties, gave unsparingly of themselves, at only nominal compensation, to make the projects successful. Without exception, they did remarkably well.

SUMMARY OF ACTIVITIES

A fleet of 12 surveying vessels carried on hydrographic work during the year—the *Gilbert*, *Hydrographer*, *Lydonia*, *Mikawe*, *Natoma*, and *Oceanographer* on the Atlantic coast, and the *Discoverer*, *Explorer*, *Guide*, *Pioneer*, *Surveyor*, and *Westdahl* on the Pacific and Alaskan coasts. Ninety-three smaller craft, mostly leased for temporary use, also were used by these vessels and by a large number of parties engaged in coastal surveys and operating from bases on shore.

Surveys in the Philippine Islands were continued by one ship, the *Fathomer*, provided by the insular government. The *Pathfinder* formerly operated by the Federal Government in the islands was laid up during the year for lack of funds.

Some thirty-two major parties (with a number of subparties) were engaged in most States in geodetic triangulation, base-line measurements, reconnaissance for triangulation, and gravity and astronomic observations.

Details of these activities and of the Bureau's tide, current, magnetic, and seismologic work are given elsewhere in this report.

Field stations were maintained at Boston, New York, New Orleans, San Francisco, Seattle, Honolulu, and Manila; handling these areas in supervisory matters, furnishing direct information as to charting needs, and supplying the public with nautical information. Operations in the Philippine Islands were supervised by the Manila station.

The Washington office of the Bureau received from these many sources of supply a large amount of basic field data which were subjected to the various processes, including the compilation and printing of nautical charts and airway maps, required to make the information obtained available for public use.

There were received in the library and archives, 213 hydrographic and 228 topographic sheets, each representing new Bureau surveys. Other additions were 1,112 blueprints (mostly surveys by Army engineers), 2,410 maps, 2,141 charts, 14,613 field, office, and observatory records, 198 negatives, 404 prints, 118 lantern slides, 1,064 books, and 4,303 periodicals.

The files contain many early maps, compiled sketches, and charts not made by this Service. With the use of recovery funds, they are being thoroughly repaired by a map researcher, to make them more readily usable.

A total of 2,691 employees was serving the Bureau on June 30, 1934, shown in the table following, compared with 2,024 in 1933 and 1,422 in 1932:

Staffs	Commissioned	Civilian				Staff totals		Total
		Classified	Unclassified			Washington	Field	
			Laborers	Seamen	Hands			
Regular appropriations:								
Washington office	14	236	4			254		254
Field service	157	73		[1] 620	[1] 62		912	912
Total	171	309	4	620	62	254	912	1,166
Public Works funds:								
Washington office		214				214		214
Field service		138			1,173		1,311	1,311
Total		352			1,173	214	1,311	1,525
Grand total	171	661	4	620	1,235	468	2,223	2,691

[1] Includes 40 civilian employees on duty at the Manila field station and 50 members of the crew of the hip *Fathomer*, paid by the insular government but under the jurisdiction of this Bureau.

The regular annual appropriations for the year, totaling $2,205,090, were supplemented by an allotment of $35,000 from "Air Navigation Facilities, 1934", and $6,503,120 from the appropriation "National Industrial Recovery, 1933–35", making available a sum totaling $8,743,210.

Expenditures during the year ended June 30, 1934, totaled $4,588,394.42, distributed among the various appropriations as follows:

Salaries, 1933	$21.25
Party expenses, 1933	28,071.40
General expenses, 1933	1,450.97
Party expenses, 1933, emergency construction	223,414.62
Pay and allowances, commissioned officers, 1933	51,128.09
Pay, officers and men, vessels, 1933	13,042.85
Repairs of vessels, 1933	2,647.57
Air navigation facilities, 1933	899.93
Salaries, 1934	460,710.88
Party expenses, 1934	299,561.16
General expenses, 1934	19,980.21
Pay and allowances, commissioned officers, 1934	522,890.87
Pay, officers and men, vessels, 1934	368,734.82
Repairs of vessels, 1934	50,697.32
Air navigation facilities	29,376.15
Topographic survey of United States, contributions	141.49
Working fund, Department of Commerce	243.59
Chicago World's Fair Centennial Celebration	614.51
Second polar year program (State transfer to Commerce Department), 1932–34	6,274.44
National Industrial Recovery, 1933–35	[1] 2,512,687.21
Special deposits	805.09
Total	[1] 4,588,394.42

[1] This sum will be increased by outstanding vouchers covering expenditures by field parties and others, not yet received in the office for settlement.

Collections on account of the sale of nautical charts and other publications, deposited in the Treasury Department to the account of miscellaneous receipts, totaled $72,621.50, as compared with $51,269.48 during the preceding year, an increase of nearly 42 percent.

The following report shows the amount of work done in connection with certain activities during the present and 1933 fiscal years, compared with that of the previous 4 fiscal years.

Year groups	Hydrography	Topography	Triangulation			Reconnaissance	Leveling		Gravity observations
			First order	Second order	Coastal		First order	Second order	
	Soundings	*Miles of shore line*	*Miles*	*Miles*	*Miles*	*Miles*	*Miles*	*Miles*	*Number*
1929	846,517	1,726	1,200	85	878	2,155	1,200	-------	13
1930	780,049	2,273	1,430	-------	863	885	727	-------	7
1931	782,044	2,472	2,895	-------	812	2,720	5,737	156	-------
1932	767,322	1,959	3,400	-------	803	5,950	5,945	1,555	35
Total	3,175,932	8,430	8,925	85	3,356	11,710	13,609	1,711	55
1933	1,387,027	4,407	3,625	-------	2,476	4,350	11,324	2,940	148
1934	2,520,406	14,877	7,440	1,080	1,969	8,810	16,153	28,670	118
Total	3,907,433	19,284	11,065	1,080	4,445	13,160	27,477	31,610	266

DEVELOPMENT OF METHODS AND INSTRUMENTS

A brief comparison of the results of old and modern methods of deep-sea hydrography is indicative of the degree of recent advances in hydrographic surveying for chart construction.

A sounding in 20,000 feet of water with wire required about an nour, during which the vessel had to be stopped. This same sounding today is made in a little over 8 seconds by means of an echo-sounding apparatus, with the vessel at full speed. By old methods the vessel's position was approximated by dead reckoning, while today it is determined accurately by radio-acoustic ranging.

By the modern method a bomb composed of a small quantity of TNT, timed to explode when it has sunk about 100 feet, is dropped overboard where it is desired to obtain the ship's position. A chronograph on the survey vessel receives electrically from its hydrophone, and records graphically, the impulse from the explosion. The subaqueous sound wave also travels at known velocity to hydrophones at two or more suitably located stations near the shore, where the vibrations set up cause an electrical impulse to travel through amplifiers to a thyratron in a temporary radio station on shore. The actuation of the thyratron at each shore station causes the radio transmitter automatically to send out a signal at the exact instant of the arrival of the sound wave, the radio signals from which are received by the survey vessel's radio receiver and transmitted to the chronograph, where the time of receipt of each is graphically recorded on the same tape which timed the explosion's impulse. Since radio transmission may be considered instantaneous for these distances, the elapsed times indicated on the tape are those required for the sound wave to travel by the water from the ship

to each shore station. These time intervals can be measured from the chronograph tape to one one-hundredth of a second, from which the distances from the shore stations are then computed and the position of the survey ship readily and accurately determined. On one occasion the sound wave from an explosion carried through a distance of 206 miles, and distances of 75 to 100 miles are not uncommon.

In connection with experimental work on the velocity and the path of sound in sea water for use in radio acoustic ranging, developed by this Bureau on offshore hydrographic surveying, the personnel on the ship *Pioneer*, off the coast of southern California, developed a deep-sea hydrophone which was used successfully to a depth of 5,100 feet. This instrument is unique in design, in that it can withstand the enormous pressure at any great depth, although built with a keenly sensitive diaphragm.

The fathometer is based on the precise measurement of the elapsed time required for a sound made on the vessel to go to the bottom and return as an echo, and while of inestimable value in hydrographic surveying from about 15 fathoms to abysmal ocean depths, it is not adapted to shoal-water surveys.

During the past year a new type of fathometer was developed for sounding by echo in depths from a few feet to 20 fathoms. Since the velocity of sound in sea water is about 4,800 feet per second, some idea may be had of the almost unbelievable accuracy of the time element in this newly developed instrument, which must measure the elapsed time for the sound to travel, for example, a depth of 3 feet to the bottom and return, a total distance of but 6 feet, requiring only 0.0012 of a second for the round trip. As the instrument is designed to measure this depth within one-tenth of a foot, its accuracy of measurement of this elapsed time must be within 0.00004 of a second.

When sounding in depths of 5 fathoms with the hand lead, it is possible for the sounding boat to travel at a speed of about 4 miles per hour and to get one sounding every 20 seconds, or every 135 feet over the bottom. With the shallow-water fathometer it will be possible to travel at a speed of at least 12 miles per hour and to get 400 soundings every 20 seconds, or every 12 inches over the bottom, furnishing a most complete profile of the bottom.

The Instrument Division was required to procure and recondition larger quantities of equipment, much of a special nature, and furnish instruments as needed, so that field work could be taken up as promptly as parties were organized.

Experiments continued with the production of more satisfactory material for theodolite precision-graduated circles; in lessening the cost of constructing precision level rods; in reducing the cost of containers and shipping charges on station marks, now used by the hundreds of thousands; in the apparatus for obtaining subsurface samples of sea water, making it more positive and prompt in action; in the timepiece of the portable tide gage, by eliminating lost motion; and in connection with the development of equipment for seismological studies, especially the strong-motion apparatus, of value to engineers and architects.

98223—34——11

Topography by aerial phototopographic ethods is now being done with 5-lens cameras. With recovery funds, designs have been prepared for a 9-lens camera for this work, bids for the construction of which were sent to manufacturers. Instead of separate films for each lens as now required for the 5-lens camera and the resulting 5 photographs for each exposure assembled, fitted, and mounted, the proposed 9-lens camera is designed for the rays of light at exposure from all 9 lenses projected to a single film, resulting in one 35 by 35 inch photograph. At a flight height of about 13,750 feet, for a scale of 1 to 20,000, this single photograph covers a flight strip 11 miles wide, reducing to one-third the number of photographs now necessary. From present estimates, it will decrease the cost of control by about 50 percent and the total cost of phototopographic mapping by about 40 percent.

With a new camera the Bureau's original topographic and hydrographic surveys are now copied to exact scale. As a result of this accuracy, field surveyors check measurements of the data shown and revise directly on them changes since the previous survey, eliminating considerable duplication of surveys formerly needed to determine exactly what changes have occurred between surveys of different dates. Other processes are also simplified. An auxiliary copyboard and a reversing mirror in connection with the camera lens furnish reverse copies, valuable in chart production details.

A new upright whirler was installed for use in coating the process aluminum plates with albumen solution, replacing a worn-out horizontal-type whirler. Because of its upright position, a small amount of coating fluid carefully poured on the center of the plate is spread uniformly by the revolving motion, the speed being stepped-up from slow motion for spreading to a fast speed for drying, the latter process being aided by electric-heating coils. The new machine gives a better coated surface with less waste of materials and time is not lost in cleaning up a heavily gummed machine.

It is no longer necessary for hydrographic units first to prepare an outline drawing before any soundings can be made in areas cut by the various meanderings of numerous waterways. A print is now made in the Washington office from an air phototopographic compilation plate on transparent celluloid in silver white ink, on which vermilion powder is dusted while wet. Burnished down on special paper, an exact duplicate of the topographic features is obtained, including projection lines, control points, and shore-line, eliminating not only former laborious details of transferring from the topographic sheet and checking the accuracy of this transfer but supplying more data, with a saving of time in the field.

DIVISION OF CHARTS

A total of 294,000 copies of nautical charts was printed during the year. Twelve new nautical charts were published, and 154 revised editions reissued. The issue of charts and related nautical publications and commerce airway maps exceeded that of the preceding fiscal year, as shown in the following tabulation of these products issued during the last 5 years by the Washington office.

Items	1934	1933	1932	1931	1930
Nautical charts	[1] 267,924	216,936	249,311	259,862	258,286
Coast Pilots	7,046	4,116	5,825	6,480	7,651
Intracoastal Pilots	1,027	1,399	2,255	1,909	2,208
Tide and current tables	32,503	31,609	49,014	50,306	42,737
Tidal current charts	701	958	635	1,784	326
Commerce airway maps	47,685	29,369	19,402	17,468	[2] 12,004

[1] Not including 5,892 issued by Manila office.
[2] Previously distributed by Aeronautics Branch.

Ever alert to improvements in charts in the interests of simplification, the following changes were inaugurated during the year: The note referring to the unit of soundings shown was enlarged to catch the eye more readily; prominent lights, including lighted buoys, were emphasized by a yellow spot; the locations of radiobeacons and radiocompass stations are brought out by a purple circle; the landmark symbol was enlarged and the identifying reference to the landmark made clearer; the use of the sand symbol between the low-water line and the 18-foot curve is supplanted in certain charts by a blue-color tint; and roads and streets on certain charts are being indicated by single lines.

The great expansion in field surveys by the Bureau and State organizations collaborating in the control network placed a heavy burden on the Chart Division in the reproduction of preliminary basic data. This was particularly true in the photograph laboratory because of the special consideration requested in the speedy delivery of the material when it reached that point in the office.

Frequent requests are received by the Bureau from organizations or individuals for photographic copies of original hydrographic and topographic surveys. Such hydrographic surveys are used by geologists in the study of submarine formations; by institutions engaged in oceanographic research; and as evidence in admiralty cases. Copies of topographic surveys are used by civil departments in planning and development; by individuals in registering property; by land courts; and in law suits over property boundaries. Both types of surveys are used in beach erosion and pollution studies.

The Air Commerce Act of 1926 directs the Secretary of Commerce to foster air navigation, chart the airways, and provide maps for safe navigation. Under this responsibility this office compiles, flight checks, and publishes the air maps of the Bureau of Air Commerce. Twenty-five sectional airway maps are now available of the 87 which will cover the United States. Seven new sectional maps were published and 35 new editions and 8 strip maps revised. To supplement these sectional maps pending the completion of the entire project, maps of routes along airways will continue to be published.

Revisions of these maps to include new or changed conditions constitute a continuing effort. During the past year the New York map was printed three times, the Chicago map three times, and the Los Angeles map four times.

DIVISION OF HYDROGRAPHY AND TOPOGRAPHY

A marked increase in hydrographic work has resulted from the use of recovery funds. Besides the alleviation of unemployment by direct wages to the men employed, the Bureau was able to accomplish many long-delayed original and revisional surveys. Among others, present charts around the islands off the southern California coast are based on surveys of a preliminary nature. The Navy requested fleet anchorage charts of these areas, and these surveys have now been made and the anchorage charts will soon be constructed.

Californians have long urged the adequate charting of the Sacramento and San Joaquin Rivers and of the highly developed agricultural areas comprising their deltas. The additional funds permitted the completion of the hydrographic surveys of these rivers and their numerous tributaries and a phototopographic survey of the 1,200 square miles of the deltas, and charts showing its results are in process.

The offshore surveys between San Francisco Bay entrance and San Nicolas Island, a distance of 300 miles, which were also extended 90 miles off the coast, beyond the 2,000-fathom contour, were completed during the fiscal year. The surveying of this unfinished 23,000-square-mile area by the *Pioneer* and *Guide* completed the main surveys along the entire Pacific coast line from Juan de Fuca Strait to the Mexican border.

The survey of the Aleutian chain of islands in Alaska was started in the spring of 1934 by the ships *Surveyor* and *Discoverer*. Work was started at Unimak Pass on a survey of this chain extending for 900 miles from the Alaskan coast almost to the coast of Siberia. Owing to the short surveying season in this high latitude, several years will be required for its completion, but when the survey is finished and the results charted, trans-Pacific vessels bound for the Orient will be able to follow the great circle track to the northward of the Aleutians and considerably shorten the passage.

On the Atlantic coast there were accomplished, with the additional funds, revision surveys of the inland waterways of the Atlantic and Gulf coasts. The surveys of a large part of these areas had not been revised since the Civil War, and the greater part of the large area constituting the Louisiana deltas had never been surveyed, because of its almost impenetrable character and the difficulties attendant with old ground methods. With the modern aerial phototopographic methods 3,000 square miles of coastal Louisiana and Mississippi were surveyed during the latter half of the fiscal year and the results compiled on 1:20,000-scale sheets.

To bring obsolete charts up to date, 21 survey parties, composed of about 600 men, working from shore bases, were engaged the entire year on surveys of the intracoastal waterways from Boston to Corpus Christi. It is anticipated that before another year has passed modern surveys will be available for charting accurately and adequately the inland waterways along the entire Atlantic and Gulf coasts.

Another undertaking completed was the topographic survey of the entire south shore of Long Island and the complete hydrographic survey of the waterways along Hempstead Bay to Montauk Point, accomplished between March and November of 1933. With the view

to having a covering chart issued before the 1934 yachting season, there was a concentration of effort on field surveys, revisions, checking of beacon locations, and follow-up of newly-dredged channels. Chart No. 578, "Inland Waters—Shinnecock Bay to Great South Bay", appeared June 30, about 14 months after the field work started. Revision surveys, less extensive but much needed projects, were made in various other areas.

A Public Works allotment of $184,200 was made to the Bureau for reconditioning the survey fleet. Contracts were awarded shipyards under competitive bids for reconditioning the *Explorer*, *Discoverer*, *Surveyor*, *Pioneer*, and *Guide* in Seattle, and the *Lydonia* and *Oceanographer* at Norfolk.

Seven 75-foot patrol boats were transferred from the Coast Guard, and contracts for alterations to fit them for survey work were awarded various shipyards on the Atlantic and Gulf coasts.

The following table shows the work done by the Division of Hydrography and Topography during the year ended June 30, 1934:

Hydrography, topography, and coastal triangulation

Locality	Hydrography			Topography		Coastal triangulation		
	Sounding lines	Area	Soundings	Shore line	Area	Length of scheme	Area	Geographic positions
	Miles	*Sq. mi.*	*Number*	*Miles*	*Sq. mi*	*Miles*	*Sq. mi.*	*Number*
Portland to Penobscot Bay, Maine						90	1,112	197
Boston and Cape Cod, Mass	1,476	97	37,229	67	19	64	775	88
Connecticut River to Rikers Islands, Conn. and N. Y	1,770	101	105,291	413	142	81	288	414
Hempstead Bay to Montauk Point, Long Island, N. Y	6,683	343	234,525	297	78	51	212	152
Vicinity New York City, N. Y. and N. J				1,173	450			
Raritan River to Manasquan Inlet, N. J	153	8	6,165	50	16	22	110	143
Chesapeake Bay, Md	2,868	153	104,456	240	65	44	174	135
Ocean City to Chincoteague, Md. and Va	6,836	3,892	72,659	61		3	5	69
Nansemond and Back Rivers, Va						47	110	106
Wilmington to Savannah, N. C., S. C., and Ga						167	700	273
Charleston to Fernandina, S. C., Ga., and Fla	15,480	593	557,621	5,388	2,073	86	167	206
Port Everglades to Alligator Reef, Fla	2,373	231	107,436	37	2	121	740	195
Mississippi Delta, Miss. and La	6,840	804	238,572	5,015	2,914	333	3,560	291
Vermillion Bay to Galveston Bay, La. and Tex	6,896	5,681	102,469	196	103	94	430	94
Galveston to Corpus Christi, Tex	6,390	555	189,166	552	306	247	1,380	177
Mexican border to Monterey Bay, Calif	23,631	13,298	234,622	508	273	125	555	198
Sacramento and San Joaquin, Calif	1,416	680	171,663	162	317			60
Hood Canal and Puget Sound, Wash	77	4	2,409	54	22	163	356	297
Revillagigedo Channel, Alaska	1,297	140	37,715	222	224	33	33	77
Gulf of Alaska and Aleutian Islands, Alaska	2,273	15,420	7,104	20	18	37	120	75
Prince William Sound, Alaska	5,196	1,590	58,620	127	151	92	3,061	27
Kodiak Island, Alaska	6,111	977	76,277	180	164	21	48	43
Balabac Island, east coast Luzon, P. I	12,279	5,187	176,407	115	388	48	423	58
Total	110,045	49,754	2,520,406	14,877	7,725	1,969	14,359	3,375

It is noted that over 2,500,000 recorded soundings were made in hydrographic surveys, whereas during a normal year about 700,000 are made. Topographic and hydrographic field sheets received from the field were 424, as compared with 181 in 1933 and 164 in 1932. Since some additional funds were made available in the previous fiscal year, the comparatively large number of field sheets received in 1934 is of surveys made partly in the former year. The increased output from recovery funds will be reflected in the fiscal year 1935.

The use of the airplane and aerial camera in topographic work is being steadily increased. Base maps of coastal areas are being made and the topography shown on nautical charts is being brought up to date by this method, which makes possible surveying economically the almost impenetrable swamps and intricate waterways of our South Atlantic States, a large part of which was impracticable by the old ground methods. During this fiscal year such surveys were made along the Connecticut coast, the entire south shore of Long Island, the outer coasts of Maryland and Virginia, the coasts of North and South Carolina, the Georgia coast, the Mississippi Delta and westward along the Louisiana coast, the Texas coast between Galveston and Corpus Christi, in California from the Mexican border to Los Angeles, and also the deltas of the San Joaquin and Sacramento Rivers. In all, about 7,000 square miles were so surveyed during the year and the data compiled into base maps.

The Coast Pilot is a publication which furnishes the mariner a wide variety of information which cannot be shown on the charts, giving a complete description of the coast and waterways and innumerable data regarding all the ports of the United States and possessions. They are of inestimable value to the navigator, especially to strangers. The 14 Coast Pilot volumes are kept current by annual supplements and revisions, based on field examinations. During the past year examinations were made of the coasts of California, Oregon, and Washington, and field examination was made of the New Jersey inland waterways.

Although the Coast and Geodetic Survey for administrative purposes is a centralized bureau, in order to keep in touch with the public served and to have more direct information as to the charting needs and the requirements for surveys over the vast area covered, field stations are maintained in the United States at Seattle, San Francisco, New Orleans, New York, and Boston. The 56,000 calls for information made on these stations during the year are indicative of their usefulness to the public in supplying information, aside from their necessity in keeping the Bureau informed.

DIVISION OF GEODESY

The past year has been notable from the standpoint of geodetic work in the field and office. With emergency funds added to the annual appropriation, there were extended in the United States 8,520 miles of first- and second-order triangulation and 44,823 miles of first- and second-order leveling. Although this far exceeds the accomplishments for any similar year of its history, the work was held to the usual high standard of accuracy.

There has been a decided increase in the interest shown by Federal and State officials in the control surveys. Such surveys are indispensable for any comprehensive long-range planning of public works, as a means of conserving and developing natural resources by efficient and economical methods.

The increased application of high-grade control surveys to nearly all engineering operations and to many scientific problems is gratifying. It is recognized that they are essential for the completion of the topographic map of the United States and for all large-scale surveying projects; the results of these surveys are of the utmost value in irrigation, drainage, flood control, highway, and other engineering problems, and in the establishment and perpetuation of State, county, city, and private property boundaries; in the determination of the size and shape of the earth; in furnishing knowledge of the density of the earth's crust, useful in the search for oil-bearing strata and bodies of ore; and in determining the extent of the horizontal and vertical movements of the earth's crust in regions subject to earthquakes.

Control surveys consist of determining the latitudes and longitudes of monumented stations and the distances and directions between them, and of the accurate determination of the elevations of bench marks. They make it possible for various and widely separated surveys to have perfect junction when the projects meet.

An outstanding piece of fieldwork during the year was the completion of first-order triangulation from St. Augustine to Miami and from Naples to Port Inglis, Fla., and from Port St. Joe, Fla., to Mobile, Ala. These arcs were among the long-delayed needs for coordinating a large number of less accurate surveys of various dates and extent, required immediately for charting purposes. Similar arcs of less extent were completed along the Delaware River and Bay and along the lower Mississippi River from New Orleans to Buras, and from the river westward to Thibodaux, La. Another important arc was extended from Pittsburgh, Pa., westward to the Mississippi River.

At the request of the Tennessee Valley Authority, both triangulation and leveling were extended in the Tennessee River Basin, with the triangulation more than half completed and the leveling being practically completed to the 25-mile intervals by the end of the year.

Additional triangulation was extended in the vicinity of New York City for the complete coordination of a number of different projects.

The arc from Newport Beach to San Bernardino, Calif., was entirely reobserved for the purpose of making studies of any horizontal movements in the earth's crust as the result of the Long Beach earthquake of 1933. This work was done originally in 1928 as part of the program of extending triangulation into regions of seismic activity. First-order leveling was also extended in the San Jose, Calif., area at the request of engineers and scientists, to study the effect of recent settlement of the earth's crust in that region.

The Bureau has cooperated with numerous Federal and private organizations in the extension of control work in many areas during the past year. There was the usual cooperation with the United States Geological Survey in the extension of arcs of triangulation and lines of leveling to meet its needs for control in areas in which

topography is being executed. Stations and lookout towers of the United States Forestry Service in Oregon, Texas, and New Mexico, were also determined.

The State of North Carolina contributed $27,500 toward a 2-year program for priority in the extension of triangulation and leveling to the 50-mile spacing within that State. This work was completed with the exception of the publication of the results, now in process.

First- and second-order triangulation, base-line measurements, reconnaissance, and leveling activities, together with gravity observations, were carried on in various other areas. The following statement itemizes the work done by the Division of Geodesy during the year ended June 30, 1934:

Geodetic triangulation, base lines, reconnaissance, leveling, and gravity observations

Locality	Length of scheme	Area
TRIANGULATION, FIRST ORDER		
	Miles	*Sq. mi.*
Moyock to Weldon to Kinston, N. C. and Va	180	1,620
Washington to Pamlico Sound, N. C	85	1,360
Newport to Core Sound, N. C	25	215
Asheville to Murphy, N. C	80	1,800
Delaware River, N. J., Pa., and Del	100	1,200
Laramie to Pocatello, Wyo. and Idaho	390	12 870
Uniontown to Wellsboro, Pa	185	2,220
Newport Beach northeastward (reobservations), Calif	45	720
Bristol to Charleston, Tenn., Va., Ky., and W. Va	130	3,120
Klamath Falls to Bend, Oreg	125	3,375
Prineville to Burns, Oreg	100	2,600
Washington to Freeland, D. C. and Md	95	850
Washington to Greenville, Pa., W. Va., and Ohio	255	3,060
Murdo to North Platte, S. Dak. and Nebr	185	2,960
Ogallala to Sharon Springs, Nebr. and Kans	150	1,950
Russell Springs to Perryton, Kans. and Okla	165	1,980
Inyokern to San Bernardino, Calif	140	2,380
Tonapah to Las Vegas, Nev	240	4,080
Vicinity New York City, N. Y. and N. J	30	150
Chesapeake Bay, Md	40	400
Hermann to Lonoke, Mo. and Ark	245	2,940
Charlotte to Augusta, N. C., S. C., and Ga	130	1,300
Louisville to Nashville, Ky. and Tenn	175	1,925
Nashville to Corinth, Tenn. and Miss	140	1,540
Newberry to Georgetown, S. C	145	1,450
Dunnellon to Naples, Fla	205	2,460
Las Cruces to Belen, N. Mex	180	5,400
Las Vegas to Niland, Nev. and Calif	160	2,560
Langtry to Hot Wells, Tex	305	3,050
Hot Wells to El Paso, Tex	110	2,460
Lordsburg to Grand Junction, N. Mex., Ariz., Utah, and Colo	540	26,400
St. Augustine to Miami, Fla	320	2,560
Crowley to Ruston, La	160	1,440
McIntyre to Mobile, Fla. and Ala	235	2,115
Niland to Calexico to Yuma, Calif. and Ariz	130	1,950
Hot Wells to Santa Rosa, Tex. and N. Mex	265	3,710
Union City to Quincy, Ind. and Ill	295	2,850
Havana to Jacksonville, Ill	45	400
Hartshorne to Lawrence, Okla, and Kans	270	2,970
Topeka to Nebraska City, Kans. and Nebr	110	1,100
James River to Washington, Va., Md., and D. C	135	1,215
Johannesburg to Bishop (Owens Valley), Calif	110	2,200
Hanna to Rosebud, Wyo. and Mont	285	4,845
Total	7,440	127,750
TRIANGULATION, SECOND ORDER		
Winchester to Lynchburg, Va	215	3,650
Smithville to Huntsville, Tenn. and Ala	95	1,045
New Orleans to Buras to Houma, La	115	690
Lebanon to Florence, Tenn. and Ala	130	1,430
LaFayette to Bristol, Ga. and Tenn	245	2,940
Boone to Bluefield, N. C., Tenn., Va., and W. Va	95	950
Clarksville to Corinth, Tenn. and Miss	160	1,280
Saulsbury to Silerton, Tenn	25	200
Total	1,080	12,185
BASE LINE, FIRST ORDER		
Lewellen, Nebr	6.8	
BASE LINE, SECOND ORDER		
Oceanside, Calif	2.8	
RECONNAISSANCE, FIRST ORDER TRIANGULATION		
Newark to Quincy, Ohio, Ind., and Ill	425	4,410
Washington to Freeland, D. C. and Md	95	850

Geodetic triangulation, base lines, reconnaissance, leveling, and gravity observations—Continued

Locality	Length of scheme	Area
RECONNAISSANCE, FIRST ORDER TRIANGULATION—continued		
	Miles	*Sq. mi.*
Hardin to Missouri River, Mont.	160	2,720
Brooksville to Lexington, Ky.	55	600
Murdo to North Platte, S. D. and Nebr.	185	2,960
Vicinity New York City, N. Y. and N. J.	30	150
Prineville to Burns, Oreg.	100	2,600
Hermann to Monroe, Mo., Ark., and La.	430	5,170
117th Meridian, Nev.	160	4,320
Owens Valley, Calif.	190	3,700
Ruston to Crowley, La.	160	1,440
Ashland to Hanna, Mont. and Wyo.	255	4,335
Havana to Belleville, Ill.	125	1,250
Wykoff to Hermann, Minn., Iowa, and Mo.	360	3,860
Chesapeake Bay, Md.	140	1,400
Inyokern to San Bernardino, Calif.	140	2,380
Tonopah to Niland, Nev. and Calif.	400	6,640
Niland to Calexico, Calif.	55	500
San Diego to Yuma, Calif. and Ariz.	120	1,200
Charlotte to Augusta, N. C., S. C., and Ga.	130	1,300
Newberry to Georgetown, S. C.	145	1,450
Langtry to Hot Wells, Tex.	305	3,050
Hot Wells to El Paso, Tex.	110	2,460
Hot Wells to Santa Rosa, Tex. and N. Mex.	265	3,710
Colorado River, Ariz., Calif., and Nev.	375	6,630
St. Augustine to Miami, Fla. (revision)	320	2,560
Catesby to Anthony, Okla. and Kans.	120	1,200
Hartshorne to Lawrence, Okla. and Kans.	270	2,970
Topeka to Blair, Kans. and Nebr.	170	1,700
Potomac River, Md. and Va.	50	600
RECONNAISSANCE, FIRST ORDER TRIANGULACION—continued		
Des Moines to Antonito, N. Mex. and Colo.	150	2,730
Grand Canyon to Boulder, Ariz., and Utah	135	3,375
Crisfield to Elkton, Md.	190	1,520
Ashland to Opheim, Mont.	220	3,300
Alma to McAllister, Wis.	220	2,640
Blair to Sioux City to Adrian, Nebr., Iowa, and Minn.	140	1,540
Towanda to Owego, Pa. and N. Y.	20	200
New Freedom to Lebanon, Pa.	50	500
Total	6,970	93,920
RECONNAISSANCE, SECOND ORDER TRIANGULATION		
Christiansburg to Beattyville, Va., W. Va., and Ky.	200	2,700
Pennington Gap to Huntington, Va., Ky., and W. Va.	140	1,960
Winchester to Lynchburg, Va.	215	3,650
Smithville to Huntsville, Tenn. and Ala.	95	1,045
Florence to Lebanon, Ala. and Tenn.	130	1,430
Clarksville to Corinth, Tenn. and Miss.	160	1,280
New Orleans to Buras to Houma, La.	115	690
Saulsbury to Princeton, Tenn. and Ky.	155	1,550
Paducah to Martin, Ky. and Tenn.	50	450
Union City to La Fayette, Tenn. and Ga.	240	2,400
La Fayette to Bristol, Ga. and Tenn.	245	2,940
Boone to Bluefield, N. C., Tenn., Va., and W. Va.	95	950
Total	1,840	21,045

Locality	First order	Second order
LEVELING		
	Miles	*Miles*
Alabama	160	1,410
Arizona	570	500
Arkansas	25	230
California	710	30
Colorado	580	
Florida	780	1,430
Georgia	250	1,580
Idaho	890	830
Iowa	360	
Kansas	970	1,390
Kentucky	50	290
Louisiana	250	190
Maine	18	680
Maryland	20	
Massachusetts		40
Minnesota	210	310
Mississippi	290	940
Missouri	170	1,230
Montana	1,070	960
Nebraska	700	260
Nevada	660	180
New Hampshire	70	345
LEVELING—continued		
	Miles	*Miles*
New Jersey	40	80
New Mexico	820	270
New York	270	520
North Carolina	70	610
North Dakota	410	1,740
Ohio	90	
Oklahoma	780	1,750
Oregon	60	135
Pennsylvania	140	
South Carolina		805
South Dakota	1,050	660
Tennessee	120	1,440
Texas	890	3,730
Utah	660	1,150
Vermont		15
Virginia	30	1,180
Washington	600	480
West Virginia	290	820
Wisconsin	110	
Wyoming	970	460
Total	16,153	28,670

Geodetic triangulation, base lines, reconnaissance, leveling, and gravity observations—Continued

Activity	Stations	Miles	Activity	Stations	Miles
SUMMARY			SUMMARY—continued		
Triangulation:			Leveling:		
First order		7,440	First order		16,153
Second order		1,080	Second order		28,670
Base line:			Gravity observations [1]	118	
First order		6.8			
Second order		2.8	Total	118	62,162.6
Reconnaissance:					
First order triangulation		6,970			
Second order triangulation		1,840			

[1] Gravity observations were made in Colorado, Connecticut, Florida, Kansas, Montana, Nebraska, Ohio, Texas, Wyoming, and Hawaii.

Splendid progress was made in the office computation and adjustment of the results obtained from field observations. The computation and adjustment of 21 arcs of first-order and 38 arcs of second- and third-order triangulation were completed, with computations of 17 arcs of first-order and 14 arcs of second- and third-order triangulation in progress.

Computations and adjustments of the leveling results were kept as current as possible, considering the great mass of field data received. Information concerning descriptions and elevations of bench marks for 153 lines of levels were distributed to engineers and surveyors in the areas covered and manuscripts prepared for 6 triangulation and 5 leveling publications. The geographic positions of 30,000 triangulation stations were prepared for ready distribution. Manuscript for the publication Triangulation Along the Mississippi River from Cairo, Ill., to Headwaters, Minn., was sent to the Chief of Engineers, United States Army. Prepared by personnel detailed to the Washington office by the Chief of Engineers, it covers data for 2,900 triangulation and traverse points.

DIVISION OF TIDES AND CURRENTS

During the past year there has been an increase in accomplishments in every field of activity covered by the Division of Tides and Currents, made possible by the allotment of recovery funds in addition to the regular appropriation.

During the year, 32 primary tide stations were in operation: 18 on the Atlantic coast, 4 on the Gulf coast, 7 on the Pacific coast, 2 in Alaska, and 1 in the Hawaiian Islands. Twelve of these stations were conducted on a cooperative basis, to reduce operating costs, with the aid of the following agencies: The Army Engineers at Southport, N. C., Miami Beach and Mayport, Fla., and Mobile, Ala.; the Navy Department at Newport, R. I., Annapolis, Md., Portsmouth, N. H., Hampton Roads, Va., and San Diego, Calif.; the Woods Hole Oceanographic Institute at Woods Hole, Mass.; the Harbor Department at Los Angeles, Calif.; and the Surveyor of the Territory of Hawaii at Honolulu.

A number of secondary stations were operated for periods of a month or more to solve special problems and to secure fuller knowl-

edge of tides along the coasts. During the year, 58 such stations were occupied, cooperative stations being operated by the Army Engineers at Fort Worden, Wash., the University of Washington at Friday Harbor, Wash., the Biological Research Bureau at Bermuda, the Washington Suburban Sanitary District at Bladensburg, Md., and the California State authorities at Santa Monica, Calif.

In addition to the fieldwork falling directly within the purview of this Division, tide observations made by the Division of Hydrography and Topography are tabulated and reduced in this Division. The expanded program of hydrographic work has brought about heavy increases in the office work, as observations at approximately 375 tide stations made in connection with the year's hydrographic surveys were tabulated and reduced in the Division, and the datum planes derived and related to local bench marks. As illustrating the Division's expanded activities, 433 secondary tide stations were occupied, compared with 281 during the year previous.

From the various tide data received the Survey issues in advance yearly tide tables, for in modern commerce, with its deep-draft vessels moving on exacting schedules, it is a prime necessity to know the times and heights of the high and low waters. Commencing with the calendar year 1934 the three volumes of tide tables were consolidated into two under the titles Tide Tables, Atlantic Ocean, and Tide Tables, Pacific Ocean and Indian Ocean. They give daily predictions of the high and low waters for 97 of the more important ports and harbors of the world, and carry data which permit predictions at some 3,900 secondary stations. Although there has been a constant growth in the information furnished by these tables, due to demands of the Navy and merchant marine, it has been possible to supply the added information with but little additional work by the organization of international exchanges of predictions. At the present time predictions are exchanged as follows: England, 21 stations; Germany, 6 stations; France, 4 stations; Canada, 5 stations; and India, 5 stations.

Another field activity of the Division relates to special tidal surveys. Various sections of our coasts have been lacking precise tidal information which in the majority of cases is derived as a byproduct of hydrographic surveys. To remedy this situation in the interests of navigation and engineering, special tidal surveys are conducted. This type of survey is a relatively recent development, necessitating a coordinated plan of operations to make possible the determination of mean values from relatively short periods of observations. During the year such a survey was completed for the coast of Oregon and for the Gulf coast of Florida.

Annual current tables are issued as navigational aids, giving information with regard to the times and velocities of the tidal currents. They give daily predictions of the current for 23 of the more important North American waterways and for one in the Philippine Islands, and furnish data which permit predictions to be made for 1,300 other stations.

In regard to currents, the primary field activity consists of surveys of important harbors and waterways to bring out in detail the features of the current movement, a matter of prime importance to navigation and harbor engineering. The specialized technique developed

has made the survey the recognized authority in this matter and requests for such surveys are received constantly. During the year the waterways of the St. Johns and Savannah Rivers were covered by such surveys. Valuable cooperation was rendered by the Army engineers of the Savannah and Jacksonville districts, the latter office loaning the tugboat *Fulton* for this work.

Requests were received during the year from various scientific and research organizations and expeditions for the loan of tidal instruments. The Louise A. Boyd expedition to Greenland was supplied with gages, the records from which have been received and tabulated, and the Byrd second Antarctic expedition was furnished with a portable tide gage and deep-sea thermometers for observations at Little America.

DIVISION OF TERRESTRIAL MAGNETISM AND SEISMOLOGY

Aside from expenditures under the regular appropriation and that for the International Polar Year, Public Works funds permitted additional needed magnetic and seismological observations, important repairs to buildings and the installation and operation of additional strong-motion seismographs.

The extension of the strong-motion program has had an important bearing on all Public Works projects in California. This program involved the construction of buildings, bridges, dams, and other structures, in the design of which resistance to earthquakes is now a recognized factor.

Active cooperation with State civil works organizations has resulted in securing reports on the present condition of some 400 magnetic stations and declination observations, with compass declinometer observations at some old stations.

TERRESTRIAL MAGNETISM

The earth's magnetism continuously changes in a complicated manner, so that the future cannot be predicted from the past. Observations in the United States are made at 5-year intervals at about 175 places for information regarding these changes and in this way it becomes possible to keep current the observations made at some 6,000 places.

The points where these observations were made, including the determination of the true direction of one or more objects from the point of observation, are known as "magnetic stations" and are usually marked in some permanent manner, as with a concrete monument. Magnetic stations where observations are made at regular intervals to determine changes are known as "repeat stations." Observations were made during the year chiefly at repeat stations in the extreme southern and western tiers of States. There has been a continuation of the policy of using triangulation stations as magnetic stations, thus substituting stations in the open country for those heretofore established in cities and towns which are subject to many disturbing and destructive forces.

Observations of declination were continued along the coasts to assure proper values on nautical charts and, especially in Alaska, to define areas where the magnetic compass is affected by magnetic

deposits. In a number of cases old stations have been replaced to meet the needs of local surveyors.

Magnetic observations were carried on in the following States during the fiscal year ended June 30, 1934:

State	Complete observations at repeat stations		Observations for declination	Total	State	Complete observations at repeat stations		Observations for declination	Total
	Old	Added				Old	Added		
Alaska	2		23	25	New Jersey	1	2		3
Arizona	3		3	6	New York	3	1	2	6
California	9	3	45	57	North Dakota			2	2
Colorado	3		4	7	Oregon	1		11	12
Connecticut	1			1	Philippine Islands			15	15
Idaho	1		3	4	Puerto Rico	1			1
Kansas	1			1	Rhode Island	2			2
Maine	5	2		7	South Dakota	1		2	3
Maryland	1			1	Vermont	3			3
Massachusetts	2	1	2	5	Washington	3	4	1	8
Montana	1			1	Wyoming	2		2	4
Nebraska	3		1	4					
Nevada	2		2	4	Total	52	13	118	183
New Hampshire	1			1					

The five magnetic observatories continued their function of recording the day-by-day changes in the earth's magnetism, those at San Juan, Puerto Rico; Sitka, Alaska; and Honolulu, Hawaii, carrying on this work as their principal function. The Cheltenham, Md., station also carried on a standardization and comparison of field instruments, and at Tucson, Ariz., measurements were made of atmospheric electricity and earth currents, related to magnetism and to telegraph and cable transmission, with the cooperation of the Carnegie Institution of Washington and the Mountain States Telegraph & Telephone Co.

The variation building at Cheltenham was saved by replacing the foundation and taking special antitermite precautions. The maintenance of routine observations during the period of building repairs was made possible through the cooperation of the department of terrestrial magnetism of the Carnegie Institution of Washington. A La Cour magnetograph was loaned and installed in the comparison and test building, providing a continuous record during the time when the other instruments were too disturbed to give a satisfactory record.

The Second Polar Year of scientific observations in the polar regions and elsewhere throughout the earth was successful, and was brought to a close at the time scheduled for the northern hemisphere on August 31, 1933. This applied to most of the activities of the College-Fairbanks station, where many cooperative efforts were carried on with this Bureau in administrative charge. The work included measurements in terrestrial magnetism, atmospheric electricity, earth currents, aurora, radio transmission, and related fields, carried on by the cooperation of the Naval Research Laboratory, Signal Corps, Rockefeller Foundation, Carnegie Institution of Washington, and Alaska Agricultural College and School of Mines. In addition, a broad program of meteorological investigation was car-

ried on by the Weather Bureau. With the close of the regular period, observations in terrestrial magnetism and in earth currents were continued until March 31, 1934, by the Bureau at the request of the International Polar Year Commission. Auroral work and radio investigation also continued under other auspices.

There is an increasing demand for and dependence upon the Bureau's accumulated information regarding the change of the magnetic declination with lapse of time in retracing lines of old magnetic surveys, in some cases as much as 200 years ago.

Current magnetic observatory records are used in connection with the examination of geological formations by magnetic methods in the search for oil and minerals. They are also in demand by Federal and commercial agencies studying the relation of magnetism to radio transmission difficulties. Magnetic information for the daily broadcast of phenomena affecting radio transmission, carried on at the request of the International Scientific Radio Union, was furnished from Tucson until December 31, 1933, and thereafter from Cheltenham.

SEISMOLOGY

The trend of the Bureau's earthquake investigations was directed toward obtaining information necessary for the saving of life and property from earthquake damage. While this has many aspects, stress was laid on fundamental measurements needed by engineers and architects for the safe design of buildings and other structures. The work is all interrelated and coordinated with that of other organizations to form an effective attack on earthquake problems.

The work includes the immediate location of every major earthquake, no matter where it may occur; the collection of instrumental and noninstrumental information regarding all earthquakes in or near the United States or the regions under its jurisdiction; the measurement of strong earth motions, especially in California; and the investigation, just started at the close of the fiscal year, of building vibrations and other factors relating to resistance of buildings and other structures to earthquake stresses.

Through cooperation of many seismological stations, the Jesuit Seismological Association, and Science News Service of Washington, D. C., prompt determination of earthquake location is made. Forty-two epicenters were located during the year. Information regarding all earthquakes occurring in or near the United States or the regions under its jurisdiction was obtained by instrumental and noninstrumental means. Instrumental information comes from the seismological stations of the Survey at San Juan, Puerto Rico; Tucson, Ariz.; Ukiah, Calif.; and Sitka, Alaska; from the cooperatively operated stations at Columbia, S. C.; Chicago, Ill.; Bozeman, Mont., and Honolulu, Hawaii, and reports from a number of other stations. Noninstrumental information is obtained from the reports of many volunteer observers and through questionnaires distributed immediately after an earthquake. In the case of Pacific Coast States, the work is divided between the San Francisco field station and the Washington office. The information is published annually.

Additional strong-motion installations were made of 11 instruments at 10 places, bringing the total to 42 in 33 cities. Ten addi-

tional instruments were constructed incorporating improvements added to previous installations.

Twenty-two records were obtained for six earthquakes. These were carefully analyzed, in a manner which obtained all possible information from them. Some of these instruments were placed at top and bottom of buildings, thereby introducing a problem which required additional work for solution.

Accordingly, toward the close of the year a program was inaugurated as a result of an allotment of Public Works funds requested by California scientists, engineers, and architects. This included measurement of vibrations of buildings and other structures and of the ground, as well as the collection of other information, all intended to make the program more definitely applicable to securing information needed for better design. An instrument convenient for making building vibration records was designed and by the close of the year observations had been made in high buildings, on tall tanks, dams, and bridges.

In addition to publication of the results of these investigations to date, there were issued lists of the principal earthquake epicenters of the world for a 30-year period, and a list of destructive and near-destructive California earthquakes. Investigations of tidal waves were also made.

By means of a shaking table at the Bureau of Standards and by cooperative action of the two Bureaus, valuable tests were made of the characteristics of several types of seismometers in regular use.

Tiltmeters installed during the previous year were kept in operation at the University of California at Berkeley, through the cooperation of that institution, for the purpose of determining possible tilting of the surface stratum; information which might give indication of an impending earthquake.

BUREAU OF NAVIGATION AND STEAMBOAT INSPECTION

AMERICAN SHIPPING ON JUNE 30, 1934

On June 30, 1934, the merchant marine of the United States, including all kinds of documented craft, comprised 24,904 vessels of 14,861,834 gross tons, as compared with 24,868 vessels of 15,060,157 gross tons on June 30, 1933. On June 30, 1934, of this total, there were 3,842 vessels of 4,606,623 gross tons engaged in the foreign trade, as compared with 3,902 vessels of 4,710,169 gross tons on June 30, 1933. Following is an analysis of the ownership of documented tonnage compared with a year ago:

Ownership and date	Steel		Wood		Total	
	Number	Gross tonnage	Number	Gross tonnage	Number	Gross tonnage
Private ownership (5 net tons and over):						
July 1, 1933	4,741	11,581,188	19,923	2,324,013	24,664	13,905,201
July 1, 1934	4,785	11,477,453	19,921	2,260,587	24,706	13,738,040
U. S. Shipping Board Bureau:						
July 1, 1933	204	1,154,956			204	1,154,956
July 1, 1934	198	1,123,794			198	1,123,794
Total, 1933	4,945	12,736,144	19,923	2,324,013	24,868	15,060,157
Total, 1934	4,983	12,601,247	19,921	2,260,587	24,904	14,861,834

Of these totals, 3,842 vessels of 4,606,623 gross tons were engaged in the foreign trade and 21,062 vessels of 10,255,211 gross tons in the coasting trade.

Since June 1, 1921, when our tonnage in the foreign trade reached its greatest volume, 11,077,398 gross tons, there has been a gradual decline, until June 30, 1934, it amounted to only 4,606,623 gross tons, a falling off of 6,470,775 gross tons. The decrease in the foreign trade tonnage is due principally to the scrapping of large vessels which belonged to the Shipping Board and to changes from foreign to coasting trade because of greater opportunities in that service.

Since June 1, 1921, the coasting trade tonnage, exclusive of the trade on the Great Lakes, has increased 3,870,992 gross tons.

During the year, 724 vessels of 66,649 gross tons were built and documented, and on July 1, 1934, there were building or under contract to build in our shipyards for private shipowners 53 vessels of 38,102 gross tons. The corresponding figures for 1933 were 642 vessels of 190,803 gross tons built and 60 vessels of 34,846 gross tons under contract to build.

The new tonnage includes 5 steel steamers of 14,044 gross tons, of which 2 are engaged in the freight service, 2 in dredging, and 1 as a ferry. These figures include only steel steam vessels of 1,000 gross tons and over.

On June 30, 1934, the laid-up tonnage of the United States aggregated 2,551 vessels of 3,125,138 gross tons, as against 2,655 vessels of 4,146,539 gross tons on June 30, 1933.

Details of the world's laid-up tonnage, classification of American vessels by size, service, and power, and of vessels launched and under construction may be found in Merchant Marine Statistics for 1934, a publication prepared by this office.

SAFETY OF LIFE AT SEA

The necessity for additional legislation affecting safety of life and property at sea is becoming more apparent as loss of life and damage to ships demonstrate that a closer supervision of the traffic out of our ports to the sea is essential.

A recommendation is renewed that there be urged the early ratification of the International Convention on Safety of Life at Sea, signed in London May 31, 1929, and already ratified by all of the principal maritime nations of the world, the United States being the outstanding exception. This Convention extends to the most advanced construction of the hull, protection against fire, and life-saving equipment. The United States was largely instrumental in the framing of the Convention under the advice of its leading marine and Government experts, technical assistants, owners, operators, and builders of ships. Its provisions constitute a marked advance in reducing the hazard of ocean transportation.

The inadequacy of our laws in regard to the inspection of vessels driven by internal-combustion engines requires attention. The steamboat inspection laws were passed long before internal-combustion engines were in use and were specifically made applicable to steam, sail, and unrigged vessels. Little jurisdiction over internal-combustion-engine vessels now exists, and it is doubtful if, under the law, the Bureau could require a single lifeboat on such a vessel. The use of Diesel engines on large sea-going ships is increasing. The need of legislation adequately covering their inspection and equipment is so obvious that the matter should be given consideration in any recommendations made to Congress at the coming session. In the consideration of such legislation it should be borne in mind that there are in the United States approximately 500,000 small vessels operating on sheltered waters where perhaps a detailed inspection would not be necessary. For this reason, it possibly might be deemed advisable to restrict the application of the additional legislation to vessels of a fixed tonnage operating on waters where the risk to life and property is present.

In connection with the large number of small vessels, further provision should be made in the case of such vessels carrying passengens for hire that the operator should be licensed after an examination by the steamboat inspectors.

COASTING TRADE

It is again suggested that consideration be given to the further restriction of our coastwise trade, having special reference to the transportation of passengers. Foreign vessels taking passengers out of our ports may return them to the same port without violating the existing law. This is a direct invasion of our domestic trade.

A passenger may proceed from San Francisco on a foreign vessel with a through ticket to New York and evade the provisions of our law by landing in Cuba, for instance, and taking another vessel of the same line to his destination in New York.

It would seem that there should be afforded the transportation of passengers in our coastwise trade the same protection that Congress has deemed proper to extend in the case of transportation of merchandise. It is difficult for American vessels to compete successfully with foreign vessels in the domestic trade because of the difference of our laws and the conditions governing foreign vessels on the high seas.

SHIPPING COMMISSIONERS

During the year 508,898 seamen were shipped, reshipped, and discharged before our shipping commissioners, as compared with 476,615 the year before. The average cost to the Government per man was 22 cents, a decrease of 4 cents per man over like costs last year.

Collectors of customs acting at ports where shipping commissioner offices have not been established, shipped and discharged during the year 27,084 officers and men, as compared with 20,438 the previous year.

Of the 271,252 men shipped before shipping commissioners, 164,365 were native Americans, and 54,941 were naturalized Americans; 219,306 in all, or 80.8 percent.

In addition to these numbers there were shipped in foreign ports in the foreign trade for the round voyage, many seamen who do not appear before our shipping commissioners. These numbers are not included in the above figures.

The following table shows the aggregate work and salaries of the shipping service for the past 15 years:

Year	Seamen shipped, reshipped, and discharged	Salaries	Average cost per man	Year	Seamen shipped, reshipped, and discharged	Salaries	Average cost per man
1920	628,980	$89,949	$0.13	1928	547,732	$123,961	$0.23
1921	650,840	99,646	.15	1929	627,392	139,454	.22
1922	541,952	92,318	.17	1930	650,673	147,873	.23
1923	538,755	94,476	.17	1931	589,901	152,003	.26
1924	555,633	94,476	.17	1932	515,051	158,616	.31
1925	552,124	123,726	.22	1933	476,615	124,305	.26
1926	534,493	123,183	.23	1934	508,898	114,442	.22
1927	561,061	122,398	.22				

The shipping commissioner service furnishes the medium through which voluminous laws for the protection, welfare, and discipline of American seamen are effectuated. In order that no advantage may be taken of the seaman and also that he may understand his responsiblities, his contract of employment is supervised by our shipping commissioners and where there are any unusual provisions because of the nature of the voyage or of the cargo carried, those provisions are explained to him in detail.

Any disputes which may arise during the voyage may be arbitrated before the shipping commissioner without cost to the seaman

and without delay. Under the law the shipping commissioner's decision is final as to the facts.

For the benefit of dependents the shipping commissioner issues allotment notes payable to such dependents from the seaman's wages as earned. In case of death of the seaman his wages and effects are taken care of by the shipping commissioner.

This is a beneficent service as it insures to the seamen the benefits of the laws which Congress has passed in their behalf.

ADMEASUREMENT OF VESSELS

The measurement of vessels through the marine divisions of the customhouses proceeded throughout the year with the usual activity; 1,144 vessels aggregating 132,486 gross tons were admeasured during the year for documentation. In addition, 390 vessels of 612,660 gross tons were remeasured for change of tonnage.

The admeasurement of vessels under our laws as affecting the tonnage of vessels transiting the Panama Canal has been under special consideration. Difficulties which have arisen in some of the maritime ports of other nations also have emphasized the advisability of the adoption by the maritime nations of the world of an international admeasurement system.

LOAD LINES

The important work of fixing the line to which a vessel may be loaded with safety has proceeded effectively; 14,654 inspections were made at the time of clearance and but 25 violations of the law, technical or otherwise, were discovered and remedied.

During the year 151 load-line certificates on the international form were issued to our vessels to conform with the international load-line convention. The agreement with Canada with a view to the exemption of vessels from the requirements of the load line while navigating sheltered waters on the northwest coast of the United States has been completed and is now in effect.

PASSENGER ACT OF 1882

The enforcement of this law through the marine divisions of the customhouses has affected 1,029 voyages involving 170,171 steerage passengers. The purpose of the act is to provide for the welfare, health conditions, food, separation of the sexes, and care in case of sickness of future citizens of our country.

NAVIGATION RECEIPTS

During the year the Bureau has collected through tonnage duties, navigation fees, and navigation fines $1,686,149.45, a sum considerably in excess of the cost of administration of the Bureau.

The following table shows these collections in detail:

June 30—	Tonnage duties	Navigation fees	Navigation fines	Total
1934	$1,483,161.11	$172,093.30	$30,895.04	$1,686,149.45
1933	1,418,774.87	169,121.32	51,498.98	1,639,395.17
1917	1,393,743.16	159,808.03	49,962.37	1,603,513.56

ADMINISTRATION

The general work of the superintendence of the commercial marine and merchant seamen 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 carried forward.

In the enforcement of the rules and regulations governing the movement of vessels in the St. Marys River, patrol of the course during regattas and marine parades including the international cup races, the Bureau is indebted to the Coast Guard Service which operated in its usual efficient manner under the rules and regulations of this Department.

During the year 5,812 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	374	46	261	12				1	6				4	43	1
Boston	205	24	46	51				25	9		3	6	4	25	12
Bridgeport	100	1	65	16						7				10	1
Buffalo	94	2	74	1										17	
Charleston	77		45	9				5		4	1			12	1
Chicago	12	2	1	7	1										1
Cleveland	110	5	41	13				1	2	12	2	3		31	
Detroit	85	3	9	23		30		6	3	4				5	2
Duluth	4		1	2					1						
Galveston	33	15	5	2					3				3	5	
Honolulu	80	7	24					3				1		26	19
Indianapolis	2		1											1	
Juneau	41		3	27				2	3	1	1	1		3	
Los Angeles	167	10	29	26				3	12			1		11	75
Louisville	4	1	2											1	
Memphis	15	1	1	9				1						3	
Milwaukee	6			1											5
Mobile	133		53	38				4	3	22				12	1
New Orleans	519	4	303	39				4	1	13	4	1		138	12
New York	1,733	104	1,169	144				13	2	84	17	2	3	179	16
Norfolk	65	6	16	19						4				7	13
Ogdensburg	35		27											8	
Philadelphia	202	36	3	70				1	8		2			79	3
Pittsburgh	27	5	3	7						6	4			2	
Port Arthur	34	2	9	16										4	3
Portland, Maine	32	3	6	11					2					9	1
Portland, Oreg	45	6	10	18				2	2	6	1				
Providence	12	3	6											3	
Rochester	108		62	2										44	
St. Albans	3		3												
St. Louis	10		8											2	
San Antonio	4		2											2	
San Diego	14	1		3										10	
San Francisco	143	11	9	38	1			5	18	18	2	2	6	23	10
San Juan	11		5	3					1				1	1	
Savannah	69		31	6				6	3	6				15	2
Seattle	340	59	42	51			2	7	29	4	1	13	3	87	42
Tampa	790	8	297	82			3	25	27	26	6	1	1	283	31
Wilmington	69	2	13	38						11	1			4	
Total	5,807	367	2,685	784	2	30	5	114	135	228	45	31	25	1,105	251

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	*Kilkenny*	*Tarragon*	*Eala*	*Siwash*	*Psyche*	Coast Guard	Local inspectors	Customs	Navigation inspectors
Baltimore	374			341				7	26	
Boston	205						21	15	169	
Bridgeport	100				80		1		19	
Buffalo	94					60		2	32	
Charleston	77	53		6			1		17	
Chicago	12						1	3	7	1
Cleveland	110					45		2	52	11
Detroit	85						30	4	51	
Duluth	4						1		3	
Galveston	33							12	21	
Honolulu	80						34		46	
Indianapolis	2								2	
Juneau	41								41	
Los Angeles	167						7	5	73	82
Louisville	4							1		3
Memphis	15								15	
Milwaukee	6								6	
Mobile	133		60				22		51	
New Orleans	519		429				26	4	60	
New York	1,733				1,414		107	21	191	
Norfolk	65			25			2		38	
Ogdensburg	35					34		1		
Philadelphia	202						6	5	191	
Pittsburgh	27							3	24	
Port Arthur	34		14						20	
Portland, Maine	32						3	3	26	
Portland, Oreg	45						3	3	32	7
Providence	12							3		9
Rochester	108					102			2	4
St. Albans	3								3	
St. Louis	10								10	
San Antonio	4								4	
San Diego	14								14	
San Francisco	143						45	6	92	
San Juan	11								11	
Savannah	69	7		12					50	
Seattle	340						26		314	
Tampa	790	261		55			16	16	442	
Wilmington	69			21			9		39	
Total	5,807	321	503	460	1,494	241	361	116	2,194	117

HULLS AND EQUIPMENT STATISTICS

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 1 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 vessels granted letters of approval		Government vessels inspected	Government boilers inspected	Local inspection district (port)	Steam vessels granted letters of approval		Government vessels inspected	Government boilers inspected
	Number	Gross tonnage				Number	Gross tonnage		
San Francisco, Calif				59	Point Pleasant, W. Va			3	56
onolulu, Hawaii			10	25	Detroit, Mich				9
s Angeles, Calif				44	Chicago, Ill			1	37
rtland, Oreg				52	Duluth, Minn			2	6
w York, N. Y			7	118	Grand Haven, Mich				10
bany, N. Y				23	Marquette, Mich			1	13
New Haven, Conn				9	Milwaukee, Wis			11	33
Philadelphia, Pa				57	Cleveland, Ohio	2	355	4	22
Norfolk, Va	1	58	1	84	Buffalo, N. Y			3	5
Baltimore, Md	1	5,673		188	Oswego, N. Y				11
Charleston, S. C			2	63	Toledo, Ohio			2	9
Jacksonville, Fla				11	New Orleans, La			37	198
Savannah, Ga				42	Galveston, Tex				81
St. Louis, Mo				189	Mobile, Ala			2	126
Dubuque, Iowa				88	San Juan, P. R				3
Boston, Mass			1	53	Tampa, Fla				12
New London, Conn				4	Seattle, Wash	2	37		28
Portland, Maine			1	19	Hoquiam, Wash				3
Providence, R. I				2					
Louisville, Ky				32	Total, 1934	6	6,123	89	2,208
Evansville, Ind				39	Total, 1933	3	113	91	2,161
Memphis, Tenn				104					
Nashville, Tenn			1	68	Increase (+) or decrease (−)	+3	+6,010	−2	−47
Pittsburgh, Pa				54					
Cincinnati, Ohio				119					

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	1,108	179	3	1,290	Detroit, Mich	70	16		86
Honolulu, Hawaii	37	15		52	Chicago, Ill	41	8		49
Portland, Oreg	14	8		22	Duluth, Minn	14			14
New York, N. Y	923	275	6	1,204	Grand Haven, Mich	34	8		42
Albany, N. Y	43	27		70	Marquette, Mich	25			25
New Haven, Conn	13	70		83	Milwaukee, Wis	21	4		25
Philadelphia, Pa	171	76		247	Port Huron, Mich	9	24		33
Norfolk, Va	62	5	3	70	Cleveland, Ohio	12			12
Baltimore, Md	52	4		56	Buffalo, N. Y	44		2	46
Charleston, S. C		9		9	Oswego, N. Y	14	35		49
Jacksonville, Fla	32	71		103	Toledo, Ohio	12	2		14
St. Louis, Mo	9			9	New Orleans, La	117	47	14	178
Dubuque, Iowa	15			15	Galveston, Tex	4	16	3	23
Boston, Mass	89	3		92	Mobile, Ala	4	2		6
Bangor, Maine	7	6	2	15	San Juan, P. R	3	1		4
New London, Conn	9	17		26	Tampa, Fla	4	5		9
Portland, Maine	94	5		99	Seattle, Wash	53	44		97
Providence, R. I	40	10		50	Juneau, Alaska	2	9		11
Louisville, Ky	1			1					
Memphis, Tenn	2			2	Total, 1934	3,241	1,001	33	4,275
Pittsburgh, Pa	4			4	Total, 1933	2,588	920	29	3,537
Cincinnati, Ohio	24			24					
Point Pleasant, W. Va	9			9	Increase	+653	+81	+4	+738

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		Number	Gross tonnage	Number	Gross tonnage
		Number	Gross tonnage	Number	Gross tonnage	Number	Gross tonnage	Number	Gross tonnage	Number	Gross tonnage				
First	San Francisco, Calif.	269	1,000,782	117	76,607	1	103	7	22,574	394	1,100,066	39	278,779	433	1,378,845
	Honolulu, Hawaii	12	26,616	9	841					21	27,457	21	296,632	42	324,089
	Los Angeles, Calif.	81	358,779	29	24,425			1	434	111	383,638	4	35,158	115	418,796
	Portland, Oreg.	59	145,188	16	1,954	1	538	1	981	77	148,661	2	19,491	79	168,152
Second	New York, N. Y.	1,045	2,147,176	189	199,099	1	465	102	108,637	1,337	2,455,377	123	2,374,789	1,460	4,830,166
	Albany, N. Y.	71	20,756	19	8,230			1	1,041	91	30,027			91	30,027
	New Haven, Conn.	27	5,192	35	1,647			3	3,689	65	10,528			65	10,528
	Philadelphia, Pa.	197	423,507	73	135,170			48	43,436	318	602,113			318	602,113
Third	Norfolk, Va.	143	188,050	113	13,122	1	126	64	83,027	321	284,325			321	284,325
	Baltimore, Md.	265	863,136	112	35,124			9	7,206	386	905,466			386	905,466
	Charleston, S. C.	18	31,939	47	2,297			1	522	66	34,758			66	34,758
	Jacksonville, Fla.	25	60,613	73	4,337			3	4,855	101	69,805	2	8,390	103	78,195
	Savannah, Ga.	22	65,053	8	421					30	65,474			30	65,474
Fourth	St. Louis, Mo.	61	17,287	25	932					86	18,219			86	18,219
	Dubuque, Iowa	27	5,024	33	1,049	1	141			61	6,214			61	6,214
Fifth	Boston, Mass.	147	384,590	19	3,860			16	15,925	182	404,375	13	102,367	195	506,742
	Bangor, Maine	4	7,465	25	767			2	1,877	31	10,109	2	1,106	33	11,215
	New London, Conn.	16	12,505	20	1,660					36	14,165			36	14,165
	Portland, Maine	24	6,325	18	1,126			4	3,763	46	11,214			46	11,214
	Providence, R. I.	36	55,549	11	4,197			1	739	48	60,485			48	60,485
Sixth	Louisville, Ky.	17	3,929	7	994					24	4,923			24	4,923
	Evansville, Ind.	22	7,464	8	486					30	7,950			30	7,950
	Memphis, Tenn.	39	9,055	7	288					46	9,343			46	9,343
	Nashville, Tenn.	30	6,339	4	184	1	294			35	6,817			35	6,817
Seventh	Pittsburgh, Pa.	55	13,519	12	878	1	320			68	14,717			68	14,717
	Cincinnati, Ohio	26	8,706	5	184					31	8,890			31	8,890
	Point Pleasant, W. Va.	25	6,046	5	115	1	109			31	6,270			31	6,270
Eighth	Detroit, Mich.	82	225,757	9	18,461					91	244,218	2	2,622	93	246,840

	Chicago, Ill.	72	219,728	13	14,616					85	234,344			85	234,344
	Duluth, Minn.	40	138,506							40	138,506			40	138,506
	Grand Haven, Mich.	18	28,804	5	471					23	29,275			23	29,275
	Marquette, Mich.	19	18,131	7	262					26	18,393	2	1,111	28	19,504
	Milwaukee, Wis.	56	171,764	9	3,158					65	174,922			65	174,922
	Port Huron, Mich.	18	19,064	7	210					25	19,274	4	12,752	29	32,026
Ninth	Cleveland, Ohio.	157	715,278	2	2,057					159	717,335			159	717,335
	Buffalo, N. Y.	161	552,294			2	233			163	552,527	8	14,758	171	567,285
	Oswego, N. Y.	22	16,742	17	2,179					39	18,921	7	2,570	46	21,491
	Toledo, Ohio.	79	359,203	6	1,464					85	360,667	1	461	86	361,128
Tenth	New Orleans, La.	180	425,324	31	2,298	5	5,961	4	10,825	220	444,408	16	94,709	236	539,117
	Galveston, Tex.	108	417,020	12	16,961	1	945	19	27,111	140	462,037			140	462,037
	Mobile, Ala.	99	382,780	24	1,550			6	5,922	129	390,252			129	390,252
	San Juan, P. R.	7	16,927	5	383					12	17,310	9	49,972	21	67,282
	Tampa, Fla.	19	81,171	14	820			1	2,304	34	84,295			34	84,295
Eleventh	Seattle, Wash.	143	371,668	60	15,519			5	3,814	208	391,001	26	160,524	234	551,525
	Hoquiam, Wash.	8	7,963							8	7,963			8	7,963
	Juneau, Alaska	4	367	25	1,980			3	4,438	32	6,785			32	6,785
	St. Michael, Alaska	3	1,138	7	272					10	1,410	4	4,034	14	5,444
	Total, 1934	4,058	10,050,219	1,292	602,655	16	9,235	301	353,120	5,667	11,015,229	285	3,460,225	5,952	14,475,454
	Total, 1933	3,903	8,954,614	1,264	602,836	16	10,319	276	312,395	5,495	9,880,154	296	3,609,218	5,755	13,489,382
	Increase (+) or decrease (−)	+155	+1,095,605	+28	−181		−1,084	+25	+40,725	+208	+1,135,065	−11	−148,993	+197	+986,072

Vessels Inspected, By Geographic Divisions

Pacific coast	579	1,912,501	263	121,598	2	641	17	32,241	861	2,066,981	96	794,618	957	2,861,599
Atlantic coast	2,047	4,288,783	767	411,440	2	591	254	274,717	3,070	4,975,531	149	2,536,624	3,219	7,512,155
Western rivers	302	77,369	106	5,110	4	864			412	83,343			412	83,343
Great Lakes	724	2,465,271	75	42,878	2	233			801	2,508,382	24	34,274	825	2,542,656
Gulf coast	406	1,306,295	81	21,629	6	6,906	30	46,162	523	1,380,992	16	94,709	539	1,475,701
Total, 1934	4,058	10,050,219	1,292	602,655	16	9,235	301	353,120	5,667	11,015,229	285	3,460,225	5,952	14,475,454

CERTIFICATES WITHDRAWN OR REFUSED

Vessels from which certificates of inspection were withdrawn	7
Vessels refused certificates of inspection:	
Domestic steam vessels	56
Domestic vessels propelled by gas, fluid, naphtha, or electric motor	4
Domestic sea-going barges of 100 gross tons or over	2
Foreign steam vessels	4
Total	73

CARGO VESSELS EXAMINED TO CARRY PERSONS IN ADDITION TO CREW

During the year ended June 30, 1934, 1,293 cargo vessels were examined to carry persons in addition to crew, under the provisions of the act of Congress approved June 5, 1920.

NEW LIFE PRESERVERS INSPECTED

Kind	Inspected	Passed	Rejected
Block cork	118,117	118,023	94
Balsa block	6,470	6,446	24
Kapok	2,643	2,631	12
Total, 1934	127,230	127,100	130
Total, 1933	101,921	101,579	342
Increase (+) or decrease (−)	+25,309	+25,521	−212

LIFE-SAVING APPARATUS INSPECTED AT FACTORIES

Kind	Inspected	Passed	Rejected
New cork-ring life buoys	5,188	5,188	
New balsa wood life buoys	748	744	4
New lifeboats	277	277	
New life rafts	143	143	
New wood floats	76	76	
New boat davits	36	36	

WORK PERFORMED BY INSPECTORS IN CENTRAL OFFICE

Vessels inclined	142
Reinspections of vessels	97

BOILERS

Boilers inspected:	
Steel (riveted plates)	8,275
Iron (riveted plates)	34
Pipe	2,606
Total	10,915
Boilers found defective:	
Gave way under hydrostatic pressure:	
Steel (riveted plates)	166
Pipe	4
Total	170

Boilers found defective—Continued.	
Defective from other causes:	
Steel (riveted plates)	1,381
Pipe	113
Total	1,494
Boilers condemned from further use	17
Defects in boilers and attachments:	
Sheets	784
Heads	269
Steam and mud drums	56
Flues and tubes	69,820
Steam pipes	373
Stay bolts	17,938
Braces	563
Other parts	8,327
Total	98,130

MARINE BOILER PLATES TESTED

Inspected by assistant inspector at—	Plates rejected because of—							Total		
	Tensile strength	Surface defect	Light gage	Heavy gage	Lost	Lamination	Elongation	Rejected	Inspected	Accepted
Coatesville, Pa.					1	1		2	519	517
Philadelphia, Pa.	3		1					4	65	61
Pittsburgh, Pa.				3		2		5	60	55
Chicago, Ill.									19	19
Cleveland, Ohio		2				17		19	73	54
Total, 1934	3	2	1	3	1	20		30	736	706
Total, 1933	3	7				1	1	12	359	347
Increase(+)or decrease(−)		−5	+1	+3	+1	+19	−1	+18	+377	+359

STEEL BARS AND FORGINGS TESTED

Tested by assistant inspector at—	Samples of bars		Samples of forgings		Bars		Forgings	
	Tested	Rejected	Tested	Rejected	Accepted	Rejected	Accepted	Rejected
Coatesville, Pa.	28		8		116		2	
Pittsburgh, Pa.	4				120			
Buffalo, N. Y.	8				116			
Chicago, Ill.	4				6			
Total, 1934	44		8		358		2	

STATISTICS CONCERNING SHIPS' PERSONNEL

OFFICERS LICENSED

Local district	Steam and motor vessels					Steam vessels		Motor vessels		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 special engineers	Engineers	Operators	Masters	Chief mates		
		Ocean	Inland										
San Francisco, Calif.	350	252	54	9	1	364	395	163	663	25	2	------	2,278
Honolulu, Hawaii	23	14	------	1	------	18	24	10	134	2	------	------	226
Los Angeles, Calif.	105	81	2	3	5	81	95	65	392	10	1	------	840
Portland, Oreg.	55	23	14	------	4	72	54	30	202	3	------	------	457
New York, N. Y.	1,036	530	46	103	8	1,193	730	361	1,288	49	------	------	5,344
Albany, N. Y.	69	1	12	37	9	97	6	17	35	------	------	------	283
New Haven, Conn.	20	2	2	9	2	18	6	18	138	2	------	------	217
Philadelphia, Pa.	145	145	6	17	7	211	120	99	607	6	------	------	1,363
Norfolk, Va.	97	21	------	17	15	129	49	41	355	2	------	------	726
Baltimore, Md.	163	109	20	15	18	191	110	70	476	3	1	------	1,176
Charleston, S. C.	26	8	1	6	4	31	8	7	88	2	------	------	181
Jacksonville, Fla.	66	53	2	12	6	48	68	59	480	7	------	------	801
Savannah, Ga.	16	9	4	5	------	25	21	9	71	3	------	------	163
St. Louis, Mo.	48	2	41	26	------	82	19	22	269	------	------	------	509
Dubuque, Iowa	7	------	2	14	------	19	8	4	117	------	------	------	171
Boston, Mass.	168	156	10	13	1	171	145	49	343	15	2	1	1,074
Bangor, Maine	38	14	4	4	5	20	12	14	134	9	------	------	254
New London, Conn.	22	7	4	8	------	33	13	36	230	------	------	------	353
Portland, Maine	64	29	4	4	1	53	16	9	146	12	------	------	338
Providence, R. I.	43	20	5	4	3	47	22	12	155	3	------	------	314
Louisville, Ky.	16	------	8	15	------	18	9	10	47	------	------	------	123
Evansville, Ind.	9	------	11	10	------	17	4	1	83	------	------	------	135
Memphis, Tenn.	20	------	9	12	------	32	6	1	75	------	------	------	155
Nashville, Tenn.	13	------	9	10	------	20	4	5	49	------	------	------	110
Pittsburgh, Pa.	28	------	24	7	1	45	21	5	96	------	------	------	227
Cincinnati, Ohio	18	------	20	10	------	26	7	3	42	------	------	------	126
Point Pleasant, W. Va.	8	------	6	7	1	16	4	1	73	------	------	------	116
Detroit, Mich.	54	5	------	26	2	97	43	9	92	------	------	------	328
Chicago, Ill.	41	2	1	12	4	54	39	20	265	------	------	------	438
Duluth, Minn.	20	1	------	13	4	30	19	33	------	------	------	------	120
Grand Haven, Mich.	18	------	------	19	3	30	22	1	82	------	------	------	175
Marquette, Mich.	11	------	------	5	2	14	5	4	70	------	------	------	111
Milwaukee, Wis.	43	------	------	28	3	63	43	16	56	------	------	------	252
Port Huron, Mich.	38	------	------	18	3	55	46	------	27	------	------	------	187
Cleveland, Ohio	53	4	------	73	3	119	91	15	105	------	------	------	463
Buffalo, N. Y.	54	1	1	53	7	119	55	15	75	------	------	------	380
Oswego, N. Y.	15	------	------	6	1	23	11	------	113	------	------	------	169
Toledo, Ohio	19	------	------	21	------	33	17	7	78	------	------	------	175
New Orleans, La.	220	67	23	35	40	234	145	69	305	9	------	1	1,148
Galveston, Tex.	113	64	1	13	9	79	64	33	269	5	------	------	650
Mobile, Ala.	54	34	5	22	5	81	38	29	136	6	------	------	410
San Juan, P. R.	8	3	------	3	3	6	8	9	39	------	1	------	80
Tampa, Fla.	34	13	1	1	1	33	24	31	266	------	------	1	405
Seattle, Wash.	155	88	48	2	8	132	100	74	310	15	1	------	933
Hoquiam, Wash.	6	2	7	------	2	8	4	3	33	1	------	------	66
Juneau, Alaska	16	13	4	2	4	14	4	31	272	2	1	------	363
St. Michael, Alaska	8	------	1	1	1	7	2	2	32	1	------	------	55
Total, 1934	3,653	1,773	412	731	196	4,308	2,756	1,522	9,413	192	9	3	24,968
Total, 1933	4,103	1,368	325	655	210	5,257	2,052	1,445	10,395	267	7	4	26,088
Increase (+) or decrease (−)	−450	+405	+87	+76	−14	−949	+704	+77	−982	−75	+2	−1	−1,120

RESULTS OF ACTION AGAINST LICENSES

Licenses suspended	92
Licenses revoked	10
Licenses refused	164
Licenses canceled	33
Violations of the law:	
Cases investigated	1,203
Cases dismissed	950
Cases reported to district attorneys and chief officers of customs	126
Number of appeals from decisions of local boards	26
Decisions of local boards reversed by supervising inspectors	2
Decisions of local boards modified by supervising inspectors	8
Decisions of local boards sustained by supervising inspectors	16

EXAMINATIONS FOR COLORBLINDNESS

During the year ended June 30, 1934, 7,041 applicants for original licenses and for renewals of licenses were examined for visual defects, 49 of whom were found colorblind, or had other visual defects, and were rejected, and 6,992 were passed. As compared with the previous year, these figures show an increase of 227 in the number examined and of 225 in the number passed.

CERTIFICATES OF SERVICE ISSUED TO ABLE SEAMEN AND TO LIFEBOAT MEN

ABLE SEAMEN

Issued by—	Applications received	Applications rejected	Certificates issued	Issued by—	Applications received	Applications rejected	Certificates issued
INSPECTION DISTRICT				INSPECTION DISTRICT—con.			
San Francisco, Calif.	402	28	374	Grand Haven, Mich.	24	6	18
Honolulu, Hawaii	171	14	157	Marquette, Mich.	35	3	32
Los Angeles, Calif.	302	46	256	Milwaukee, Wis.	91		91
Portland, Oreg.	79	16	63	Port Huron, Mich.	68	25	43
New York, N. Y.	872	41	831	Cleveland, Ohio	318	35	283
Albany, N. Y.	4		4	Buffalo, N. Y.	213	19	194
New Haven, Conn.	8		8	Oswego, N. Y.	5	1	4
Philadelphia, Pa.	292	33	259	Toledo, Ohio	99	4	95
Norfolk, Va.	147	7	140	New Orleans, La.	173	6	167
Baltimore, Md.	442	43	399	Galveston, Tex.	94	1	93
Charleston, S. C.	19	4	15	Mobile, Ala.	112	6	106
Jacksonville, Fla.	161	4	157	San Juan, P. R.	20	1	19
Savannah, Ga.	65	8	57	Tampa, Fla.	45		45
Boston, Mass.	287	18	269	Seattle, Wash.	248	16	232
Bangor, Maine	17		17	Hoquiam, Wash.	9		9
New London, Conn.	12		12	Juneau, Alaska	26	8	18
Portland, Maine	45	5	40				
Providence, R. I.	104	16	88	Total, 1934	5,365	444	4,921
Detroit, Mich.	146	19	127	Total, 1933	4,125	276	3,849
Chicago, Ill.	126	9	117				
Duluth, Minn.	84	2	82	Increase	1,240	168	1,072

CERTIFICATES OF SERVICE ISSUED TO ABLE SEAMEN AND TO LIFEBOAT MEN—continued

LIFEBOAT MEN

Issued by—	Applications received	Applications rejected	Certificates issued
Local inspectors of vessels:			
San Francisco, Calif.	97		97
Honolulu, Hawaii	329	67	262
Los Angeles, Calif.	582	81	501
Portland, Oreg.	26		26
New York, N. Y.	2,343	872	1,471
Albany, N. Y.	12		12
Philadelphia, Pa.	37		37
Norfolk, Va.	21		21
Baltimore, Md.	147		147
Charleston, S. C.	2		2
Jacksonville, Fla.	194		194
Savannah, Ga.	61	4	57
Boston, Mass.	514		514
Bangor, Maine	18		18
New London, Conn.	51		51
Portland, Maine	41		41
Providence, R. I.	146		146
Detroit, Mich.	54		54
Chicago, Ill.	9		9
Grand Haven, Mich.	1		1
Marquette, Mich.	1		1
Milwaukee, Wis.	10		10
Port Huron, Mich.	2		2
Cleveland, Ohio	18		18
Buffalo, N. Y.	10		10
Toledo, Ohio	12		12
New Orleans, La.	184	1	183
Galveston, Tex.	16		16
Mobile, Ala.	27		27
San Juan, P. R.	2		2
Tampa, Fla.	23		23
Seattle, Wash.	2,540	1,746	794
Hoquiam, Wash.	20		20
Juneau, Alaska	140	24	116
Local inspectors of vessels—Con.			
St. Michael, Alaska	3		3
Total by local inspectors	7,693	2,795	4,898
Navy Department:			
Navy yards:			
New York, N. Y.	92	11	81
Portsmouth, Va.	93	13	80
Receiving station, Philadelphia, Pa.	164	5	159
U. S. Coast Guard, Treasury Department	5,917	2,132	3,785
Coast and Geodetic Survey, Department of Commerce	199	66	133
Bureau of Lighthouses, Department of Commerce	823	229	594
Massachusetts nautical school ship *Nantucket*	48	2	46
California nautical school ship *California State*	60		60
New York State Merchant Marine Academy	72		72
Total, 1934	15,161	5,253	9,908
Total, 1933	10,086	3,098	6,988
Increase	5,075	2,155	2,920

TRANSPORTATION AND LOSS OF LIFE

PASSENGERS CARRIED

During the fiscal year 238,489,713 passengers were carried on vessels that are required by law to report the number of passengers carried. Dividing this number by 69, the total number of passengers lost, shows that 3,456,372 passengers were carried for each one lost.

LIVES SAVED

During the year 114 lives were directly saved by means of the life-saving appliances required by law.

LIVES LOST ON VESSELS SUBJECT TO INSPECTION, BY DISTRICTS

Cause	First		Second		Third		Fourth		Fifth		Sixth	
	Passengers	Crew	Passengers	Crew	Passengers	Crew	Passengers	Crew	Passengers	Crew	Passengers	Crew
Fire: Nonpassenger steamers		2				1						
Explosion, escape of steam, etc.: Nonpassenger steamers						2						
Sinking:												
Passenger steamers												
Nonpassenger steamers				4		1						
Wreck: Passenger steamers												
Accidental drowning:												
Passenger steamers		1		1		5		1				
Nonpassenger steamers	1	2		5		3		2		1		2
Suicide:												
Passenger steamers	14	1	9	1			2		1			
Nonpassenger steamers		1		2		1						
Miscellaneous:												
Passenger steamers	13	3	8	2	3				1	1		1
Nonpassenger steamers		1	2	14		3		2		1		1
Total:												
Passenger steamers	27	5	17	4	3	5	2	1	2	1		1
Nonpassenger steamers	1	6	2	25		11		4		2		3
Grand total	28	11	19	29	3	16	2	5	2	3		4
Last year	14	48	89	27	4	11		3	4	6		3
Increase (+) or decrease (−)	+14	−37	−70	+2	−1	+5	+2	+2	−2	−3		+1

Cause	Seventh		Eighth		Ninth		Tenth		Eleventh		Total	
	Passengers	Crew	Passengers	Crew	Passengers	Crew	Passengers	Crew	Passengers	Crew	Passengers	Crew
Fire: Nonpassenger steamers												3
Explosion, escape of steam, etc.: Nonpassenger steamers												2
Sinking:												
Passenger steamers		3										3
Nonpassenger steamers												5
Wreck: Passenger steamers									4	4	4	4
Accidental drowning:												
Passenger steamers				2		2		5			1	24
Nonpassenger steamers	1		4		1		1	1	1		34	3
Suicide:												4
Passenger steamers	1						1		1		28	7
Nonpassenger steamers		1		2		2		7			2	34
Miscellaneous:												
Passenger steamers	2	3	4		1		2	1	6	4	66	25
Nonpassenger steamers		1		4		4		12			3	72
Total:												
Passenger steamers	2	4	4	4	1	4	2	13	6	4	69	97
Nonpassenger steamers	5	2	9	2		2	3	14	2	2	130	120
Grand total												
Last year												
Increase (+) or decrease (−)	−3	+2	−5	+2	+1	+2	−1	−1	+4	+2	−61	−23

The total number of lives lost from all causes, passengers and crew, was 166, a decrease of 84 from the previous year. Of the lives lost, 145 were from suicide, accidental drowning, and other causes beyond the power of the Service to prevent, leaving a loss of 21 fairly chargeable to such accidents as fire, sinking, explosion, and wreck.

ACCIDENTS RESULTING IN LOSS OF LIFE

The total number of accidents resulting in loss of life during the past year was 147.

VESSELS LOST

Steam vessels	25
Motor vessels	8
Barges, etc	23
Total	56

PROPERTY LOST

By explosion or accidental escape of steam	$21,166
By wreck or founder	1,092,461
By collision	2,077,096
By fire	594,793
By snags	274,464
From miscellaneous causes	2,557,849
Total	6,617,829

NAVIGATION PATROL SERVICE

On the waters of the United States subject to Federal control, there are between three and four hundred thousand small motor vessels transporting millions of persons annually. Congress has provided for the safety of this navigation through the equipment of such vessels with life-saving devices, and in the enforcement of that law the Bureau has operated five inspection vessels covering the waters of the Atlantic and Gulf coasts, and a part of the Great Lakes. These vessels also supervise the fleets of oyster and fishing vessels to gain assurance that the crews receive their wages, have proper quarters, food, and the treatment to which they are entitled by law.

Through the imposition of fines, penalties, and forfeitures, this service is in considerable part self-sustaining, and through cooperation with motor-boat owners, associations, yacht clubs, etc., a reasonable compliance of the law is maintained without the imposition of unnecessary hardship.

Of the 5,807 violations of the law reported, 3,019 were discovered by the Bureau's patrol boats. Record of the work of these vessels however, is better shown by the fact that during the year they made 19,307 inspections.

The following is a comparative statement of cases of violations of the navigation laws 1930–34:

Port	1930	1931	1932	1933	1934	Port	1930	1931	1932	1933	1934
Baltimore	746	584	471	485	374	Ogdensburg	36	28	21	9	35
Boston	441	509	693	250	205	Pembina	1		1		
Bridgeport	182	163	63	165	100	Philadelphia	568	511	340	498	202
Buffalo	43	83	24	21	94	Pittsburgh	23	9	21	13	27
Charleston	68	40	52	45	77	Port Arthur	24	26	13	120	34
Chicago	49	37	24	123	12	Portland, Maine	264	315	370	50	32
Cleveland	172	167	180	83	110	Portland, Oreg	86	129	118	87	45
Detroit	234	185	191	174	85	Providence	103	47	151	16	12
Duluth	30	27	20	3	4	Rochester	75	86	37	34	108
Galveston	32	39	65	15	33	St. Albans	41	170		1	3
Honolulu	32	15	35	68	80	St. Louis	9	6	4	4	10
Indianapolis	12	4	4	2	2	St. Paul		2	11		
Juneau	58	47	71	52	41	San Antonio	16	72	44	46	4
Los Angeles	336	400	237	278	167	San Diego		22	30	9	14
Louisville	8	9	15	49	4	San Francisco	327	232	252	202	143
Memphis	35	48	54	87	15	San Juan	10	23	15	17	11
Milwaukee	26	9	2	28	6	Savannah	105	91	90	84	69
Mobile	76	95	269	171	133	Seattle	336	581	1,176	450	340
New Orleans	217	187	937	755	519	Tampa	977	928	1,037	1,688	790
New York	951	828	589	2,598	1,733	Wilmington, N. C	218	196	116	37	69
Nogales	2		5								
Norfolk	448	228	214	335	65	Total	7,417	7,187	8,062	9,152	5,807

PREVENTING 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 approximately 49 inspectors who count such passengers and when the limit has been reached, prevent additional persons from going on board.

During the year 4,314,211 passengers going on excursion boats were so counted. The following table shows these counts by navigation and customs services.

Port	Navigation		Customs		Total	
	Counts	Passengers	Counts	Passengers	Counts	Passengers
Baltimore	1,809	562,312			1,809	562,312
Boston			238	207,718	238	207,718
Buffalo			1,185	543,854	1,185	543,854
Chicago	1,680	535,881	131	52,291	1,811	588,172
Cleveland	201	260,105	33	22,499	234	282,604
Detroit	273	322,502	22	20,030	295	342,532
Duluth	134	23,405			134	23,405
Galveston			17	2,384	17	2,384
Indianapolis			10	10,112	10	10,112
Mobile	152	9,461			152	9,461
New York			800	1,527,293	800	1,527,293
Norfolk			102	26,227	102	26,227
Philadelphia			84	51,993	84	51,993
Portland, Maine	156	18,627			156	18,627
Portland, Oreg	4	1,291			4	1,291
Providence	98	19,858			98	19,858
Rochester	23	10,273	1	585	24	10,858
San Francisco	427	22,667	403	23,321	830	45,988
Seattle	268	33,274	372	6,248	640	39,522
Total, 1934	5,225	1,819,656	3,398	2,494,555	8,623	4,314,211
Total, 1933	5,768	1,806,096	3,578	2,172,988	9,346	3,979,064

On 127 occasions it became necessary for the inspectors to prevent additional passengers from going on board. This involved the safety of 92,986 passengers. There was a material decrease in the number of these shut-offs as compared with the year before, although there was an increase in the number of passengers carried.

The following table shows in detail by ports these shut-offs:

Port	July 1933		August 1933		September 1933		June 1934		Total	
	Counts	Passengers	Counts	Passengers	Counts	Passengers	Counts	Passengers	Counts	Passengers
Baltimore	4	3,400	1	850					5	4,250
Boston	8	12,438	8	13,005	2	3,454			18	28,897
Buffalo	3	6,850							3	6,850
Chicago	7	3,775	1	2,280	2	1,301			10	7,356
Cleveland			5	16,700					5	16,700
Detroit							6	14,000	6	14,000
Mobile	1	335							1	335
New York					1	1,520	25	4,376	26	5,896
Norfolk	6	1,489	14	4,686	1	489			21	6,664
San Francisco							1	250	1	250
Seattle	30	790	1	998					31	1,788
Total	59	29,077	30	38,519	6	6,764	32	18,626	127	92,986

PATENT OFFICE

VOLUME OF BUSINESS

A grand total of 79,690 applications was filed, compared with 79,822 the preceding year, a difference of only 132 cases. The maintenance of the volume of new business at substantially the same level as that of the preceding year is not without its encouraging aspects, considering the steady and severe decline recorded in the preceding several years, commencing with the period of depression.

The total of new patent applications filed with fees was 56,095, a decrease of 3,313 from the fiscal year 1933, when 59,408 applications were received. The slight recession in patent applications was more than counterbalanced by the filing of 16,317 trade-mark applications, which is an increase of 3,616 over the total of the preceding year. The increased activity in the Trade Mark Division was undoubtedly due to the repeal of the eighteenth amendment, as the applications included an abnormally large proportion of trade marks relating to beer, whisky, gin, wines, and other alcoholic beverages.

CONDITION OF WORK

The work in all clerical divisions is current. The Design Division is only 1 month behind. Of the 65 examining divisions there are now only 2 over 4 months behind in the work as compared with 25 divisions in that condition a year ago; 17 additional divisions have moved from the 4-month to the 3-month period, and 23 more divisions are now within the 4-month period.

During the year the number of patent applications awaiting action was reduced from 49,050 to 39,226, a decrease of over 20 percent. Encouraging though this may sound, a decrease in the number of applications awaiting action does not represent progress unless it be accompanied by an increase in the number of cases which have been finally disposed of and cleared from the active records. Obviously the mere transfer of a case from the "awaiting action" status to the "awaiting amendment" status does not necessarily indicate in itself an advancement in the prosecution or an improvement in the condition of the work in the office. More satisfaction is derived from the fact that, as revealed by a complete inventory of cases in the Patent Office, the number of cases finally disposed of greatly exceeded the number received. During the first 6 months of 1934, 31,745 applications were received, and within the same period 10,501 applications were abandoned and 26,260 were passed to issue. Thus, 5,016 more cases were finally disposed of than were received by the Office during that period. According to the inventory of June 30, 1934, there were 112,576 applications awaiting amendment by the applicant or action

by the Office as compared with 119,869 on January 2, 1934, 180,355 on February 3, 1932, and 198,177 on January 2, 1931.

This impressive improvement in the condition of the work of the Office, considered either from the standpoint of the number of applications awaiting action or the number of cases which remain to be disposed of, has been accomplished with a greatly depleted personnel. There have been vacant 1 position on the Board of Appeals, 1 in the law examiners' group, 35 in the examining corps, 54 in the clerical force, and 19 in the copy-pullers force, a total of 110 vacant positions.

SURPLUS

For the first time since 1922, and largely as the result of drastic economy measures, the last fiscal year brought a surplus to the Patent Office, the actual receipts being $506,683.10 in excess of expenditures. Receipts for the year from all sources totaled $4,383,468.11. The total expenditures were $3,876,785.01. While the receipts were lower than those of the previous year, expenditures were reduced by more than $700,000.

The income of the Office is derived from a limited class of our citizens, the inventors, who are required by statute to accompany their applications for patents with fees designed primarily to cover the cost of operating the Bureau. Within the past 15 years the fees in patent applications have been successively increased from $15 to $20, from $20 to $25, and finally, in 1932, from $25 to $30 as basic fees. The fees in trade-mark applications were increased 33⅓ per cent in June 1930. These increased fees, constituting a severe burden on inventors, were justified when enacted, as they can only be justified today, as a means of providing sufficient revenue to enable the Office to render that high character of service demanded by inventors and industry; to perform the work efficiently and promptly by enlarging the personnel to cope with the volume of business; and to increase salaries to the point where the trained and experienced examiner is induced to remain in the service. The higher fees were not imposed with the thought of creating an additional source of general revenue for the Treasury.

In the last annual report of this Office reference was made to the demand for a reduction in Patent Office fees as a measure of relief to distressed inventors who are unable to pay the high fees now required for patent protection. If the fees deposited by the inventors exceed the amount required to operate the Patent Office effectively, the fees should be reduced as a measure of relief. On the other hand, to the extent required by the Patent Office in the proper performance of its duties, the receipts should be made available to meet the expenses of operation.

A fair analysis of conditions in the Patent Office indicates that, while it will probably operate with a surplus, the appropriations for the fiscal year 1935 are insufficient to meet urgent requirements, and that its service to the public and its internal work will not be up to the desired standard.

CLASSIFICATION DIVISION

The conditions in the Patent Office have now reached a point where it is no longer merely desirable, it is essential, to establish and main-

tain an adequate classification division to carry out the act of June 10, 1898, and the program of classification announced in 1912 by the President's Committee on Economy and Efficiency. It is estimated that proper and adequate classification of the arts in the Patent Office would increase the efficiency of the examiners by not less than 10 percent, materially lessen the cost of examination, and attach to future patents a greater degree of validity.

The Commissioner of Patents is expressly charged by statute with the duty of revising and perfecting classification of patents and publications. This duty is not now being fully performed because of insufficient appropriations to provide for classification personnel. The acute need for modern, scientific, and accurate classification of the patents and literature has been recognized within the past year by the Secretary of Commerce, the Secretary's Patent Office Advisory Committee, the Bureau of the Budget, and the Congress. It is therefore urgently recommended that sufficient funds be appropriated to rebuild the Classification Division to at least the size of the 1914–18 average, when 20 examiners and a correspondingly sized clerical force were devoted to this work.

REALLOCATION OF EXAMINERS IN GRADES P–1 AND P–2

The junior examiners in the Patent Office have presented to the Department a formal petition for reallocation from grade P–1 to grade P–2, in the course of which they have described the hardships under which they are working and accurately set forth the inequity of their present classification. Assuming the Department to be sympathetic toward the proposed reallocations, it is recommended that appropriate steps be taken not only to effectuate them but to provide additional congressional funds to meet the added annual salary obligation.

THE REESTABLISHMENT OF ABOLISHED POSITIONS

The severe restrictions imposed on salary expenditures have forced the Patent Office to abolish approximately 109 positions for the years 1934 and 1935, including 37 examiners, 58 clerks, and 14 copy pullers. The reduced force is insufficient to handle the work and the office can no longer continue to provide the excellent and efficient service to which industry and inventors have become accustomed and for which the latter are taxed. At least part of the abolished positions should be reestablished. This is especially urged, as the number of patent applications appears to be now definitely on the increase.

While clerks and stenographers have been shifted from one division to another to meet the emergency, continued resignations and unfilled vacancies have made it extremely difficult for the available personnel to handle the work. The productive work of the examiners is seriously interfered with if stenographers and clerks are not available to perform essential duties.

Within the last several years, three additional divisions were created, the Board of Supervisors was established, additions were made to the Board of Appeals, and reorganizations effected in the Interference Division and the proof-reading section of the Issue Division. These new divisions and sections required the transfer of

15 stenographers previously employed to assist in keeping the work current in the examining divisions.

It is recommended that a sufficient number of the abolished positions in the examining and clerical corps be reestablished to meet absolute requirements.

On June 30, 1934, there were numerous important key positions vacant in the Patent Office, including 4 primary examiners, 1 law examiner, 2 assistant chiefs in the examining divisions, and the Chief of the Mail Division. These vacant key positions should be filled.

REGISTRATION OF ATTORNEYS

A new and improved system for the registration of attorneys to practice before the Patent Office has been introduced. Rule 17 was amended to require an applicant for admission to practice to demonstrate by examination that he is possessed of the necessary scientific and legal qualifications "to enable him to render inventors valuable service and is otherwise competent to advise and assist them in the presentation and prosecution of their applications before the Patent Office." The examinations will be held under the auspices of the Civil Service Commission. By thoroughly examining the qualifications of an attorney before registration, it is hoped that a higher standard among the practitioners before this Office will be obtained. The first examination for attorneys will be held on September 27, 1934, in about 600 cities of continental United States, Alaska, Hawaii, Canal Zone, and Puerto Rico. More than 100 applicants have signified their intention of taking the first examination under the new registration system.

PATENT OFFICE ADVISORY COMMITTEE

The special committee appointed by the Secretary of Commerce during the summer of 1933 to study conditions in the Patent Office continues its labors and has offered numerous recommendations for improving the practice and procedure. So valuable have been the contributions of this committee to the public service that consideration is being given to converting the committee into a permanent advisory body. With this in view, it was decided to enlarge the committee to 15, to adopt the principle of a rotating membership and to include, in addition to patent lawyers, representatives from the manufacturing and engineering groups. The following new men have accepted invitation to serve on the committee: William J. Belknap, Esq., Detroit, Mich.; Harlow M. Davis, Esq., Boston, Mass.; Carl D. Kelly, Chicago, Ill.; H. B. Spalding, New York, N. Y.; and Franklin E. Hardy, Esq., Pittsburgh, Pa. Two of these are industrialists whereas the remaining three are members of the patent bar. A third group will be added to the committee in approximately 6 months after the appointment of the second group. After attaining its full membership, the committee will be rotated every 6 months by the withdrawal of the five oldest members and the appointment of a corresponding number of new members.

Since its creation the committee has met in Washington on an average of once a month, and each of its sessions has lasted from 2 to 3 days. Too much cannot be said in praise of these public-

spirited men who, not only without compensation but at considerable expense to themselves, have served on this committee and have given so generously of their time, energy, and talents.

THE CONFERENCE AT LONDON

The International Union for the Protection of Industrial Property held its sixth amendatory conference in London beginning May 1, 1934, and completed its deliberations by the signing of a revised convention of June 2, 1934. Under Presidential commission the Commissioner of Patents was selected as chairman of the American delegation, of which the other members were Hon. Thomas Ewing, former Commissioner of Patents, and John A. Dienner, Esq., of the Chicago bar. The American delegation also included as technical advisers Fritz von Briesen, Esq., of New York, N. Y.; Robert F. Whitehead, law examiner in the Patent Office; and John J. Darby, Esq., Washington, D. C. Delegations from 46 nations were present at the conference, including 34 members of the international union and 12 nonadhering countries invited to participate but without voting privileges.

In many respects the London conference may properly be regarded as one of the most successful conferences of the international union. It is believed that, when ratified by this and other adhering nations, these latest amendments to the convention will result in substantial and lasting benefit to the inventors and manufacturers in this country.

The London convention, in its main provisions, follows largely the text of the convention signed at The Hague in 1925, except for the following notable modifications:

PATENTS

Article 1. The definition of industrial property has been rewritten to make clearer that there are included in this term processed agricultural products such as beer, flour, etc. (par. 3).

Article 4. Reference to the reservation of third-party rights has been deleted from the first paragraph. The third paragraph, B, has been amended to provide explicitly that third-party rights and rights of personal possession shall not arise out of any acts done during the priority period.

Provision has been made for the recognition of the filing of an application for patent, trade mark, design, or industrial model under any international arrangement as giving rise to rights or priority in countries of the union not parties to such arrangement. This provision was included in the convention in order to avoid loss of priority rights because such applications are filed in an international bureau and not in a country of the union. The American delegation supported this amendment after having made clear its interpretation thereof as not excluding the right of the United States to demand a certificate from the government of the applicant's nationality or residence that such an international deposit is the full equivalent of a deposit in such country. In supporting the amendment, at least nine other countries adopted the American interpretation.

The right to file an application under the convention with the benefit of priority based on more than one earlier application has been more clearly defined (par. F and new par. G); and it is expressly provided (par. H) that to obtain the benefit of priority for an invention, the original application need merely disclose the invention and need not contain claims thereto.

Article 4 bis. A new subparagraph, 5, has been added to provide that if an application for patent is filed with a claim of priority based on an application in another country, the patent granted shall have the same term as if it had been filed without claim of priority.

Article 4. ter. This new article gives the inventor the right to have his name mentioned in patents taken out on his inventions.

Article 5. This article has been amended (par. A–4) to provide that in case of failure to work the invention, no compulsory license may be demanded within the 3 years following the grant of the patent and that the patent may not be declared invalid for failure to work or other abuse of monopoly except upon application made not earlier than 2 years after the grant of the first compulsory license. This provision is made equally applicable to utility models (par. A–5).

Provision is made (par. D) that recognition of a patent right is not forfeited by failure to place upon the patented article a notice that the same is covered by patent.

TRADE MARKS

Article 5. Use of a trade mark in a form slightly different from that in which it is originally registered, provided the distinctive character is not changed, will not invalidate the registration or diminish the protection afforded (par. C–2).

The simultaneous use of the same mark in one country by industrial or commercial establishments regarded as joint owners of the mark, according to the law of the country where protection is claimed, shall not prevent registration or in any way diminish the protection of such mark in any country of the union provided its use does not deceive the public and is not contrary to the public interest (par. C–3).

Article 6. An application for registration of a trade mark in a foreign country cannot be refused merely because the application presents the mark in a form slightly different from the form in which it is registered in the country of origin, provided the distinctive character of the mark is retained (par. B–2).

If a trade mark has once been registered in the country of origin and then in one or more other countries of the union, the right to such trade mark in such other countries shall be independent of the right to such mark in the country of origin provided such trade mark is in conformity with the law of the country of importation (par. D).

Article 6 quater. This new article provides that where, in conformity with the legislation of the country of the union, an assignment of a trade mark is valid only if at the same time there is a transfer of the enterprise or goodwill to which the mark relates, it will suffice, in order that the validity of the transfer be admitted,

that the part of the enterprise or business goodwill in the country where the transfer is made be transferred to the purchaser with the exclusive right to manufacture or sell therein products under the assigned mark; it being provided, however, that no such assignment need be regarded as valid if the public would be deceived thereby, especially as to origin of the goods to which the assigned mark is applied or the substantial quality of such goods.

AID TO INDUSTRY

The Patent Office has continued to advance the examination of a patent application and to expedite its prosecution whenever it has appeared that the patent will cause the employment of men and the investment of idle capital. Verified reports filed in this Office from time to time prove that the practice has accomplished its purpose, and has resulted in the investment of a substantial amount of capital and the creation of numerous positions to reduce the ranks of the unemployed.

Following is an appendix giving the usual statistical information.

APPENDIX

STATISTICS

Applications received during the fiscal year ended June 30, 1934[1]

With fees:		
Applications for patents for inventions	56,095	
Applications for patents for designs	3,811	
Applications for reissues of patents	457	
		60,363
Applications for registration of trade marks	[2] 16,317	
Applications for registration of labels and prints	2,687	
		19,004
Total, with fees		79,367
Without fees:		
Applications for inventions (act Mar. 3, 1883)	318	
Applications for reissue (act Mar. 3, 1883)	3	
Applications for reissue (rule 170)	2	
Total, without fees		323
Grand total		79,690

Applications for patents for inventions with fees

Year ended June 30—		Year ended June 30—Continued.	
1925	77,926	1930	91,430
1926	80,682	1931	84,097
1927	84,511	1932	73,465
1928	88,482	1933	59,408
1929	87,039	1934	56,095

Applications for patents, including reissues, designs, trade marks, labels, and prints, with fees

Year ended June 30—		Year ended June 30—Continued.	
1925	103,591	1930	117,569
1926	110,030	1931	106,717
1927	113,783	1932	93,859
1928	116,844	1933	79,469
1929	114,496	1934	79,367

Patent applications awaiting action

June 30—		June 30—Continued.	
1925	44,556	1930	119,597
1926	43,765	1931	92,203
1927	64,646	1932	76,723
1928	106,575	1933	49,050
1929	103,236	1934	39,226

[1] Including applications in which fees were refunded and transferred.
[2] Includes 2,211 applications for renewal of trade-mark registrations.

Patents withheld and patents expired

	1933	1934
Letters patent withheld for nonpayment of final fees	14,072	10,342
Applications allowed awaiting payment of final fees	23,448	22,675
Patents expired	42,328	39,213
Applications in which issue of patent has been deferred under sec. 4885 Rev. Stat.	345	366
Applications in process of issue	4,108	3,537

Patents granted and trade marks, labels, and prints registered

	1930	1931	1932	1933	1934
Letters patent	49,599	44,317	52,572	50,766	48,523
Plant patents			17	52	30
Design patents	2,598	3,089	2,728	2,934	2,419
Reissue patents	374	400	392	375	343
Trade marks	13,897	12,437	10,901	8,909	10,139
Labels	1,610	1,787	1,492	1,458	1,635
Prints	723	678	483	479	535
Total	68,801	62,708	68,585	64,973	63,624

Statement of receipts and earnings for the fiscal year ended June 30, 1934

Unearned balance at close of business June 30, 1933		$177,663.86
Collections during fiscal year ended June 30, 1934		4,229,987.40
Total		4,407,651.26
Refundments		24,183.15
Net collections		4,383,468.11

EARNINGS

Inventions, first fees	$1,679,700.00		
Extra claims	33,086.00		
Reissues	13,620.00		
Designs	40,140.00		
Design extensions	17,715.00		
Trade-marks	240,375.00		
Labels and prints	12,336.00		
Total		$2,036,972.00	
Final fees	$1,431,780.00		
Extra claims	29,236.00		
Total		1,461,016.00	
Appeals	$42,845.00		
Oppositions	8,800.00		
Disclaimers	1,940.00		
Revivals	5,650.00		
Total		59,235.00	
Printed copies, etc	$331,831.35		
Photoprints	10,019.50		
Photostats	53,147.55		
Manuscript	89,948.85		
Certified printed copies, etc	6,171.00		
Recording articles of incorporation	821.00		
Registration of attorneys	1,600.00		
Total		493,539.25	
Drawings		16,258.45	
Assignments		130,003.10	
Total earnings			4,197,023.80
Unearned balance June 30, 1934			186,444.31
Net receipts			4,383,468.11

Expenditures, fiscal year ended June 30, 1934

Salaries		$2,761,472.74
Public use of inventions and defending suits		286.53
Photolithographing:		
Current issue, black and white	$67,220.75	
Current issue, color	6,688.50	
Reproduction	31,404.76	
Photographic printing	12,596.29	
Photostat supplies	33,486.30	
Total		151,396.60
Printing and binding:		
Specifications	$777,902.97	
Indexes	9,555.48	
Official Gazette	103,344.28	
Total		890,802.73
Miscellaneous		41,125.57
Furniture and filing cases		5,293.68
Contingent expenses, including library stock		26,407.16
Total		3,876,785.01

Receipts and Expenditures

Receipts from all sources	$4,383,468.11
Expenditures	3,876,785.01
Surplus	506,683.10
Receipts from sale of Official Gazette and other publications (Superintendent of Documents)	65,000.00

Comparative statement

June 30	Receipts	Expenditures	Deficit	Surplus
1925	$3,271,253.89	$3,775,476.97	$504,223.08	
1926	3,457,774.53	3,857,952.11	400,177.58	
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	4,096,825.43	4,552,685.41	455,859.98	
1931	4,565,377.08	4,832,277.96	266,900.88	
1932	[1] 4,487,508.78	5,314,851.59	827,342.81	
1933	[1] 4,423,563.18	4,588,585.02	165,021.84	
1934	[1] 4,383,468.11	3,876,785.01		$506,683.10

[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	1933	1934
Salaries	$3,032,802.58	$2,761,472.74
Public use of inventions, etc	5.00	286.53
Photolithographing	233,377.13	151,396.60
Printing and binding	1,239,909.85	890,802.73
Miscellaneous printing and binding	45,156.01	41,125.57
Furniture and filing cases	12,475.70	5,293.68
Contingent expenses, including library stock	24,858.75	26,407.16
Total	4,588,585.02	3,876,785.01

Litigated cases

Patent:			
Interferences declared			2,356
Interferences disposed of before final hearing			1,732
Interferences disposed of after final hearing			216
Interferences awaiting decision			144
Trade-mark:			
Interferences declared			215
Oppositions instituted			873
Cancellations instituted			140
Interferences disposed of before final hearing			636
Interferences disposed of after final hearing			241
Interferences awaiting decision			37
Before the Board of Appeals:			
Appeals in ex parte cases		2,395	
Appeals in interference cases:			
Priorities	119		
Motions	187		
		306	
			2,701
Ex parte appeals disposed of		2,304	
Appeals in interference cases disposed of:			
Priorities	154		
Motions	217		
		371	
			2,675
Ex parte cases awaiting action		1,163	
Interference cases awaiting action:			
Priorities	35		
Motions	51		
		86	
			1,249
Oldest ex parte case awaiting action, June 4, 1934.			
Oldest interference case awaiting action, Apr. 25, 1934.			
To the Commissioner:			
Appeals in trade-mark interferences	1		
Appeals in trade-mark oppositions	55		
Appeals in trade-mark cancellations	10		
Appeals in ex parte trade-mark cases	32		
Interlocutory appeals	20		
		118	
Petitions to Commissioner:			
Ex parte	7,763		
Inter partes	162		
		7,925	
			8,043
Cases disposed of by Commissioner:			
Appeals in trade-mark interferences	1		
Appeals in trade-mark oppositions	47		
Appeals in trade-mark cancellations	9		
Appeals in ex parte trade marks	29		
Interlocutory appeals	20		
		106	
Petitions disposed of:			
Ex parte	7,710		
Inter partes	159		
		7,869	
			7,975
Notices of appeals to United States Court of Customs and Patent Appeals:			
In ex parte cases (including 4 trade marks)		123	
In inter partes cases		49	
In trade-mark oppositions		12	
In trade-mark cancellations		6	
In design applications		7	
In trade-mark interferences		1	
			198
To Supreme Court, District of Columbia, in equity suits			67

OTHER DETAILS OF BUSINESS FOR THE FISCAL YEAR

As to the volume of business, the Office received during the year 60,363 applications for patents, reissues and designs; 14,106 trade-mark applications and 2,211 applications for renewal of trade-mark registrations; and 2,687 label and print applications; 204,766 amendments to patent applications, 5,691 amendments to design applications, and 16,251 amendments to trade-mark, label, and print applications.

The number of letters constituting the miscellaneous correspondence received and indexed was 403,902. In addition, 34,134 letters were returned with information.

The number of printed copies of patents sold was 3,248,593; 1,369,550 copies of patents were shipped to foreign governments and 816,988 copies furnished public libraries. The total number of copies of patents furnished was 5,882,092, including those for Office use and for other departments.

The Office received for record 38,929 deeds of assignment.

The Drafting Division made 696 drawings for inventors, and corrected 12,206 drawings on request of inventors; 109,171 sheets of drawings were inspected, and 15,498 letters answered.

Typewritten copies of 3,090,200 words were furnished at 10 cents per hundred words. The Office certified to 12,171 manuscript copies, and furnished 5,428 miscellaneous certified copies. The Office also furnished 381,755 photostat copies of manuscript pages; 36,803 photographic copies, and 269,553 photostat copies of publications and foreign patents, for sale; 25,993 photostat-manuscript pages; 89 certified manuscript copies and 8,325 photostat copies for Government departments, without charge; 29,866 photostat and 9,153 photographic copies for use of the Patent Office; 14,329 photostat copies for sale through photoprint section, and 195 photostats for Office use; also 67,633 photostats for assignments, grants, and disclaimers for official use; in all, 797,649 photostat and 45,956 photographic copies.

UNITED STATES SHIPPING BOARD BUREAU

By Executive order dated June 10, 1933, the United States Shipping Board was abolished, effective August 9, 1933, and its activities, including those over and in respect to the United States Shipping Board Merchant Fleet Corporation, were transferred to the Department of Commerce.

At the same time the United States Shipping Board Bureau, in charge of an Advisory Committee of three members, was created to perform the work formerly carried on by the Shipping Board when it functioned as an independent body. The Bureau is 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.

On January 10, 1934, the Shipping Board Bureau was placed under a Director who reports directly to the Secretary of Commerce. A thorough study of the organization was thereupon undertaken, and on April 14, 1934, many important changes, involving a redesignation of administrative units and a realignment of functions, were put into effect. At the close of the fiscal year the Bureau's principal activities were carried on in the following divisions and sections: Division of Loans and Sales, Division of Regulation, Division of Shipping Research, Division of Traffic, Sea Service Section (since transferred to the Bureau of Navigation and Steamboat Inspection), and the Section of Public Information. The work of the Merchant Fleet Corporation was carried on in the Division of Operations, the Division of Insurance, the Legal Division, and in the offices of the Secretary, General Comptroller, and Treasurer. The Secretary, General Comptroller, Treasurer, and legal staff of the Fleet Corporation perform similar functions for the Shipping Board Bureau.

In addition to the reorganization outlined above, many important changes in administrative policy were inaugurated during the latter half of the year, with the major purpose of introducing a more businesslike administration of the laws relating to the American merchant marine. The Government's vast investment in shipping, coupled with the Federal subsidies paid for the maintenance of essential services, placed upon the Department the obligation to scrutinize the finances, operating methods, and business practices of American-flag lines. especially of those lines which were indebted to the Government for ships purchased or for construction loans.

In conformity with this changed administrative policy, debtor shipowners were required to amortize past-due accounts with reasonable dispatch and to liquidate current obligations as promptly as possible, closer control being established over the disbursements and moneys received by the shipowners from operations and from the

Government under ocean-mail contracts. A committee on finance was set up within the Bureau to administer the joint accounts established with debtor shipowners and to report to the Director on financial matters involving mortgagors and other debtors and on related problems assigned to it from time to time for analysis and recommendation.

It is believed that the new policy, by introducing better business methods, has tended to strengthen the financial status of debtor shipowner, and at the same time it has safeguarded the public interest by bringing about more prompt settlement of outstanding accounts.

With its introduction of fiscal reforms, the Bureau during the year made wider use of the regulatory powers invested in the Secretary of Commerce over the rates, fares, charges, and practices of carriers by water. Here again the object was a dual one—to stabilize and strengthen the industry itself, and at the same time protect the interests of the shipping and traveling public.

In March 1934, at the request of the Secretary of Commerce, the Director of the Bureau submitted a series of recommendations for changes in the ship-subsidy policy laid down by the Merchant Marine Act of 1928. Among other things, the Director recommended that the present system of linking subsidies with the carrying of ocean mail should be abandoned, and in lieu thereof specific subsidies should be granted for the maintenance of essential services. It was further recommended that subsidy contracts, based as at present on building and operating differentials, should be sufficiently flexible to permit of equitable revision as changes in competitive conditions occurred. On June 20, 1934, the Secretary appointed an Interdepartmental Committee on Shipping Policy to make a more intensive study of the subject.

The Bureau has supplied the committee with factual data and expert advice, and its recommendations for new legislation affecting the merchant marine will be worked out in cooperation with, and will clear through, the Committee on Shipping Policy.

During the year the American merchant marine, in common with many other industries, continued to feel the effects of the unprecedented falling-off in international commerce, due in part to the world-wide depression, and in part to the imposition of artificial trade barriers by virtually all of the great maritime nations. Subnormal business conditions throughout the world have, in turn, stimulated the wide-spread use of governmental subsidies to shipping, with the object not only of enabling shipowners to weather the economic storm, but to assist them in modernizing their fleets against a revival of international trade.

It is obvious that with the return of normal conditions on the world's trade routes, the chief beneficiaries will be those countries whose merchant marines occupy strong competitive positions. The work of the Shipping Board Bureau during the past fiscal year can be summarized by stating that the Bureau, acting in cooperation with American shipowners, has exerted every effort to improve the operating efficiency and financial standing of the American merchant marine.

In the following pages will be found brief reports, covering the fiscal year 1934, of the various divisions and sections of the Shipping Board Bureau and Merchant Fleet Corporation.

DIVISION OF LOANS AND SALES

The Division of Loans and Sales was formed during the year by the consolidation of the former Bureau of Construction and Finance and the Ship Sales Division.

The work of the Division of Loans and Sales included the administration of the construction loan fund and the analysis of proposals for the purchase of merchant ships owned by the Government and controlled by the Department of Commerce. Incident to these duties, the Division appraised the value of merchant vessels and studied the merits of different types of ships for various services.

Other work of the Division included the determination of shipbuilding cost differentials; the examination of plans and specifications to ascertain whether certain vessels met the requirements laid down by the Navy Department for naval auxiliaries; the determination of speed, tonnage, and cost of vessels operating in ocean mail contract and other services; the supervision of the dieselization program of the Bureau; and studies of the possibility of standardizing ship designs, and of extending the work of the American Marine Standards Committee.

Construction-loan fund.—From the inception of the construction-loan fund to June 30, 1934, inclusive, there have been authorized loans to 35 steamship companies for the construction of 58 new vessels and for the conversion and/or reconditioning of 40 vessels. These authorized loans total $148,074,537.41, of which $147,605,809.41 had been advanced by June 30, 1934, leaving a balance of $468,728 to be advanced in the future. Loans outstanding on June 30, 1934, totaled $120,719,056.38.

The financial activities of the construction-loan fund during the fiscal year 1934, and the distribution of the total fund at the close of the year, are shown by the following statement:

Cash and appropriation balance, June 30, 1933, as shown in seventeenth annual report		$15,363,763.02
Deposits during fiscal year 1934:		
Sales receipts, fiscal year 1933, transferred after June 30, 1933	$775,000.00	
Sales receipts, fiscal year 1934, transferred before June 30, 1934	3,407,067.01	
Loan repayments	10,717,698.43	
Total deposits		14,899,765.44
		30,263,528.46
Advances on loans during fiscal year 1934		482,584.84
Cash and appropriation balances, June 30, 1934		29,780,943.62

Distribution of total fund at June 30, 1934

Loans:		
Total amount advanced from inception of fund to June 30, 1934, inclusive	$147,605,809.41	
Total repayments of loans to date	26,886,753.03	
Outstanding loans, June 30, 1934		120,719,056.38
Advances to Diesel fund		9,500,000.00
Cash and appropriation balances, as above		29,780,943.62
Total construction-loan fund		160,000,000.00

During the fiscal year applications for loans in aid of the construction of new vessels were received and acted on as follows:

Northland Transportation Co.—On July 31, 1933, the Shipping Board approved a loan in an amount not to exceed $350,000 to aid in the construction and equipment of one combination passenger and cargo motor ship to be operated between Seattle and Alaskan ports via certain Canadian ports. Following a review of this case before the Department, the Secretary authorized a loan to the company in an amount not to exceed $333,712.50. The company had not started construction of the vessel nor made application for any part of the loan before the close of the fiscal year.

Gulf Pacific Mail Line, Ltd.—Under a loan agreement executed December 28, 1932, there remained on July 1, 1933, a balance of $47,600.84 to be advanced on a total authorized loan of $106,016 in aid of reconditioning the steamship *Point Lobos*, such balance to be advanced on completion and acceptance of the improved equipment installed in connection with the main propulsive plant. Under agreement of February 9, 1934, the Secretary of Commerce released the steamship *Point Fermin* from the blanket mortgage securing loans covering the steamships *Point Ancha* and *Point Lobos*, and the amount of the loan on the steamship *Point Lobos* was reduced by the amount of $47,600.84.

Waterman Steamship Corporation.—Reconstruction, reconditioning, and improvements on the steamships *Afoundria*, *Maiden Creek*, and *Kenowis*, for which loans were authorized prior to the past fiscal year, were completed during the year and the loans authorized were accordingly made in the following amounts: *Afoundria*, $131,248; *Maiden Creek*, $120,000; and *Kenowis*, $182,736.

Application was made during the year for loans to be used in reconditioning and improving two other vessels owned by this corporation, viz, the steamships *Antinous* and *Hastings*. Favorable action on this application was taken shortly after the close of the fiscal year.

Cherokee-Seminole Steamship Corporation.—On June 22, 1933, the Shipping Board approved loans to this corporation to aid in the installation of refrigeration in the steamships *Cherokee* and *Seminole* and additional refrigeration in the steamship *Algonquin*, and to cover also the installation of a conveyor system in each of the vessels for the handling of small-package cargo. These loans were not to exceed $52,500 for the *Algonquin* or $75,000 for each of the other two vessels. The applicant canceled application for these loans before execution of the loan agreements, presumably for the reason that the corporation's increased earnings made a loan unnecessary.

Proposed Atlantic-Pacific Transport Corporation, represented by Angelo Conti.—A preliminary application was made April 9, 1934, on behalf of a corporation to be formed (to be known as the "Atlantic-Pacific Transport Corporation"), for a loan to aid in the construction of five refrigerated ships to engage in the fruit and vegetable produce trade between the Pacific and Atlantic coasts. The cost of the vessels was estimated at $12,000,000 and they were designed for a speed of 18 knots. Protests received from a number of operators of ships engaged in trade between the two coasts were communicated to the applicant. A public hearing was set for October 2, 1934, and upon the findings it will be determined whether such a loan should be

recommended. Plans and specifications for the proposed ships were examined by the Navy Department and the Division.

Equator Tuna Fishing Corporation, represented by Capt. Henry Anderson.—Application has been made for a loan of undefined amount but to equal three-fourths of the cost to aid in the construction of one or two fishing vessels, plans and specifications for which have been passed as generally satisfactory by both the Navy Department and the Division. Bids for construction, opened by the applicant on June 15, 1934, ranged from $481,500 for 1 vessel and $912,000 for 2 vessels to $549,000 for 1 vessel and $1,075,000 for 2 vessels. At the close of the fiscal year the application was being held in abeyance pending further organization and financial arrangements by the applicant.

Sales of vessels.—Sales and deliveries were made of 3 cargo vessels of a total deadweight tonnage of 16,750, and of 2 barges and a motor-sailing launch. Deliveries of vessels included in sales agreements effected during the previous fiscal year aggregated 17 vessels of a total dead-weight tonnage of 147,392. Nine of these vessels were delivered to the Boston Iron & Metal Co. for scrapping under agreement dated November 5, 1932, which covered 124 ships. All told, 39 ships have been delivered to the Boston Iron & Metal Co., although no deliveries have been made subsequent to August 25, 1933. The remaining eight vessels involved in sales agreements effected during the fiscal year 1933 were delivered to the Lykes Bros.-Ripley Steamship Co., Inc. This agreement was dated February 17, 1933, and involved 52 ships, of which 43 have been delivered. No deliveries have been made subsequent to September 16, 1933.

Revaluation of Government-owned merchant vessels.—In the process of consolidating construction-loan and ship-sales activities, it was determined that the method used by the former Ship Sales Division for determining the book or asset value of Government-owned vessels was not such as to give proper results and, on recommendation, approved by the Director of the Bureau, a method was evolved to govern the procedure in producing a corrected valuation as of the end of the fiscal year. This method involved the use of the appraised values determined in 1923 for each vessel by the Central Fleet Survey Committee appointed by the former United States Shipping Board in March 1923; the determination of a residual or scrap value for each vessel; the deduction of depreciation charges at different rates, according to the age of the vessels; and the ascertainment and deduction of the estimated cost of repairs, drydocking, and surveys due on each vessel. The purpose of the valuation was to establish a corrected book value for the asset accounts of the Government and to serve as reference data in considering proposals for the purchase of ships. The values thus determined may or may not approximate the prices for which vessels of corresponding type and class are being sold in the open market, as the latter fluctuate with the demand for ships to carry on the world's trade and they are not therefore to be considered as sales prices. However, they furnish reliable criteria for determining when the asset value of the ships has diminished to a point where expense for maintenance and repairs would no longer be justified.

Shipbuilding-cost differentials.—Anticipating that reliable data on this subject would be required in connection with recommendations

for further ship-subsidy legislation, a comparatively simple method was outlined by the Division for the purpose of ascertaining, with a reasonable degree of accuracy, the difference in shipbuilding costs as between domestic and foreign shipyards.

The method contemplated the simultaneous ascertainment here and abroad of prevailing prices for selected representative materials (defined as to quantities, grades, and essential characteristics) and the prevailing hourly wages for representative shipbuilding trades and occupations in certain defined proportions. A preliminary draft of the method was widely circularized for critical comment and has been generally endorsed as to principle. A committee was appointed by the National Council of American Shipbuilders for research among the records of American shipyards for data to verify or correct the factors proposed in the method and to study the subject in cooperation with the Division. At the close of the fiscal year sufficient progress had been made to indicate that the subject would be satisfactorily concluded at an early date.

Standardized types of ships.—Under the supervision of the Division there was undertaken during the year a study of the desirable characteristics of cargo ships, refrigerator ships, tankers, and combination cargo and passenger ships. The study embraced one size of vessel in each class, but it is planned to extend the study to include at least one additional size of each class. Consideration was given in this study to the possible need of such vessels as naval auxiliaries in the event of a national emergency.

Dieselization program.—During the fiscal year activities in connection with the Diesel program consisted in the investigation and correction of defects developed during the continued operation of the vessels converted from steam to Diesel propulsion. This was carried on by a small staff of experts in cooperation with the engine builders. The main items of work previously undertaken and completed during the year were the renewal on the vessels *Galveston*, *Oldham*, and *West Grama* of the lower cylinder heads, main columns, cylinder liners, and pistons. Of the original fund of $25,000,000 authorized for this program the total sum of $23,665,000 has been made available. Expenditures for the several Diesel programs have totaled $23,468,194.81, leaving an unexpended balance of $196,805.19 available for such purposes.

DIVISION OF REGULATION

During the year the division continued to administer the regulatory provisions of the Shipping Act, 1916, the Merchant Marine Act, 1920, and the Intercoastal Shipping Act, 1933. Section 22 of the Shipping Act, 1916, confers authority for investigations concerning the lawfulness of carriers' acts under that statute, and inquiries into alleged violations of sections 14, 16, 17, 18, 19, and 20 thereof continued to constitute an important part of the Division's work.

Formal docket.—The number of cases on the formal docket during the fiscal year totaled 48, of which 24 were disposed of, while 12 were heard but not finally decided. The remaining 12 were not reached for hearing during the period covered by this report. Of the formal docket cases, 2 deserve special mention because of their outstanding importance.

The first of these was an investigation, ordered by the Secretary of Commerce on February 5, 1934, into the policies, practices, services, and charges of common carriers by water in intercoastal commerce subject to the Intercoastal Shipping Act, 1933. The investigation involved, among other matters, the lawfulness and effect of the pooling of revenue by intercoastal carriers; the classification of vessels and lines for rate-making purposes; absorptions of terminal and line-haul charges; port equalization; private contracts between carriers and shippers; the performance of transportation services, or services in connection therewith, without proper tariff authority; and the nonperformance of services which by proper tariff provisions the carriers hold themselves out to perform. Sixty-two carriers were named respondents in the Secretary's order. Hearings were held on the Atlantic, Gulf, and Pacific coasts. At the end of the fiscal year this proceeding was still in progress.

The other outstanding case among the formal proceedings conducted by the Division during the fiscal year was an investigation ordered by the Secretary on March 9, 1934, to determine whether conditions unfavorable to shipping in foreign trade exist as a result of the competitive methods and practices employed by owners, operators, agents, or masters of vessels of foreign countries, and what rules and regulations should be made under authority of section 19 of the Merchant Marine Act, 1920, to adjust or meet such conditions if found to exist. From information before the Department it appeared that on many trade routes in the foreign commerce of the United States such owners, operators, agents, or masters were habitually making drastic and destructive cuts in the rates established by freight conferences under the jurisdiction of the Department, and otherwise resorting to alleged unfair competitive methods and practices, resulting in conditions detrimental to the commerce of the United States. At the close of the fiscal year the investigation was still in progress. Hearings were held in New York, New Orleans, and San Francisco.

Informal docket.—On its informal docket the Division endeavors to compose differences between shippers, carriers, and others through correspondence or informal conference. During the fiscal year 81 cases were handled on this docket. At the end of the fiscal year 13 of these awaited disposition.

Special docket.—During the fiscal year 33 applications by subject carriers for authority to make refunds or waive collection of undercharges were filed. Under a special procedure inaugurated subsequent to the passage of the Intercoastal Shipping Act, such applications are handled on a special reparation docket. Of the 33 applications filed, 19 were denied for failure to show a violation of law, 3 were granted, and, at the end of the fiscal year, 11 were pending. As in the case of informal complaints, adverse action on the special docket does not preclude the subsequent submission of the issues for decision by the filing of a formal complaint under section 22 of the Shipping Act, 1916.

Tariffs.—During the fiscal year 2,879 schedules of rates and charges covering transportation by water in interstate commerce were filed pursuant to statutory requirements and were submitted to examination by the Division's Tariff Section. Fifty of these schedules were

rejected for failure to comply with the law or the Department's tariff rules and regulations. In addition, 19 individual pages of loose-leaf tariffs were rejected. In 6 instances tariffs were suspended. Twelve requests that schedules be suspended were denied. Two hundred and sixty-seven requests for special permission to depart from notice requirements of the statute or requirements of the tariff rules and regulations were received, of which 212 were granted.

Two motions were filed by San Francisco Bay wharfingers and other California interests asking for an order of the Department requiring the withdrawal and cancelation of various tariffs which accorded to Sacramento the same intercoastal rates as applied to and from San Francisco and other points on San Francisco Bay. The lawfulness of applying such rates to Sacramento was at the same time at issue on the formal docket. After oral argument thereon the motions were denied without prejudice to the Department's decision in the formal case referred to.

Agreements.—Section 15 of the Shipping Act, 1916, requires that agreements between carriers or other persons subject to that act, or any modifications or cancelations thereof, be filed with the Department, and makes it unlawful for any such agreements, modifications, or cancelations to be carried out in whole or in part without the Department's approval. The Department is authorized to disapprove any agreement, modification, or cancelation which it finds to be unjustly discriminatory or unfair, or which operates to the detriment of the commerce of the United States, or which is in violation of the Shipping Act.

During the past fiscal year 1,045 of these agreements, or modifications or cancelations thereof, were submitted for consideration. In approximately 60 percent of these cases, the Division, by correspondence, procured the removal of objectional features prior to formal action by the Department. Seven hundred and fifty-seven agreements, modifications, or cancelations thereof were approved during the year; 3 were formally disapproved. In 113 instances the agreements were not filed in proper form, and the parties were so notified and instructed as to the proper form.

Included in the agreements in effect as of June 30, 1934, were 109 conference agreements, under which carriers operating in the same trades coordinate their traffic activities. These agreements in most instances require the parties to maintain agreed rates and conditions for or in connection with the transportation of cargo or passengers, as the case may be, between the ports covered. To shippers and travelers they tend to give an assurance of stable rates and equality of treatment, and to carriers an assurance that competition will be maintained upon a fair basis.

Public file.—A public tariff room was maintained during the year. As promptly as possible after receipt thereof, all tariffs, agreements, and formal pleadings were made available for public inspection. These files were consulted daily by shippers, carriers, representatives of the press, and others.

Committee on regulation.—During the year a committee on regulation was appointed to expedite regulatory decisions. All recommendations of the Division of Regulation for formal action by the Department are reviewed by this committee before submission to the

Director and the Secretary of Commerce. The Bureau's regulatory work has been greatly expedited by this committee, which meets daily.

DIVISION OF SHIPPING RESEARCH

This Division continued to compile statistics on the transportation of cargo (in tons of 2,240 pounds) and passengers between United States and foreign ports, and information regarding the ownership, operation, and general characteristics of vessels of 1,000 gross tons and over throughout the world; conducted studies of ocean trade routes, operating cost differentials between American and foreign-flag vessels, and other special studies as were required from time to time.

The Division's records indicate that during the last fiscal year 3,731 vessels of the world fleet participated in our water-borne trade, making nearly 43,000 entrances and clearances at 158 United States ports and carrying over 58,000,000 tons of cargo and 1,500,000 passengers; 1,183 foreign ports of origin and destination were involved in these movements.

The Division's files now include data pertaining to the water-borne foreign commerce of the United States during a period of 13 years, and cover transactions at 351 domestic ports, 432 ports in United States possessions, and 2,869 foreign ports, a total of 3,652 world ports. During this period (1921–33) 2,056 products were transported in the water-borne commerce of the United States. The total volume of these commodities exceeded 1,060,000,000 cargo tons and their value was nearly 85 billion dollars.

During the fiscal year the Division prepared 30 periodical reports, copies of which were issued to Government officials and organizations, transportation companies, financial, industrial, educational, and other institutions. The Division also compiled 126 special reports, 34 of which were for the use of the Shipping Board Bureau and 33 for other Government departments. The remaining 59 special compilations were prepared for commercial and port organizations, transportation companies, periodical publications, and educational institutions.

Incoming data to the Division for the fiscal year 1934 comprised nearly 85,000 individual reports received from vessel operators, collectors of customs, and others.

DIVISION OF TRAFFIC

This Division, formerly a part of the Merchant Fleet Corporation, is now a Division of the Shipping Board Bureau and handles traffic matters not only for the Bureau but for the Merchant Fleet Corporation also.

Some idea of the work of the Division in developing traffic not only for the Bureau's five remaining lines but for the privately owned American merchant marine, may be obtained from the following activities of the Division during the period covered by this report:

Shipments of cargo to China.—Through the instrumentality of the Division of Traffic, cooperating with other governmental agencies and representatives of the Chinese Government, American cargo lines

operating from Pacific coast ports secured the trans-Pacific movement of approximately 140,000 tons of wheat and flour, involving freight revenues of $525,000. Under similar circumstances American-flag services in the Gulf of Mexico secured the movement of some 60,000 bales of cotton to Shanghai, with revenue exceeding $100,000.

Liquor quotas.—When the liquor-import quotas were first apportioned, complaints were received by the Bureau from a number of American carriers to the effect that shipments were moving exclusively via foreign-flag lines. Cooperating with the Federal Alcohol Control Administration, the Traffic Division was instrumental in having a clause inserted in application blanks for future shipments, whereby American-flag services were assured of reasonable participation in the movement of this cargo, which is carried at attractive rates.

Egyptian cotton.—Through the instrumentality of the Division, a season's contract was closed for the movement of Egyptian cotton to New York and Boston. Two American-flag lines were benefited by this arrangement, which involved 50,000 bales, with steamship revenues approximating $175,000.

Swedish wood pulp.—During the year an American-flag line appealed to the Bureau for assistance in securing a share of the large wood-pulp movement from Sweden, which had been closed by a Swedish syndicate in favor of German and Swedish steamers and to the exclusion of American ships. As a result of negotiations with agents of the Swedish syndicate in this country, the Shipping Board Bureau, through the Traffic Division, was able to secure for the American line a share of the contract amounting to from 40,000 to 60,000 tons, involving freight revenues approximating $250,000.

Increased revenue in shipments.—The five lines still being operated for Government account showed an increase in revenue of over $2,500,000 for the fiscal year 1934, although with four less sailings. This increase in revenue was due to slightly increased rates and to an increase in the volume of cargo carried both in and out. As a result of the increase in revenue, material reductions have been made in the amount of the lump sums per voyage paid to managing operators. Further increase in cargo movement is expected during the coming year for practically all remaining lines.

Pooling agreements.—Revision of conference agreements in several of the trades in which American-flag lines were interested was delayed awaiting the results of placing the whole shipping industry under a shipping code. However, as a result of the delay in perfecting a code the different conferences again began working on plans to rationalize tonnage and form pooling agreements. The Bureau continued its endeavors to encourage and assist American-flag lines in their negotiations for such agreements.

American lines' share of shipments.—The passage, during the Seventy-third Congress, of the following joint resolution will prove of great assistance to American-flag lines:

That it is the sense of Congress that in any loans made by the Reconstruction Finance Corporation or any other instrumentality of the Government to foster the exporting of agricultural or other products, provision shall be made that such products shall be carried exclusively in vessels of the United States, unless, as to any or all of such products, the Shipping Board Bureau, after investigation, shall certify to the Reconstruction Finance Corporation or any other instrumentality of the Government that vessels of the United States are not available in sufficient numbers, or in sufficient tonnage capacity, or on necessary sailing schedule, or at reasonable rates.

It is expected that with this resolution in effect considerable cargo that has moved on foreign-flag carriers, or that has been divided with American-flag lines, will in the future move exclusively via American-flag ships.

SEA SERVICE SECTION

During the fiscal year the Sea Service Section, through its 12 field offices, placed 25,423 officers and men in various ratings aboard ship, 97.7 percent of whom were American citizens. On July 1, 1934, the section was transferred to the Bureau of Navigation and Steamboat Inspection.

One of the principal objectives of the Sea Service Section during the year was the manning of American ships with American crews. Because of a decrease in employment opportunities through laying-up of ships for lack of cargo, special effort was made to secure available employment for citizen officers and seamen. The percentage of Americans among the placements by the Sea Service Section for the fiscal year is the best mark thus far attained. Although all placements aboard American vessels were not made through the Sea Service Section, it influenced more favorable consideration for citizens by others engaging shipboard labor.

There was a decrease in deck-boy placements by the section in order to provide more work on American ships for idle seamen.

SECTION OF PUBLIC INFORMATION

Cooperation with the Secretary of War in the study of ports and port facilities, required by section 8 of the Merchant Marine Act of 1920, was continued during the fiscal year. The following port studies were published and distributed:

Port Series No. 12: San Francisco, Oakland, Berkeley, Richmond, upper San Francisco Bay, Santa Cruz, and Monterey, Calif.
Port Series No. 14: Port Arthur, Sabine, Beaumont, and Orange, Tex.
Port Series No. 16: Baltimore, Md.
Port Series No. 20: The port of New York.

The following reports were completed and sent to the Public Printer:

Port Series No. 9: Charleston, S. C.; and Wilmington, N. C.
Port Series No. 22: The Panama Canal and its ports.
Port Series No. 24: The ports of northern New England.
Miscellaneous Series No. 1: Port and terminal charges at United States ports.

The following report was in progress at the close of the fiscal year: Port Series No. 15: The ports of Norfolk, Portsmouth, and Newport News, Va.

The foreign port studies conducted by the section were continued throughout the year, with the result that its foreign port information, probably the most complete in the world, was kept up to date. In addition to answering individual inquiries regarding foreign-port conditions, rates, and practices, two major studies of harbor facilities in 88 ports of Central and South America, Mexico, and the West Indies, together with a list of steamship lines serving these areas, were completed at the request of the Pan American Union for use at the Pan American Commercial Conference scheduled to be held in Buenos Aires in March 1935.

Investigations were completed during the year for the National Recovery Administration, the Federal Power Commission, the Public Works Administration, the United States Tariff Commission, and other governmental agencies.

SECRETARY

The Assistant to Director of the Bureau serves also as secretary of the Merchant Fleet Corporation, and the joint office is the central administrative office of the Bureau and the Corporation.

In addition to these administrative functions, the office performs special assignments, including the making of 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 55 vessels with a gross tonnage of 100,614 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 as units in the merchant marine. Many of the larger obsolescent vessels had become surplus to operating fleets and had been previously replaced by newly constructed modern vessels. Of the 55 vessels, 52 were specifically enumerated for transfer to foreign registry as follows: British 8, 455 gross tons; Canadian 9, 881 gross tons; Colombian 1, 5,378 gross tons; Dutch 2, 99 gross tons; Estonian 1, 1,138 gross tons; French 1, 60 gross tons; Honduran 2, 62 gross tons; Italian 3, 14,169 gross tons; Japanese 9, 48,704 gross tons; Mexican 11, 6,318 gross tons; Panamanian 1, 117 gross tons; Russian 2, 852 gross tons; Venezuelan 2, 4,364 gross tons. During the year approval was granted to issue mortgages to aliens on nine vessels documented under the laws of the United States. Three charters of American vessels to aliens were also approved.

Surrender of marine documents.—During the fiscal year ended June 30, 1934, the approval required by section 30, subsection O (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 40 vessels. The surrenders of the documents were 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 be concurrently 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

Numerous changes in the officers and board of trustees of the Merchant Fleet Corporation took place during the fiscal year. The joint office of president of the corporation and chairman of the board of trustees was vacated on August 9, 1933, by the resignation of E. E. Crowley.

At the annual meeting of the stockholders on April 17, 1934, the following trustees were elected for the ensuing year:

Otto Praeger (vice chairman), South Trimble, Jr., James Craig Peacock, Huntington T. Morse, F. G. Frieser, L. D. Staver, and C. D. Gibbons.

On June 21, 1934, James Craig Peacock was elected president of the Merchant Fleet Corporation and chairman of the board of trustees.

At the close of the fiscal year the officers of the Merchant Fleet Corporation were as follows:

President and chairman of the board of trustees	James Craig Peacock.
Vice chairman of the board of trustees	Otto Praeger.
Senior vice president	Admiral H. I. Cone.
Vice president	T. M. Woodward.
Secretary	S. D. Schell.
Treasurer	C. D. Gibbons.
General comptroller	L. D. Staver.

DIVISION OF OPERATIONS

In the reorganization which took place during the year the Division of Operations was created and charged with the general administration of all activities pertaining to the maintenance and operation of the physical properties of the Bureau and Merchant Fleet Corporation. The following sections are under its jurisdiction: Maintenance and Reserve Fleet, Supplies, Disability and Vessel Personnel, and Terminals and Real Estate.

Vessel operations.—The Merchant Fleet Corporation continued the operation of its remaining services on the basis of minimum sailings adopted in the fiscal year 1932, and during the year 5 lines were maintained by 4 managing operators under the "Operating Agreement A, 1930." There were 190 voyage terminations against a total of 352 terminations during the fiscal year 1933. The entire reduction was due to the sale of Gulf port services in 1933. It was necessary, however, to permit the purchaser of these services to carry out, under the operating agreement, 11 voyages with vessels which have been withheld from delivery by the Department under the sales agreement, and these voyage terminations are included in the total of 190.

The 5 lines have been operated with a total of 38 cargo vessels at a cost of $1,870,750 to the Merchant Fleet Corporation, exclusive

of administrative expense. The cost of operation for 1933 was $4,634,196. This reduction of $2,763,446 resulted from the discontinuance of the Gulf services under Government operation and lower lump-sum compensation paid to 3 of the 4 managing operators.

The Bureau's remaining lines, operated on the basis of a stipulated sum per voyage by four managing operators, are as follows:

Service	Ships	Managing operator
America-France Line	8	Cosmopolitan Shipping Co., Inc.
American Hampton Roads Line (Yankee Line Service)	4	Southgate-Nelson Corporation.
Oriole Line	5	
American Pioneer Line	10	Roosevelt Steamship Co., Inc.
American Republics Line	11	C. H. Sprague & Son, Inc.

Through close supervision of the operations of the lines under the lump-sum agreement, compensation to the managing operators was reduced to a basis more nearly in line with the current financial results and still allowing a reasonable profit to the managing operator. In one case the rate, on an annual basis, was reduced from $446,600 to $348,000, a decrease of $98,600; in another case, from $324,000 to $252,000, a decrease of $72,000; in the third, from $770,000 to $240,000, a total decrease for this line of $530,000 a year.

At the reduced rates the total cost of continuing these five services per annum amounts to $1,334,000, as compared with the yearly rate of $2,034,600 in effect at the end of the fiscal year 1933. Continued close supervision is being exercised and, should improved conditions warrant further adjustments, they will be effected.

Investigations were started in the last half of the fiscal year looking to consolidation or rearrangement of services in the North Atlantic-European trades. As a result of these investigations, recommendations will be made which it is felt will be of benefit both to the Government and to the private operation of our merchant-marine services in this trade territory.

Expense of inactive vessels was reduced from $170,503 for 1933 to $40,294 for the fiscal year 1934. The greater part of this expenditure was incurred in connection with the reconditioning of Diesel vessels by the engine builders.

Administrative expense chargeable to operations was also reduced from $681,605 in 1933 to $337,725 in 1934.

During the fiscal year 2 cargo vessels and 3 salvage tugs were under bare-boat charter. One cargo vessel was chartered during the year and redelivered. Charter net earnings totaled $7,353.21.

The total operating loss, including net profit from the operation and maintenance of terminals and real estate, as well as the expense of employees assigned to the United States Shipping Board Bureau, of the Merchant Fleet Corporation for the fiscal year 1934 was approximately $2,200,000, as compared with a loss of approximately $5,387,000 for the fiscal year 1933, or a reduction of $3,187,000. Shipping conditions during the first half of the fiscal year 1934 continued unsatisfactory, and while certain improvements were noted during the second half, the improvement is to a great extent offset by increased costs of operation.

Maintenance and Reserve Fleet Section.—During the year reserve fleet and maintenance and repair activities were combined in one section, and as a result many administrative economies have been effected.

There were 246 vessels in the reserve fleet at the beginning of the fiscal year 1934 and 234 at the end of the year. The cost of maintaining these vessels was $165,870, against a cost of $246,985 for the fiscal year 1933. In addition to this expense, which was applicable to liquidation authorization, an outlay of approximately $432,000 of expenses was incurred during the fiscal year 1934, principally for administrative expenses throughout the organization.

During the year the inspection of vessels under mortgage, and of those under operating or charter contracts, was carried on under this section. There were 422 condition surveys made of mortgaged vessels and 69 of operated and chartered vessels.

Arrangements were also concluded with the Bureau of Navigation and Steamboat Inspection whereby condition surveys were made of mortgaged vessels and of active Bureau vessels at the time they were put through annual inspection.

Maintenance and repair materials valued at $58,238.56 were released for issue to managing operators and $17,299.35 for emergency purposes by purchasers of Shipping Board tonnage. In order that the repair-material stocks would not be greatly depleted, materials valued at $46,296 were purchased or reconditioned as replacements for those sold.

Supplies Section.—Managing operators are required to make their own purchases for the vessels which they are operating. The Fleet Corporation's activities are confined to purchasing, storing, and distributing materials, supplies and equipment for replacement on shipboard and for terminals and offices of the Shipping Board Bureau and Merchant Fleet Corporation. During the past year, purchase orders were issued amounting to $195,096.42, of which $82,491.74 represented purchases made by the Washington office, including the purchase of maintenance and repair materials mentioned above. Sales of equipment and materials were made to managing operators, purchasers of vessels, and others in an approximate amount of $87,000, including the releases of maintenance and repair material mentioned above.

On November 14, 1933, a policy was adopted whereby all warehouse stocks are to be held for possible future emergency operations or until a decision is made as to the disposition of vessels under the control of the Merchant Fleet Corporation. It was further decided to reappraise all materials and equipment in the warehouses as of June 30, 1934, and the estimated value was determined to be $1,200,000.

Disability and Vessel Personnel Section.—This Section continued to act in an advisory capacity on nautical problems and submitted 27 written opinions to the Insurance and Legal Divisions during the year.

In order to protect the interests of the Government in the navigation of Shipping Board vessels, form 7007, Instructions to masters and officers of United States Shipping Board vessels, was reissued to managing operators. Twenty-one masters and twenty-one chief

engineers were approved for appointment, after they had been selected by the managing operators. Other licensed officers were suspended or reinstated on the Fleet Corporation's recommendation. Twelve major disability cases were investigated.

Terminals and Real Estate Section.—It was decided during the fiscal year 1934 that all leases of terminals under the jurisdiction of the Shipping Board Bureau which had been entered into without due advertising and competitive bidding should be canceled and that such properties should be leased for a stated sum per annum instead of on a profit-sharing basis. It was further decided that lessees should assume the expense of ordinary repairs, but that extraordinary repairs or betterments be made by the Merchant Fleet Corporation.

Accordingly, the leases for the terminals at Boston, Philadelphia, and Norfolk were canceled, effective August 2, 1934, and invitations issued for bids for new leases.

Boston Terminal: This property was leased to the Boston Tidewater Terminal, Inc., effective October 15, 1932, at a rental of 20 percent of the gross revenue derived from the use and operation of the property, with a minimum yearly guarantee of $27,500. The sum of $38,265.64 accrued to the Bureau from July 1, 1933, to June 30, 1934. Maintenance, reconditioning, etc., by the Bureau amounted to $30,077.58 for the same period, leaving a net revenue to the Government of $8,188.06.

This lease was canceled, effective August 2, 1934. The property was advertised and bids received and opened on June 11, 1934, on the basis of a fixed annual rental of not less than $40,000. The lease was awarded to the high bidder, Piers Operating Co., of Boston, Mass., at an annual rental of $65,711 for a period of 5 years from August 3, 1934.

Hoboken Terminal: This terminal was operated directly by the Merchant Fleet Corporation until August 31, 1933. During the fiscal year the property was advertised for lease, but the only bid received was considered unsatisfactory. As the result of negotiations with the bidder, an offer was accepted on July 12, 1933, and lease was entered into with the North Atlantic Terminal Service, Inc., for a period of 5 years, effective September 1, 1933, at a rental of 50 percent of the gross revenue, with a minimum guarantee of $90,000 for the first year and $100,000 for each of the succeeding 4 years.

Revenue accrued to the Government during the period from July 1 to August 31, 1933, in the amount of $13,148.87, and for the period September 1, 1933, to June 30, 1934, $38,235.18, a total of $51,384.05.

Expenditures for maintenance, reconditioning, etc., by the Bureau amounted to $131,898.72, resulting in a net loss of $80,514.67. The large expenditure was principally for dredging, carried out prior to the commencement of the lease on September 1, 1933.

Brooklyn Terminal: This terminal was operated by the Atlantic Tidewater Terminals under lease which expired December 1, 1933, at a rental of 55 percent of the gross receipts, with the minimum guarantee of $160,000 per annum.

Under date of December 12, 1933, an agreement was entered into with the Atlantic Tidewater Terminals under which they continued to operate the property until such time as a new lease could be negotiated. This agreement provided for a rental of 55 percent of the gross revenue, with a minimum of $144,000 a year.

Under date of August 16, 1933, the Merchant Fleet Corporation leased Pier No. 3 of this terminal to the Steamship Facilities Corporation (North German Lloyd), effective December 1, 1933, and to end at midnight on December 31, 1936, at an annual rental of $144,000.

The entire property, Pier No. 3 and Pier No. 4, was advertised for lease and bids covering use and occupancy of same were received and opened on October 16, 1933, but since the highest bid received called for a minimum annual rental of but $135,000, all bids were rejected and the property was again advertised. Bids were invited for the operation of the entire property (Pier No. 3 and Pier No. 4) or for the operation of Pier No. 3 only.

Under date of December 22, 1933, bids were again opened, on a basis of a percentage of the gross revenue with a minimum annual guarantee of $150,000. The following bids were received:

Pier No. 3 and Pier No. 4 ($150,000 guaranty): Piers, Inc., 56 percent of gross; Atlantic Tidewater Terminals, 50 percent of gross (yearly minimum)	$151,000
Pier No. 3 only:	
Piers, Inc., 51 percent of gross (yearly)	20,000
North Atlantic Terminal Service, Inc., 70 percent of gross (yearly)	10,000

An alternate bid was submitted by the Atlantic Tidewater Terminals to renew lease covering the entire property for a 5-year period, on a basis of 55 percent of gross revenue, with a minimum guarantee of $144,000.

The lease was awarded to Piers, Inc., and signed on February 15, 1934, covering operation of Pier No. 3 and Pier No. 4, at a rental of 56 percent of the gross revenue derived from use and operation, with a minimum annual guarantee of $150,000.

Revenue accrued to the Government for the fiscal year amounted to $154,497.35. Maintenance, reconditioning costs, etc., during the same period amounted to $1,527.73, leaving a net revenue to the Government of $152.969.62.

Philadelphia Terminal: This terminal was leased to the Merchants' Warehouse Co., effective July 1, 1931, at a rental of 25 percent of the gross revenue derived from operation of the property, with a minimum guaranty of $125,000 per annum.

Revenue accruing to the Bureau during the fiscal year amounted to $137,935.77. Maintenance, reconditioning, etc., by the Bureau during the same period amounted to $8,575.87, leaving a net revenue to the Government of $129.359.90.

On February 1, 1934, the lease with the Merchants' Warehouse Co. was canceled, effective August 2, 1934. The property was subsequently advertised for lease on the basis of a fixed annual rental of not less than $140.000.

Lease was awarded to Philadelphia Piers, Inc., the high bidder, at an annual rental of $162,500, for a period of five years from August 3, 1934.

Norfolk Terminal: This terminal has been leased to the Norfolk Tidewater Terminals, Inc., at a rental of 18 percent of the gross revenue, with a minimum guaranty of $75,000 per annum. The lease also provided for the reimbursement to the Bureau of $83,333.33, for

improvements previously made by the Bureau at the rate of $10,000 per year.

Revenue accruing to the Bureau during the fiscal year amounted to $87,624.81. Maintenance, reconditioning costs, etc., during the same period aggregated $85,097.99, leaving a net revenue to the Government of $2,526.82.

Under date of February 1, 1934, the lease with the Norfolk Tidewater Terminals, Inc., was canceled, effective August 2, 1934, and the property was advertised for lease, on the basis of a fixed annual rental of not less than $110,000. Lease was awarded to Norfolk Tidewater Terminals, Inc., the high bidder, at an annual rental of $160,000, for a period of 5 years from August 3, 1934.

Charleston Terminal: This terminal is under lease to the Port Utilities Commission of Charleston for a term of 5 years from March 1, 1931. Revenue accruing to the Bureau for the fiscal year amounted to $30,529.43. Reconditioning costs, etc., during the same period amounted to $10,072.46, leaving a net profit of $20,456.97 to the Government. The property is in such poor physical condition that substantial repairs will have to be made in the near future.

Craney Island fuel station: Lease of the Fleet Corporation's fuel-oil station at Craney Island, Norfolk, Va., to the Pennsylvania Shipping Co. was continued for another year from May 1, 1934, at a rental of $500 per year. This property is subleased to the Virginia Tank Storage Co., a subsidiary of the lessee. Approximately $80,000 was expended by the lessee during the first year for improvements to the property.

45 Broadway, New York City: Under the provisions of Executive order dated June 10, 1933, the custody, maintenance, and operation of 45 Broadway, New York City, was transferred to the Department of the Interior, effective February 1, 1934. The net operating cost of the property from July 1, 1933, to January 31, 1934, was $18,928.38. The transfer will save the Merchant Fleet Corporation approximately $25,000 a year.

DIVISION OF INSURANCE

Under authority of the Merchant Marine Act, 1928, the Merchant Fleet Corporation, as directed by the Shipping Board Bureau, has continued to maintain and administer 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 Bureau, through the Insurance Division, has continued to encourage the placing of hull insurance in the American commercial market and has rendered assistance to owners of vessels purchased from the Government, 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 (1) the excess of the capacity of the world market; (2) insurance not exceeding the mortgage debt, in cases where the shipowner is unable to obtain satisfactory rates in the American market. In some cases the use of the foreign market has been approved under special circumstances.

As at June 30, 1934, the total coverage in the general insurance fund amounted to $36,927,171, of which $21,631,821 applied to 99 privately owned American-flag vessels and $15,295,350 represented insurance on 50 vessels operated in Fleet Corporation services. The

total amount of insurance was $17,076,604 less than the amount covered at the beginning of the fiscal year.

From the date of the creation of the general insurance fund on January 1, 1930, to June 30, 1934, premiums earned on policies, interest, and miscellaneous earnings totaled $10,056,589, which includes $1,070,065, premiums earned on American privately owned vessels from August 2, 1928, to December 31, 1929; claims paid on such policies and administrative expenses amounted to $9,221,303. Payments totaling $2,647,413 were also made during this period in settlement of old claims which arose on vessels covered in the marine insurance reserve which was accumulated before the present fund was established.

Unsettled claims on policies issued by the fund and on policies formerly covered by the marine insurance reserve are estimated to total $1,958,140 at June 30, 1934. Assuming that these claims are settled for this estimated amount, the unobligated balance of the general insurance fund at June 30, 1934, would be $4,996,491, which is less by $119,509 than the unobligated balance at the end of the fiscal year 1933.

The examination of commercial policies furnished by owners of vessels mortgaged to the Government has continued to be an important activity. These policies totaled $543,000,000.

Commercial protection and indemnity insurance furnished by operators of Government vessels in the amount of $32,296,500 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 170 cases of personal injury of employees of the Fleet Corporation 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 151 claims were settled for approximately $133,945, and on June 30, 1934, there were 113 pending claims, totaling $3,802,302, including a number of claims revived by the amendment to the Suits in Admiralty Act of June 30, 1932.

TREASURER

The treasurer's office of the United States Shipping Board Merchant Fleet Corporation handles receipts and disbursements, both for the United States Shipping Board Bureau and the Merchant Fleet Corporation. In the fiscal year 1934, the Shipping Board Bureau had a total appropriation of $310,000, of which $196,605.56 was obligated, and $191,200.96 was disbursed during the year.

No appropriation from the United States Treasury was made for administrative and operating expenses of the Merchant Fleet Corporation in the fiscal year 1934, but the use of unexpended balances of funds on hand at the beginning of that year and operating receipts during the year, was authorized. A brief statement for the several active funds maintained during the fiscal year 1934 by the Merchant Fleet Corporation follows:

Item	Opening balance	Net receipts	Net disbursements	Closing balance
Operating fund	$11,092,055.94	$827,919.60	$4,671,610.95	$7,248,364.59
Dieselization fund	280,133.40		83,328.21	196,805.19
Liquidation fund	106,323.29	5,906,304.78	[1] [2] 5,540,078.55	472,549.52
Insurance fund	7,534,603.87	[2] 2,574,660.36	1,431,233.04	8,678,031.19

[1] Includes $3,407,067.01 transferred to construction loan fund.
[2] Includes $1,525,000 of liquidation receipts transferred to insurance fund.

Collections.—The collection of current and inactive accounts receivable of the Merchant Fleet Corporation is an important activity of the treasurer's office. During the fiscal year 2,310 current invoices totaling approximately $1,800,000 and insurance premiums totaling about $1,200,000 were collected and 134 inactive accounts, amounting to $1,774,000, were collected, settled, or adjusted.

Collections of principal payments on secured accounts due the Shipping Board Bureau and Merchant Fleet Corporation totaled $15,507,778.27, of which $10,670,097.59 applied to construction loan notes and $4,564,288.50 to ship sales securities. The sum of $4,541,523.77 was collected as interest on notes and other securities, of which $3,444,847.13 applied to construction loan notes. The amount collected on principal and interest on ship sales notes was applied to the construction loan fund, insurance fund, and to the payment of liquidating expenses, while collections of interest on construction loans were deposited as miscellaneous receipts, United States Treasury.

Securities.—Due to these heavy collections and to the fact that few new construction loans or ship sales deliveries were made, the face value of notes and other securities held for the Bureau and/or Merchant Fleet Corporation dropped from approximately $163,300,000 at July 1, 1933, to about $148,500,000, at the end of the fiscal year.

The face value of notes and bonds held as collateral security for various forms of agreements, for bank deposits and in lieu of surety bonds, dropped from $2,039,000 to $807,500, due to the complete settlement in cash of the obligations of two companies and to the closing of one bank account.

Housing properties.—Conveyances of three properties at Brooklawn, N. J., to the Brooklawn Housing Corporation were made during the year, leaving 54 properties to be conveyed to that corporation, pursuant to the terms of the sales agreements.

For a number of years the disposition of seven improved properties in Camden, N. J., has been delayed by inability to deliver insurable titles. This obstacle has now been removed, however, and it is hoped that these and five other properties at the same location may be disposed of to advantage when market conditions for such properties improve.

One piece of improved property in the city of Philadelphia was acquired by foreclosure during the year.

Joint account activities.—The disbursing organization of the Merchant Fleet Corporation has assisted in the administration of joint bank accounts that have been entered into by the former Shipping Board and continued by the Secretary of Commerce with purchasers of vessels and with borrowers from the construction loan fund, whc

have been unable to meet their obligations when due. The treasurer since April 6, 1934, has served as a member of the committee on finance in handling joint account matters and other specially assigned financial questions of the Bureau and Merchant Fleet Corporation.

GENERAL COMPTROLLER

The General Comptroller's office continued its work of internal accounting and auditing for the Bureau, settling and disposing of managing operators' and other accounts, and preparing data for the defense and prosecution of claims, domestic and international.

During the fiscal year the General Comptroller was made responsible for the preparation of certain statistical reports formerly compiled by the Division of Operations. The Office also effected an improved and more complete control of both "line" and "corporate" accounts of managing operators and of the operation of the Bureau's terminal properties; maintained a close supervision of the fiscal activities of delinquent debtors working under "joint account" agreements; prepared data for use in effecting reductions of "lump-sum" operating compensation; and handled special work for the Senate committee investigating ocean- and air-mail contracts.

To a greater extent than in the past the executives of the Bureau and Merchant Fleet Corporation utilized the resources of the General Comptroller's Office in considering matters of policy, the provisions of proposed contracts, etc. The resulting increased volume of work during the year necessitated an increase of approximately 20 percent in personnel.

LEGAL DIVISION

The Legal Division serves both the Shipping Board Bureau and the Merchant Fleet Corporation. All the administration of the Division's activities are under the direction of the Solicitor of the Department of Commerce, through whom all the legal work is handled.

Litigation.—On July 1, 1933, 670 cases, in which the United States or the Merchant Fleet Corporation were parties plaintiff or defendant, were pending in the various trial and appellate courts in this and in foreign countries. These cases involved the total sum of $61,688.317.31, and were of varied character—at law, in equity, in admiralty, bankruptcies, and receiverships. During the fiscal year 250 of these cases were disposed of by trials, dismissals, and compromise settlements. Ninety-two new actions were brought during the year, so that on June 30, 1934, there were pending 512 cases involving $61,190,027.33.

Sixty-six of these cases, involving $833,456.34, were in foreign countries. These cases were handled by foreign attorneys under the control of the Washington office, although they were immediately supervised by the legal representative in London.

At the close of the fiscal year there were 446 cases, involving $60,-356,570.99, pending in the courts of this country. Of this number 19 were pending in the Court of Claims of the United States; 29 were bankruptcies and receiverships; 106 were at law or in equity actions in State or Federal courts; 163, involving cargo damage or personal injury, and 129, involving collisions, salvage, general and particular average, etc., were in courts of admiralty. Practically all of these

were actively litigated, every effort having been made during the year to dispose of the dormant cases.

In addition to the above cases, the lawyers attached to the New York office handled all public vessel cases in that jurisdiction in which other departments of the Government were interested. On June 30, 1934, there were 122 cases of this character, involving $3,707,253.71, on the New York docket.

There have been 80 cases tried or appeals argued during the year, involving $3,658,512, and of this number 42 were entirely successful. Partial success was obtained in 5 cases and in 26 cases there were adverse judgments. Seven cases were awaiting decision at the close of the fiscal year.

One of the most important cases tried during the year was the suit of the Baltimore Mail Steamship Co. against the United States, in the United States District Court of Maryland, in which the Government was successful. While the amount involved was only $10,000, this was a test case, involving the proper interpretation of section 301, Merchant Marine Act, 1928, as to the rate of interest the Government should receive on the construction loans authorized by that act.

Contracts, opinions, and claims.—All legal instruments, including contracts, mortgages, bonds, bills of sale, deeds, notes, and miscellaneous agreements were prepared by the Division, as well as agreements and other instruments in connection with construction loan and ship sales matters. Many miscellaneous contracts for supplies and leases were drafted and approved. In addition, claims not in litigation, including the details of the investigation, conferences with Insurance Division officials, underwriters, etc., have had the attention of the Division.

On June 30, 1934, claims not in litigation totaled 144, involving $81,059,040.75.

STATISTICS

Due to limitations of space, a few of the statistical statements heretofore incorporated in the annual reports of the Shipping Board will be omitted from this report, but will be furnished in mimeographed form to those making application in writing to the Director of the Shipping Board Bureau, Department of Commerce, Washington, D. C.

Summarized consolidated cash statement, by appropriations, for the fiscal year ended June 30, 1934

Code	Caption	Total	United States Shipping Board Bureau				
			Chicago World's Fair Centennial Celebration	Salaries and expenses 1932	Salaries and expenses 1933	Salaries and expenses 1934	Construction loan fund
	Unexpended balance as at June 30, 1933	$40,612,939.53	$6,340.81	$29,834.00	$38,139.20		$16,138,763.02
	Receipts:						
RA	Appropriations	310,000.00				$310,000.00	
	Sales:						
RB	Sales of vessels, tugs, and/or barges	4,931,225.64					
RC	Sales of assets other than vessels, tugs, and/or barges	58,136.58					
	Total sales	4,989,362.22					
RF	Operation of vessels revenue	44,879.69					
RH	Real-estate operation and rental revenue	581,241.47					
	Other receipts:						
RJ	Interest earned	1,044,500.15					
RL	Miscellaneous receipts	3,912,187.20				130.11	3,448,556.31
RM	Insurance premiums	1,165,470.42					
	Total other receipts	6,122,157.77				130.11	3,448,556.31
	Recovered disbursements:						
RDD	Operation of vessels expense	166,720.56					
RDE	Vessel repairs and betterments	36,004.50					
RDG	Protection and indemnity insurance expense and losses	3,139.28					
RDH	Marine insurance expense and losses	197,580.50					
RDJ	Laid-up vessels expense	43,790.87					
RDL	Real estate operation and rental expense	16,959.55					
RDO	Warehouse stores	396.15					
RDS	Appropriations returned to U. S. Treasury	3,338.65					
RDT	Miscellaneous disbursements	10,933,603.10					10,615,407.59
RDU	Administrative salaries	51,296.52				8.75	
RDV	Other general expense	67,941.34	722.60		926.00	2,808.15	
RDX	Dieselization expense	723.34					
	Total recovered disbursements	11,521,994.36	722.60		926.00	2,816.90	10,615,407.59
	Total receipts	23,569,635.51	722.60		926.00	312,947.01	14,063,963.90
	Transfer of funds	6,021,924.46					3,407,067.01
	Total	70,204,499.50	7,063.41	29,834.00	39,065.20	312,947.01	33,609,793.93

Summarized consolidated cash statement, by appropriations, for the fiscal year ended June 30, 1934—Continued

Code	Caption	Total	United States Shipping Board Bureau				
			Chicago World's Fair Centennial Celebration	Salaries and expenses 1932	Salaries and expenses 1933	Salaries and expenses 1934	Construction loan fund
	Disbursements:						
	Construction, repairs, and/or betterments:						
DC	Real estate and/or equipment	$1,054.07					
DX	Dieselization expense	85,004.33					
	Total construction, repairs, and/or betterments	86,058.40					
	Operations outgo—Vessels:						
DD	Operation of vessels expense	1,756,860.87					
DE	Vessel repairs	46,702.54					
DG	Protection and indemnity insurance expense and losses	140,482.93					
DH	Marine insurance expense and losses	997,562.68					
DI	Marine insurance premiums	13,726.73					
	Total operations outgo—Vessels	2,955,335.75					
DJ	Laid-up vessels expense	202,476.01					
DL	Real-estate operation and rental expense	290,466.00					
	Other disbursements:						
DO	Warehouse stores	14,782.11					
DS	Appropriations returned to U. S. Treasury	2,749,841.52		$29,831.46	$33,646.62	$33,220.71	
DT	Miscellaneous disbursements	610,627.64					$434,984.00
	Total other disbursements	3,375,251.27		29,831.46	33,646.62	33,220.71	434,984.00
	General administrative expense:						
DU	Administrative salaries	1,296,046.70				167,246.61	
DV	Other general expense	223,547.12	$5,031.01	2.54	5,418.58	26,001.25	
	Total general administrative expense	1,519,593.82	5,031.01	2.54	5,418.58	193,247.86	
	Refunded receipts:						
DRB	Sales of vessels, tugs, and/or barges	11,000.00					
DRC	Sales of assets other than vessels, tugs, and/or barges	11.49					
DRF	Operation of vessels revenue	1,452.19					
DRJ	Interest earned	140.65					

DRL	Miscellaneous receipts		3,809,702.93				101.31	3,448,556.31
DRM	Insurance premiums		139,926.89					
	Total refunded receipts		3,962,234.15				101.31	3,448,556.31
	Total disbursements		12,391,415.40	5,031.01	29,834.00	39,065.20	226,569.88	3,883,540.31
	Transfers of funds		6,021,924.46					
	Unexpended balance as at June 30, 1934		51,791,159.64	2,032.40			86,377.13	29,726,253.62
	Grand total		70,204,499.50	7,063.41	29,834.00	39,065.20	312,947.01	33,609,793.93

Code	Caption	United States Shipping Board Merchant Fleet Corporation							
		Operating fund	1923 claims appropriation	Liquidation fund, 1931-33	Sales receipts: Liquidation fund, 1934	Sales receipts: In suspense	Dieselization fund	Repossessed ships and trade routes	Insurance fund
	Unexpended balance as at June 30, 1933	$11,092,055.94	$386,746.00	$106,323.29			$280,133.40	$5,000,000.00	$7,534,603.87
	Receipts:								
RA	Appropriations								
	Sales:								
RB	Sales of vessels, tugs, and/or barges				$920,424.38	$4,010,801.26			
RC	Sales of assets other than vessels, tugs, and/or barges				2,020.00	56,116.58			
	Total sales				922,444.38	4,066,917.84			
RF	Operation of vessels revenue	44,879.69							
RH	Real estate operation and rental revenue	581,241.47							
	Other receipts:								
RJ	Interest earned	101,100.94			77,555.62	843,991.61			21,842.98
RL	Miscellaneous receipts	463,469.78							40.00
RM	Insurance premiums								1,165,470.42
	Total other receipts	564,570.72			77,555.62	843,991.61			1,187,353.40
	Recovered disbursements:								
RDD	Operation of vessels expense	166,720.56							
RDE	Vessel repairs and betterments	36,004.50							
RDG	Protection and indemnity insurance expense and losses	3,139.28							
RDH	Marine insurance expense and losses	149,984.32							47,596.18
RDJ	Laid-up vessels expense	43,790.87							
RDL	Real estate operation and rental expense	16,959.55							

Summarized consolidated cash statement, by appropriations, for the fiscal year ended June 30, 1934—Continued

Code	Caption	United States Shipping Board Merchant Fleet Corporation							
		Operating fund	1923 claims appropriation	Liquidation fund, 1931–33	Sales receipts		Dieselization fund	Repossessed ships and trade routes	Insurance fund
					Liquidation fund, 1934	In suspense			
	Receipts—Continued.								
	Recovered disbursements—Continued.								
RDO	Warehouse stores	$396.15							
RDS	Appropriations returned to U. S. Treasury	3,838.65							
RDT	Miscellaneous disbursements	318,195.51							
RDU	Administrative salaries	51,084.44							$203.33
RDV	Other general expense	63,484.59							
RDX	Dieselization expense						$723.34		
	Total recovered disbursements	853,598.42					723.34		47,799.51
	Total receipts	2,044,290.30			$1,000,000.00	$4,910,909.45	723.34		1,235,152.91
	Transfer of funds	1,081,216.78				6,406.82			1,527,233.85
	Total	14,217,563.02	$386,746.00	$106,323.29	1,000,000.00	4,917,316.27	280,856.74	$5,000,000.00	10,296,990.63
	Disbursements:								
	Construction, repairs, and/or betterments:								
DC	Real estate and/or equipment	1,054.07							
DX	Dieselization expense	57,771.03					27,233.30		
	Total construction, repairs, and/or betterments	58,825.10					27,233.30		
	Operations outgo—Vessels:								
DD	Operation of vessels expense	1,756,860.87							
DE	Vessel repairs	46,702.54							
DG	Protection and indemnity insurance expense and losses	140,482.93							
DH	Marine insurance expense and losses	45,612.36							951,950.32
DI	Marine insurance premiums	13,726.73							
	Total operations outgo—Vessels	2,003,385.43							951,950.32
DJ	Laid-up vessels expense	202,476.01							
DL	Real-estate operation and rental expense	290,466.00							

	Other disbursements:								
DO	Warehouse stores	14,782.11							
DS	Appropriations returned to U. S. Treasury	2,649,332.06							3,810.67
DT	Miscellaneous disbursements	169,643.64	6,000.00						
	Total other disbursements	2,833,757.81	6,000.00						3,810.67
	General administrative expense:								
DU	Administrative salaries	1,079,817.95							48,982.14
DV	Other general expense	129,191.31							57,902.43
	Total general administrative expense	1,209,009.26							106,884.57
	Refunded receipts:								
DRB	Sales of vessels, tugs, and/or barges					11,000.00			
DRC	Sales of assets other than vessels, tugs, and/or barges					11.49			
DRF	Operation of vessels revenue	1,452.19							
DRJ	Interest earned	140.65							
DRL	Miscellaneous receipts	361,045.31							
DRM	Insurance premiums								139,926.89
	Total refunded receipts	362,638.15				11,011.49			139,926.89
	Total disbursements	6,960,557.76	6,000.00			11,011.49	27,233.30		1,202,572.45
	Transfers of funds	8,640.67		41,301.01	592,472.76	4,906,304.78	56,818.25		416,386.99
	Unexpended balance as at June 30, 1934	7,248,364.59	380,746.00	65,022.28	407,527.24		196,805.19	5,000,000.00	8,678,031.19
	Grand total	14,217,563.02	386,746.00	106,323.29	1,000,000.00	4,917,316.27	280,856.74	5,000,000.00	10,296,990.63

Balance sheet as at June 30, 1934

ASSETS

A-1-1	Cash and unrequisitioned appropriations available for general purposes			$7,720,914.11
A-1-2	Cash and unrequisitioned appropriations available for operation of vessels taken back from purchasers			5,000,000.00
A-1-3	Cash, insurance fund, Merchant Marine Act, 1928			8,678,031.19
A-2	Cash, available for settlement of claims, appropriation act, fiscal year 1923			380,746.00
A-3	Cash and unrequisitioned appropriations, U. S. Shipping Board Bureau			88,409.53
A-4	Construction loan and dieselization funds			150,696,805.19
A-5	Accounts receivable		$23,069,139.20	
	Less: Accounts payable	$330,177.99		
	Claim offsets	15,609,154.53		
	Reserve for doubtful or uncollectible accounts	6,170,347.25		
			22,109,679.77	
				959,459.43
A-6	Accounts receivable due insurance fund, Merchant Marine Act, 1928			231,248.65
A-7	Notes and mortgages receivable and securities		$1,447,006.42	
	Less reserve for doubtful or uncollectible notes		179,894.03	
				1,267,112.39
A-8	Stores and supplies, reserve fleets			153,792.71
A-9	Vessels, equipment and materials			691,786.36
A-10	Land, structures, and equipment for sale			50,696.66
A-11	Surplus supplies and materials			500,635.90
A-12	Accounts and notes receivable for ship sales		$23,432,638.01	
	Less reserve for uncollectible accounts and notes		1,844,178.79	
				21,588,459.22
A-13	Real estate, ground-rent estate, and equipment			12,201,961.20
A-14	Estimated recoverable value of claims in favor of U. S. Shipping Board			179,399.38
A-15	Fleet (at appraisal value)			36,230,617.00
A-16	Deferred accounts and commitment charges			273,976.41
	Total			246,894,051.33

LIABILITIES

L-1	Accounts payable and unclaimed wages		$1,725,131.52	
	Less receivable offsets		180,177.99	
				1,544,953.53
L-2	Deposits on sales and other contracts not consummated		212,079.59	
	Less receivable offsets		150,000.00	
				62,079.59
L-3	Commitments (other than dieselization)			726,557.68
L-4	Reserve for protection and indemnity insurance claims and losses			2,813,322.39
L-5	Reserve for operating claims			2,574,000.92
L-6	Dieselization commitments and accounts payable			48,183.67
L-7	Reserve for claims settlements and accounts payable			380,746.00
L-8-1	Reserve, insurance fund, Merchant Marine Act, 1928			3,201,558.12
L-8-2	Accounts payable, insurance fund, Merchant Marine Act, 1928			325,294.59
L-8-3	Unearned premiums, insurance fund, Merchant Marine Act, 1928			357,427.13
	Reserve for operation of vessels taken back from purchasers			5,000,000.00
	Net worth as at June 30, 1934			229,859,927.71
	Total			246,894,051.33

SCHEDULE 1.—*Cash and unrequisitioned appropriations available for general purposes as at June 30, 1934*

Cash available for general purposes, before adjustment—cash in U. S. Treasury, in banks, and in transit to depositories		$9,231,191.66
Unrequisitioned appropriations, U. S. Shipping Board Bureau, 1934		14,658.77
Plus—		
Amount to be transferred from dieselization fund subsequent to June 30, 1934, representing reimbursement of net dieselization charges disbursed from operating fund		63.68
		9,245,914.11
Less—		
Amount to be transferred from operating fund subsequent to June 30, 1934, representing excess of sales receipts over liquidation expense requirements and amount transferred on June 28, 1934, to the construction loan fund		1,525,000.00
Total excess sales receipts, fiscal year 1934	$4,932,067.01	
Less amount transferred to unrequisitioned funds, U. S. Treasury construction loan fund, June 28, 1934	3,407,067.01	
	1,525,000.00	
Total cash and unrequisitioned appropriations available for general purposes as at June 30, 1934		7,720,914.11

SCHEDULE 2.—*Reconciliation of cash and unrequisitioned appropriation balances as shown by the balance sheet with treasurer's cash and appropriation statement as at June 30, 1934*

Total cash and unrequisitioned appropriation balances per treasurer's statement, June 30, 1934			$51,791,159.64
Balance sheet application of the above total:			
Cash and unrequisitioned appropriations available for general purposes		$7,720,914.11	
Operating fund	$7,125,036.85		
Liquidation fund, fiscal year 1932	13,613.21		
Liquidation fund, fiscal year 1933	51,409.07		
Liquidation fund, fiscal year 1934	407,527.24		
Engineering and development program	123,327.74		
Total	7,720,914.11		
Cash, operating contingencies fund		5,000,000.00	
Insurance fund, Merchant Marine Act, 1928		8,678,031.19	
Claims fund: Fund established by Fleet Corporation appropriation act for the fiscal year 1923		380,746.00	
U. S. Shipping Board Bureau, 1934, cash and appropriation balance		86,376.83	
Chicago World's Fair Centennial Celebration, 1933 and 1934, cash and appropriation balance		2,032.40	
Special deposit, Symbol 80051		.30	
Amount set aside for construction loan fund as authorized by sec. 11 of the Merchant Marine Act of 1920, and amendment thereto approved Mar. 4, 1927		29,726,253.62	
Amount established as a fund for the dieselization of vessels		196,805.19	
Total cash and unrequisitioned appropriations per balance sheet of June 30, 1934			51,791,159.64

SCHEDULE 3.—*Cash and unrequisitioned appropriations available for expenses of the U. S. Shipping Board Bureau as at June 30, 1934*

Cash:		
Available for salaries and expenses, fiscal year 1934	$34,573.02	
Available for printing and binding, fiscal year 1934	4,232.11	
Available for Chicago World's Fair Centennial Celebration, 1933 and 1934	1,516.96	
Special deposits, symbol 80051	.30	
Total cash		$40,322.39
Unrequisitioned appropriations:		
Salaries and expenses, fiscal year 1934	$44,571.70	
Printing and binding, fiscal year 1934	3,000.00	
Chicago World's Fair Centennial Celebration, 1933 and 1934	515.44	
Total unrequisitioned appropriations		48,087.14
Total cash and unrequisitioned appropriations, U. S. Shipping Board Bureau		88,409.53
Memorandum only:		
At the close of business Aug. 9, 1933, the total of unrequisitioned appropriations of the U. S. Shipping Board, amounted to $354,305.32 of which the following disposition was made:		
(1) Amount transferred to the Department of Commerce		255,318.97
(2) Amount taken over by U. S Treasury as follows:		
Unexpended balance, salaries and expenses, fiscal year 1932	$29,292.62	
Unexpended balance, salaries and expenses, fiscal year 1933	31,047.15	
Unexpended balance, salaries and expenses, July 1 to Aug. 9, 1933, inclusive	32,448.21	
Unexpended balance, printing and binding, fiscal year 1932	538.84	
Unexpended balance, printing and binding, fiscal year 1933	5,659.53	
		98,986.35
		354,305.32

The amount reflected by this schedule is the balance available as of June 30, 1934, of (1) amount transferred to the Department of Commerce.

The U. S. Shipping Board Bureau has no control over (2) amounts taken over by the U. S. Treasury, as all transactions thereof are handled by the General Accounting Office. A memorandum record of these transactions is kept by the special disbursing clerk of the U. S. Shipping Board Bureau, and this record reflects that as of June 30, 1934, there is a balance remaining of $90,062.41, of which $29,831.46 representing balances of the 1932 appropriations will be credited to said appropriations; and $60,230.95 is available for any expenditures incurred for the U. S. Shipping Board for the period July 1, 1932, to Aug. 9, 1933, inclusive.

Gross appropriations and allotments from inception to July 1, 1934

Item	Original appropriation	Returned to U. S. Treasury surplus or reappropriated	Net appropriation	U. S. Shipping Board	U. S. Shipping Board Merchant Fleet Corporation
For fiscal year ended prior to July 1, 1933:					
U. S. Shipping Board:					
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, and June 30, 1932	$42, 262, 116. 41	$769, 692. 33	$41, 492, 424. 08	$41, 492, 424. 08	
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; Feb. 23, 1931; and June 30, 1932, current maintenance and operations	167, 354, 250. 00	367. 70	167, 353, 882. 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)	29, 512, 426. 27	4, 524, 107. 72	24, 988, 318. 55		
Acts of Apr. 22, 1926; Feb. 11, 1927; May 16, 1928; Feb. 20, 1929; Apr. 19, 1930; Feb. 23, 1931; and June 30, 1932, operation of trade lines, expurchasers (expenditures on approval of President of the United States)	40, 000, 000. 00	40, 000, 000. 00			
Returned to U. S. Treasury as required by act of Congress June 30, 1932 (Public No. 212, 72d Cong.), sec. 306 (f) and (h), exclusive of salary impoundments		2, 138, 240. 00	*12, 138, 240. 00*		
Total U. S. Shipping Board Merchant Fleet Corporation	3, 700, 419, 676. 27	96, 098, 028. 13	3, 604, 321, 648. 14		$3, 604, 321, 648. 14
Total for fiscal year prior to July 1, 1933	3, 742, 681, 792. 68	96, 867, 720. 46	3, 645, 814, 072. 22		
For fiscal year ended June 30, 1934:					
U. S. Shipping Board:					
Act of June 16, 1933:					
Printing and binding	10, 000. 00		10, 000. 00		
All other expenses	300, 000. 00		300, 000. 00		
Total for U. S. Shipping Board	310, 000. 00		310, 000. 00	310, 000. 00	
U. S. Shipping Board Merchant Fleet Corporation:					
Act of June 16, 1933:					
Operation of trade lines, expurchasers (expenditures on approval of 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, 1934	5, 310, 000. 00	5, 000, 000. 00	310, 000. 00		

For fiscal year ending June 30, 1935:					
U. S. Shipping Board Bureau:					
Act of Apr. 7, 1934:					
Salaries and expenses	219, 216. 00		219, 216. 00		
Total for U. S. Shipping Board Bureau	219, 216. 00		219, 216. 00	219, 216. 00	
U. S. Shipping Board Merchant Fleet Corporation:					
Act of Apr. 7, 1934:					
Operation of trade lines, expurchasers (expenditures on approval of 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		5, 000, 000. 00
Total for fiscal year ending June 30, 1935	5, 219, 216. 00		5, 219, 216. 00		
Gross appropriations and allotments	3, 753, 211, 008. 68	101, 867, 720. 46	3, 651, 343, 288. 22	42, 021, 640. 08	3, 609, 321, 648. 14

[1] Loss.

NOTE.—In addition to the returns to the U. S. Treasury, as indicated above, the U. S. Shipping Board Merchant Fleet Corporation returned to the U. S. Treasury the following as required by acts of Congress: 1. Act of Mar. 20, 1933 (Public No. 2, 73d Cong.), $6,071.62 for transfer to the Department of the Interior to balance the operating budget of the building, 45 Broadway, New York City; 2. Act of June 16, 1933 (Public No. 78, 73d Cong.), $2,600,000 for transfer to the Post Office Department for meeting the cost of foreign mail contracts.

Estimated operating profit and loss fiscal year 1934

[Amounts shown in italics represent losses]

Item	Number of terminations	Estimated revenue	Estimated voyage expense	Insurance	Total expense	Profit or loss
Freighters	190		$1,870,750.00		$1,870,750.00	*$1,870,750.00*
Chartered vessels	[1] 1	$13,954.84		$6,601.63	6,601 63	7,353.21
	191	13,954.84	1,870,750.00	6,601.63	1,877,351.63	*1,863,396.79*
Inactive vessels operations					40,294.05	*40,294.05*
Administrative expense operations					337,725.02	*337,725.02*
Miscellaneous revenue		605,202.34			312,464.54	292,737.80
Total operations	191	619,157.18			2,567,835.24	*1,948,678.06*
Administrative expense, employees assigned to U. S. Shipping Board Bureau					249,871.26	*249,871.26*
Total					2,817,706.50	*2,198,549.32*

[1] Number of vessels at end of fiscal year.